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Manual on regional accounts methods

2013 edition

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Abbreviations

CFC	Consumption of Fixed Capital
COFOG	Classification of the Functions of Government
COICOP	Classification of Individual Consumption According to Purpose
CPA	Classification of Products by Activity
CPI	Consumer Price Index
EAA/EAF	Economic Accounts for Agriculture and Forestry
EFRD	European Fund for Regional Development
EIB	European Investment Bank
ESA	European System of Accounts
ESS	European Statistical System
EU	European Union
FISIM	Financial Intermediation Services Indirectly Measured
FSS	Farm Structure Survey
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GNI	Gross National Income
GOS	Gross Operating Surplus
GVA	Gross Value Added
KAU	Kind-of-Activity Unit
LFS	Labour Force Survey
NACE	Nomenclature statistique des Activités économiques dans la Communauté Européenne (European industrial activity classification)
NOS	Net Operating Surplus
NPISH	Non-Profit Institutions Serving Households
NUTS	Nomenclature of Territorial Units for Statistics
PIM	Perpetual Inventory Method
R&D	Research and Development
QAF	Quality Assurance Framework
SBS	Structural Business Statistics
SNA	System of National Accounts
VAT	Value Added Tax

Foreword

Regional accounts play an important role in the formulation, implementation and evaluation of regional policies. In particular regional indicators resulting from the regional accounts are used for assessing regional disparities. In the context of the European Cohesion Policy, regional Gross Domestic Product (GDP) is an indicator of the regional accounts by industry, used to allocate funds to eligible regions.

The regional accounts are a regional specification of the national accounts. This manual provides a combined update of the two former regional manuals 'Regional accounts methods, gross value added and gross fixed capital formation by activity' of 1995 and 'Household accounts' of 1996, in line with the European System of Accounts 2010 (ESA 2010), chapter 13, Regional accounts.

ESA 2010, chapter 13 contains basic rules, but not detailed recommendations for their practical implementation in the Member States. Such recommendations have been developed jointly by the representatives of the Member States and the Statistical Office of the European Union (Eurostat).

Compared to the former manuals new topics have been introduced. Regarding the regional accounts by industry, they concern: the A, B and C-methods; the treatment of the extra-regio territory; the volume growth rates of regional Gross Value Added; the production of units without significant input of labour; the production of ancillary units; regional estimates of employment; and earlier estimates. Regarding the regional accounts of households, they concern: an extension of the transactions to include social transfers in kind; and final consumption expenditure of private households.

This manual has two objectives. Firstly, to provide guidelines to ensure comparable, consistent and sound statistical results and secondly, to give users a better idea of the problems encountered and solutions developed, to enable an appropriate use of the regional statistical results.

Eurostat is indebted to the experts from the Members States who, as members of the Task Force, contributed to the preparation of this manual.

Introduction

1.1. Overview

Objective, reliable, consistent, relevant and harmonised regional statistical indicators provide a firm foundation for policies aimed at reducing economic and social disparities between the European regions. Regional accounts play an important role in providing such essential indicators. 'Regional accounts are a regional specification of the corresponding accounts of the national economy. Regional accounts provide a regional breakdown for major aggregates such as Gross Value Added (GVA) and household income.' (ESA 2010, par. 13.02) The name 'regional accounts' could suggest the same coverage of accounts and transactions as in the national accounts, which however is not the case. ESA 2010, Par. 13.04 sheds some light on this phenomenon:

> 'Ideally regional accounts cover the same set of accounts as national accounts, in that they make regional economic structures, developments and differences visible. However, due to specific conceptual and measurement problems they are usually more limited in scope and detail.'

For instance, because of the administrative burden it is almost impossible for enterprises and statistical offices to collect data on imports from and exports to other regions. Examples of conceptual problems are the regional allocation of financial transactions of enterprises with establishments in several different regions or the regional allocation of collective consumption of general government. Allocating these transactions to regions based on assumptions would be highly questionable.

The 'System of National Accounts 2008' (SNA 2008) draws the conclusion that 'these conceptual difficulties partly explain why no country establishes the complete SNA accounts for every region.' (SNA 2008, par. 18.51)

For these reasons, the EU confines the regional accounts to regional accounts by industry and regional household accounts.

Regional accounts by industry aim to describe production processes in regions including the statistical description of production processes of economic entities settled in the regions, with their inputs, outputs, GVA, Gross Domestic Product (GDP), compensation of employees, and employment involved in production. The accounts also describe Gross Fixed Capital Formation (GFCF) by industry.

The EU regional accounts of households are limited to income distribution and redistribution together with income spending.

Regional accounts generally make use of the concepts of the national accounts, though there are issues at regional level for which additional compilation rules have to be developed. The main issues are addressed in chapter 13 of ESA 2010, but not practically specified.

This manual defines the general methodology of the regional accounts and provides practical guidelines for the implementation of the methodology within the framework of ESA 2010.

1.2. Use of regional accounts for policy and analysis

The use of regional accounts is widespread. It ranges from the European Union to ministries and local governments responsible for regional policy. The accounts are also used by universities, enterprises, the media and the general public.

Data from the regional accounts are used for many purposes. They provide data for:

European Union regional policy and analysis:

— Monitoring the eligibility of regions lagging behind, based on the indicator GDP per head of the population (Economic and Social Cohesion). Council regulation 1083/2006 on the Structural Funds states in Title I, chapter III, Article 5, point 1 on the Convergence objective: 'The regions eligible for funding from the Structural Funds under the Convergence objective shall be regions corresponding to level 2 of the common classification of territorial units for statistics (hereinafter NUTS level 2) within the meaning of Regulation (EC) No 1059/2003 whose gross domestic product (GDP) per capita, measured in purchasing power parities and calculated on the basis of Community figures for the period 2000 to 2002, is less than 75 % of the average GDP of the EU-25 for the same reference period.' [1]

— Monitoring regional economic growth related to job creation and GFCF (The Europe 2020 Strategy), for example, which regions contribute most to national economic growth, and why?

— Monitoring the development of regional labour productivity, which is relevant for overall growth against the background of an aging population of the EU (The Europe 2020 Strategy).

— Monitoring regional employment rates as an indicator of labour participation (The Europe 2020 Strategy).

— Monitoring the development of regional adjusted disposable income of households and their actual individual consumption and saving, to identify changes in disparities of regional welfare.

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[1] Article 5, points 2 and 3 also state: 'The Member States eligible for funding from the Cohesion Fund shall be those whose gross national income (GNI) per capita, measured in purchasing power parities and calculated on the basis of Community figures for the period 2001 to 2003, is less than 90 % of the average GNI of the EU-25 and which have a programme for meeting the economic convergence conditions referred to in Article 104 of the Treaty. Immediately following the entry into force of this Regulation, the Commission shall adopt the list of regions fulfilling the criteria under paragraph 1 and of Member States fulfilling the criteria under paragraph 2. This list shall be valid from 1 January 2007 to 31 December 2013.'

Central government and national planning offices of Member States for both regional policy and analysis:

— Informing regional policy by highlighting regions lagging behind. The policy measures include investment in infrastructure and support of investment in enterprises with effects on the regional economies and labour markets (impact studies).

— Regional labour productivity studies.

— Analysis of the contribution of regions to the national aggregates.

— Analysis of the specialisation of the regions.

— Analysis of the role of regions for each industry.

Regional and local government for both regional policy and analysis:

— The size and autonomy of regions within the European Union differ between countries. More autonomous regional governments need almost the same information as central government.

— Studies utilising regional accounts data generally rank the position of regions within the country or the European Union.

Universities, research institutions and schools, mainly for analysis:

— Impact studies.

— Regional labour market studies.

— Analysis of the specialisation of the regions.

— Analysis of the role of regions for each industry.

Enterprises:

Studies by enterprises about where to establish their head offices or production plants require, amongst other things, information on the availability of supply industries, service industries, the labour market situation and their consumers.

1.3. Relevant statistics

1.3.1. Regional accounts, a sub-system of national accounts

ESA 1995 was the first ESA manual to devote a chapter to regional accounts. SNA 1993 also devoted some paragraphs to regional accounts (19.88-19.96). ESA 1995 stated that the 'regional accounts are a regional specification of the corresponding accounts of the total economy' and SNA 1993 also assumed that implicitly. ESA 2010 reiterated the close relationship of regional accounts with national accounts concepts and SNA 2008 implicitly assumes this relationship.

The national accounts describe the behaviour of institutional units and the activities in which they engage, namely production, consumption and accumulation of assets. Residence of the institutional units in the country is fundamental to the allocation of the activities to the country.

These statistical concepts are also the basis for the regional accounts. The description of the economy of a region is, like in the national accounts, based on institutional units located in the region with their activities, such as production, consumption and capital formation.

There are practical and conceptual problems when describing a regional economy. Regional accounts of households in principle require some additional guidelines, although the national accounts concepts almost fully apply. For example, it is necessary to clarify some aspects of regional accounts of households, such as the allocation of income and consumption of students studying in regions other than their home region.

There are examples of regional economic phenomena where guidelines additional to national accounts practices are necessary. These additional guidelines concern mainly regional accounts by industry:

— A general problem for the accounts by industry is that enterprises may consist of several establishments in different regions within the country. For instance, there may be a head office in one region (often in urban areas) and production establishments in other regions (often in more peripheral regions). In such a case each of the establishments of the institutional unit should have to provide information on output, intermediate consumption and thus value added which in practice is not the case. Allocating all value added to the head office or a kind of quasi-regio would be a solution, however a solution that does not reflect the activities of the establishments in the region and one which would destroy the relationship of these establishments with the regional labour market, other establishments in or outside the region and the resident households with their income and consumption. Additional guidelines for regional accounts are required to reflect the real economic situation.

— Another general problem is the existence of the extra-regio territory. It mainly concerns activities of mineral exploration and extraction by enterprises at the continental shelf and activities of government agencies in the rest of the world (embassies, consulates, military bases, scientific bases, etc.). In national accounts the activities of these units are part of the national economic territory. The question here is where to allocate these activities. In practice, most of the statistical offices did not allocate these transactions to the extra-regio territory because the transactions were not applicable or were thought of no importance or data were not available. In many

countries the transactions were allocated to the main-land, often the city where central government resided. The extra-regio territory appears as an additional region in the regional accounts by industry.

— Enterprises may have large capital-intensive production units in a region and a distribution network of pipelines and cables or a wireless network which may cross regional boundaries. Examples are enterprises that distribute electricity or gas, refineries that distribute fuel via pipelines, and telephone companies that provide their services via cables or wireless networks, not only to the region where they are located but also to other regions. This is a conceptual problem for which guidelines are necessary to ensure internationally comparable results.

— Enterprises in construction may not only build houses, buildings, bridges, roads, etc. in the region where they are settled, but also in other regions. The concept in regional accounts is clear; it should be allocated to the region of the building site for projects of a year or longer. The practical implementation, however, depends largely on available statistical sources.

— Railway enterprises consist of head offices, stations, workplaces for the repair of trains or tracks, signal boxes, railway lines, each of which has a regional dimension. In this case ancillary units are of importance. The complex problems here are partly practical and partly conceptual. The conceptual problem concerns the allocation of the net operating surplus of the railway enterprise to its establishments in different regions. The practical problem concerns the availability of regional indicators, such as consumption of fixed capital. For both problems, additional guidelines are necessary.

— There may be units without significant input of labour. Typical examples are units for energy production (windmills, gas and oil extraction), unstaffed petrol stations and telecommunication networks for mobile phones. One must consider where to allocate these activities. These cases differ from the example of the railway enterprises as there are no establishments with labour input. The conceptual question here is whether value added should be linked to capital productivity.

— Last but not least, many source data are based on samples designed for national and not for regional purposes. The only way to estimate regional accounts data is the use of regional indicators and small area estimates. The manual will focus on a correct use of regional indicators.

1.3.2. Regional Gross Value Added (GVA) and regional Gross Domestic Product (GDP)

Regional accounts by industry are a regional specification of the corresponding accounts of the nation. These accounts make use of the concepts and classifications used for the national accounts. Regional GVA and regional GDP are the main economic indicators resulting from these accounts.

Regional GVA can be defined from two perspectives: the production approach, and the income approach. The former may be defined in current prices and in prices of the previous year. There is a third method, the expenditure method, which cannot be applied for practical reasons, e.g. the absence of data on imports and exports between regions.

Using the production approach, GVA can be defined as follows:

> Regional GVA at basic prices by industry is equal to the difference between output (at basic prices) and intermediate consumption (at purchasers' prices).

Using the income approach, GVA can be defined as follows:

> Regional GVA at basic prices by industry is equal to the sum of other taxes less subsidies on production, wages and salaries, employers' social contributions, consumption of fixed capital and net operating surplus.

Regional GDP can be defined as regional GVA plus taxes on products less subsidies on products.

The industry classification is based on NACE Revision 2 (see Annex 1a).

1.3.3. Regional labour data

Regional accounts by industry focus, in addition to regional GVA and GDP, on labour input and related labour costs. This information will generally be collected from enterprises or government administrations. This implies that labour input also includes non-residents who work for resident regional production units (i.e. domestic concept). The regionalisation of the labour data is based on the same concepts as for the regional allocation of production and is therefore closely related.

It is quite obvious that developments of the regional labour market are closely related to developments in production activities. One of the top priorities for all governments is to keep unemployment as low as possible. An important instrument is creating and stimulating economic activities in regions and thus stimulating employment. That is why growth of employment is highly relevant.

1.3.4. Regional Gross Fixed Capital Formation (GFCF)

Fixed capital formation is the expenditure on produced tangible or intangible assets that are used in the production process for more than one year.

GFCF consists of producers' acquisitions less disposals of fixed assets:

— Acquisitions less disposals of tangible fixed assets consisting of:

- Dwellings and non-residential buildings.
- Civil engineering works.
- Transport equipment.
- Machinery, equipment and computers.
- Cultivated assets (trees and livestock).

— Acquisitions less disposals of intangible fixed assets consisting of:

- Mineral exploration.
- Computer software.
- Entertainment, literary or artistic originals.
- Other intangible fixed assets.

— Major improvements to land (reclamation, land consolidation and preparing land for building).

— Fixed capital formation also includes:

- Work in progress of construction, such as unfinished dwellings, non-residential buildings and civil engineering works. These are recorded as fixed capital formation of the client.
- Military structures and equipment, similar to those used by civilian producers, such as airfields and hospitals.
- Improvements to existing fixed assets that go well beyond the requirements of ordinary maintenance and repairs.
- Transfer costs of fixed assets, such as conveyance fees and costs made by real estate agents, architects and notaries.

The registration of fixed capital formation by industry and sector is on an **owner basis**. That means that fixed capital formation is assigned to the industry and region which can be considered the economic owner of the capital goods concerned. Fixed assets owned by a multiregional unit are allocated to the establishments where they are used.

As in national accounts fixed assets obtained through operational leasing are recorded in the region of the owner and those through financial leasing, in the region of the user.

1.3.5. Regional sector accounts of households

The regional sector accounts of households are a regional specification of the corresponding national accounts based on the households that are resident in the regional territory (ESA 2010, par. 13.51). With few exceptions the rules for determining the residence of households at the national level also apply to the regional accounts of households.

The household sector (S.14) covers individuals or groups of individuals as consumers and possibly also as entrepreneurs producing market goods and non-financial and financial services (the unincorporated enterprises). It also includes individuals or groups of individuals as producers of goods and non-financial services exclusively for their own final use.

The principal resources of these units are derived from compensation of employees, property income, transfers from other sectors, the receipts from the disposal of market products, or the imputed receipts from the output of products for own final consumption.

The main accounts and balancing items are:

— The allocation of primary income account of households with primary income (B.5) as the balancing item.

— The secondary distribution of income account of households with disposable income (B.6) as the balancing item.

— The redistribution of income in kind account of households with adjusted disposable income (B.7) as the balancing item.

— The use of disposable income account of households with final consumption expenditure (P.3) as an important variable, and saving (B.8) as the balancing item.

— The use of adjusted disposable income of households with actual final consumption expenditure (P.4) as an important variable, and saving (B.8) as the balancing item.

The balancing items can be gross or net of **consumption of fixed capital (P.51c)**.

The regional accounts of households enable inter-regional comparison of the main transactions in which households are involved. They present differences in the way in which income is generated in the different regions and regional levels of households' disposable income and saving. They are therefore a useful tool for policy-makers working at the regional level in both the Member States and the EU.

However, one has to bear in mind that disposable income of households only describes part of a country's disposable income of all sectors. The share of household disposable income in total disposable income varies across the EU Member States, complicating the inter-country comparison of regional disposable income and consumption. The inclusion of social transfers in kind improves international comparability, though institutional differences remain between the Member States which affect the comparability of regional adjusted disposable income. For example, in 2010 the share of net adjusted disposable income of households and non-profit institutions serving households in net disposable income of the total economy was 88 per cent for Germany and 76 per cent for the Netherlands.

1.4. Historical background ([2])

The Treaty of Rome of 25th March 1957 recognised the regional dimension when establishing the European Investment Bank (EIB). The task of the EIB was amongst others facilitating 'projects for developing less developed regions'.

An important moment for the regional policy of the European Communities was the proposal for a regulation of the Commission to the Council dated October 1969. In this proposal the need for regional development programmes and effective financial means to stimulate the creation of the development programmes were discussed.

In February 1971 the Council accepted the third economic policy programme for the medium term. This programme underlined the responsibility of the Member States and the European Community to deal with a number of regional problems of general concern, to reach a balanced development of the Community. Also, priorities for regional policy were set in the proposal. It regarded regions lagging behind in economic development (the so-called objective-1 areas) and regions faced with a decline in previously dominant economic activities in the region (the later so-called objective-2 regions).

The political programme resulted in 1975 in a regulation concerning the European Fund for Regional Development (EFRD) and an adjustment to the regulation in 1980. This fund aimed at improving the regional balance within the Communities.

In this climate, favourable for the development of the regional accounts, a first meeting about 'Economic accounts and statistical indicators at the regional level' took place in 1970 between representatives of the statistical offices of the six Member States and Eurostat. In this meeting the need for mutual comparability was emphasised because of the big differences in available information and in the methodologies used.

According to Eurostat, regional input-output tables, compiled by Statistics Netherlands for 1960 and 1965, could serve as a good framework for the development of co-ordinated and related regional statistics. Beside these, regional indicators had to be developed. The indicators had to make possible to assess the regional economic developments and the economic and social differences between the regions of the European Community.

Three indicators were considered to be important: GVA, consumption expenditure of households and GFCF. Eurostat stipulated the fit between the indicators and similar variables in the regional input-output tables. The indicators had to be compiled annually, in the first instance at an

aggregated regional level comparable with the later NUTS 2 level and in a later stage for smaller areas corresponding to the later NUTS 3 level (Eurostat, 1974 ([3])). The Nomenclature of Territorial Units for Statistics (NUTS) provides a single uniform breakdown for the production of regional statistics for the EU at specific geographical levels.

The NUTS classification was established by Eurostat in the early 1970s as a single, coherent system for dividing up European Union territory in order to produce regional statistics for the EU. The NUTS classification has been used in EU legislation since 1988 ([4]), but it was only in 2003, after three years of preparation, that a European Parliament and Council Regulation on NUTS was adopted ([5]). Since that time, any changes within Member States relating to, for instance, local authority boundaries, need to go through a formal process of application to the EU, with any changes being implemented at the end of pre-set periods of enforced stability.

From the further discussions in the period 1970–1972 we can see an agreed preference for the development of regional indicators instead of regional input-output tables. These indicators were: 'employment, new GFCF and value added, in all cases classified by industry.'

The regional policy of the European Union (EU) around and after 1985 had a tremendous impact on the development of the regional accounts. In that period a series of regulations was adopted, regarding for instance, the regulations concerning the European Regional Development Fund, the European Social Fund and a regulation concerning the tasks of the Structural Funds. The latter regulation explicitly defines regions lagging behind. These are regions at NUTS 2 level for which the GDP per capita, and differences in purchasing power parities, remains under 75 per cent of the average of the EU. This was the first time that GDP per region was included in an EU regulation. Regions that met this criterion were eligible for substantial financial aid from the Structural Funds.

This regulation was followed by a regulation concerning the European System of Accounts (ESA 1995). ESA 1995 served as the methodological basis for the compilation of comparable national and regional accounts for the Member States of the EU. The regulation also specified which statistical data the Member States have to provide.

For the regional accounts, it concerned the provision of data concerning GVA, employed persons, compensation of employees and GFCF. Simplified regional accounts of households at NUTS 2 level became obligatory, with disposable

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([2]) This paragraph is based on 'Century of statistics', Statistics Netherlands 1999. Chapter 10, Data for regional economic policy: forty years of regional accounts by Bas de Vet.

([3]) Work document for the meeting of the workgroup 'Economic aggregates and Statistical indicators at Regional Level' at 15 and 16 January 1974.
([4]) Council Regulation (EEC) No 2052/88 on the tasks of the Structural Funds: OJ L 185, 15.7.1988.
([5]) Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003 on the establishment of a common classification of territorial units for statistics (NUTS).

income of households per capita as the most important indicator. The increasing importance of the regional structural policy for the EU appears not only from the regulations, but also from the allocation of substantial financial resources. Of the total budget of the EU available in 1993, 31 per cent was spent on structural measures. For the period 2007–2013 it had grown to 36 per cent.

The growing importance of the regional policy of the EU and its financial consequences led to an increasing need for comparable regional data from the Member States. Because of this, Eurostat promoted the development of new methodologies improving the comparability of the data. Methodology was on the agenda of many meetings at Eurostat in the period 1990–1996. This led to the development of a harmonised methodology of regional accounts.

During the first decade of the 21st century the focus of the regional accounts was on quality and methodological issues such as volume growth rates, earlier estimates for key variables and the treatment of new technological phenomena such as the appearance of production units without significant input of labour (e.g. telecommunication networks for mobile phones).

1.5. 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 the regional level. Therefore, ESA 2010 specifies a limited system of regional accounts. This covers some aggregates by industry and simplified accounts of households. The new regional chapter 13 in the revised ESA 2010 provides the main issues regarding concepts, principles and methods. Chapter 13 covers some new items, such as:

— Production activities without significant labour input.

— The allocation of FISIM to user industries.

— Volume growth rates of regional GVA.

Chapter 13 of ESA 2010 will be supplemented by this manual giving more practical guidance on the compilation of regional accounts by industry and regional household accounts. The regional accounts by industry comprise: regional GVA, total employment, employees, compensation of employees and regional GFCF. Special attention will be given to the volume growth rates of regional GVA. Regional accounts of households focus on primary and (adjusted) disposable income of households and (actual) final consumption expenditure.

1.6. Methods

Methods vary between Member States because they are determined by the type of data available and the organisation of the national statistical system.

Nevertheless, different methods can produce comparable results. For example, output and income data can both produce valid measures of GVA. Of course there is always room to harmonise and improve methods of compiling the data, in particular where data are incomplete. In such cases regional indicators might be used to allocate a national variable to regions. The extent to which an indicator reflects the variable to be measured is a topic that will also be discussed in this manual.

More fundamentally, some national accounts concepts can be interpreted in different ways at regional level and principles have to be developed to deal with multiregional enterprises.

The ESA 2010 regional chapter 13 develops the interpretation of some national accounts concepts at regional level. This should lead to greater comparability between the Member States.

1.7. Quality ([6])

Eurostat's aim is to provide the European Union with a high quality statistical information service. Accordingly, quality considerations play a central role with regard to Eurostat corporate management as well as day-to-day statistical operations.

With the adoption of the European Statistics Code of Practice, Eurostat and the statistical authorities of the EU Member States have committed themselves to an encompassing approach towards high quality statistics. The Code of Practice builds upon a common European Statistical System (ESS) definition of quality in statistics. It targets all relevant areas from the institutional environment, the statistical production processes to the output of statistics.

Quality reporting presents information on the quality of the Eurostat products as well as on tools and standards for quality reporting agreed within the European Statistical System.

The Eurostat Quality Assurance Framework (QAF) ([7]) is embedded in Total Quality Management and describes the tools and procedures put in place to ensure that the statistics produced are of high quality. In this manual the focus is on statistical outputs, which are covered by principles 11 to 15 of the Code of Practice.

([6]) Reference to the *European statistics code of practice*, Eurostat, 2005 and the European Statistic Systems Committee, Eurostat 2011 for an update of the Code of Practice.
([7]) See the Eurostat website, the item 'quality and selected ESS practices'.

For the purpose of the QAF, the quality of statistical outputs is assessed against six criteria:

— Relevance.

— Accuracy and reliability.

— Timeliness and punctuality.

— Accessibility and clarity.

— Comparability.

— Coherence.

This manual focuses on accuracy and reliability, timeliness, comparability and coherence. It concentrates on the regional accounts methodology, but other aspects must not be forgotten. Accuracy of the source data is often outside the control of the statistician responsible for the regional accounts. So coordination with other statisticians is also a key issue for the regional accounts. Accuracy of the regional accounts estimates (A, B and C-methods) will be discussed in par. 3.9.

1.8. Scope of the manual

This manual is intended to help regional statisticians to produce figures which provide a firm foundation for regional policy. The manual should also help users to better understand the figures and to use them more appropriately.

General basis for
regional accounts

2

2.1. Introduction

This chapter explores the general principles to be adopted in measuring the GVA and GFCF of the production units resident in a given region. This chapter also discusses the general principles of measuring primary and disposable income, final consumption expenditure and saving of households.

The first step is to define the regional territory, the Nomenclature of Territorial Units for Statistics (NUTS) and the main approach to regionalisation (par. 2.2).

Secondly the role of the statistical units will be discussed. Regionalisation can be seen from the point of view of the units resident in the region and their activities. It can also be seen from the point of view of activities in a region regardless of the economic agents involved. The first approach is denominated as an institutional approach. Following the institutional approach of the national accounts, the next step clarifies the role of the economic agents in the region. For the regional accounts by industry these are the establishments of the enterprises and for the regional accounts of households these are the private households. The many different forms of statistical units and their different characteristics will be discussed in detail (par. 2.3).

Thirdly the methods of regionalisation will be discussed (see chapter 3). The focus will be on data requirements and related methods of regionalisation, which could be bottom-up, top-down or mixed methods. From an accuracy point of view, a ranking of preferred methods can be given. Users need more timely data, so final and provisional estimates will also be discussed. The revisions to the provisional estimates are an important quality indicator. It will be shown that the provisional estimates of the national accounts play an important role in revisions to regional estimates.

Fourthly the general principles and methods will be discussed for regional GVA by industry in current prices and in prices of the previous year (see chapters 4–6).

Fifthly the general principles and application of the regional allocation of GFCF by industry will be discussed in chapters 7 and 8. Employment and compensation of employees will be discussed in chapter 9 and the regional accounts of households in chapter 10.

The differences in approach between Member States may appear large at first sight. But diverse methods can produce equally valid and comparable results. Also on closer examination, the actual methods of compilation are often remarkably similar at a detailed level. For example, wages and salaries are the key determinant of GVA in several industries in both output- and income-based methods.

2.2. Economic territory

2.2.1. The regional territory

The economic territory of a country is unambiguously defined in ESA 2010 (2.05). A regional economy of a country is part of the total economy of that country. The total economy is defined in terms of institutional units and sectors. It consists of all the institutional units which have a centre of predominant economic interest within the economic territory of a country (see ESA 2010, par. 2.04). The economic territory does not coincide exactly with the geographic territory (see ESA 2010, par. 2.05). The economic territory of a country is divided into regional territory and the extra-regio territory. The former consists of that part of the economic territory of a country that is directly assigned to a region, including any free zones and bonded warehouses. The latter is made up of parts of the economic territory of a country which cannot be assigned to a single region.

2.2.2. The extra-regio territory

The extra-regio territory consists 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 exclaves (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, e.g. 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 (see ESA 2010, par. 13.09 to 13.11).

2.2.3. The Nomenclature of Territorial Units for Statistics (NUTS)

The Nomenclature of Territorial Units for Statistics (NUTS) provides a single uniform breakdown of the economic territory of the European Union ([8]).

The NUTS classification is a hierarchical system for dividing up the economic territory of the EU for the purpose of:

— The collection, development and harmonisation of EU regional statistics.

— Socio-economic analysis of the regions.

— Framing of EU regional policies.

([8]) As defined by Regulation (EC) No. 1059/2003 of 26 May 2003 and its subsequent amendments.

2.2.4. Residence and territory concepts and commuting

Economic transactions of both enterprises and households may cross regional boundaries. For instance, transport services and energy supply can consist of moving goods between two or more regions. Employees can earn their wages or salaries in a region different from their home region and households can spend part of their income outside the resident region. Enterprises may also operate in more than one region, either at permanent sites or on a temporary basis, e.g. builders may undertake work in different regions. Therefore a clear principle is needed to help Member States to consistently allocate this interregional activity to a region.

The residence concept

The general principle for regional accounts is that transactions should be allocated to the region where the production unit or household is resident (see ESA 2010, par. 2.01, 2.04 and 13.24).

Par. 2.01: 'The economy of a country is a system whereby **institutions and people interact** through exchanges and transfers of goods, services and means of payments, (e.g. money), for the production and consumption of goods and services. In the economy, the units interacting are economic entities that are capable of owning assets, incurring liabilities and engaging in economic activities and in transactions with other entities. They are known as institutional units. Defining the units used in national accounts serves various purposes.

First, **units are the essential building blocks** in defining economies in **geographical terms, e.g. nations, regions**, and nation groupings such as monetary or political unions.

Second, they are the essential building blocks for grouping units into institutional sectors.

Third, they are essential for defining which flows and stocks are recorded. Transactions between various parts of the same institutional unit are in principle not recorded in the national accounts.'

Par. 2.04: 'The units which constitute the economy of a country and whose flows and stocks are recorded in the ESA are those which are resident. The residence of each institutional unit is the economic territory where a unit has its centre of predominant economic interest. These units are known as resident units, irrespective of nationality, irrespective of legal form, and irrespective of presence on the economic territory at the time they carry out a transaction.'

The residence principle implies for instance that GVA from transporting goods across several regions will not be partitioned between the regions, but allocated to the region where the production unit is resident. An example for households is that household expenditures in another region will be allocated to the region of residence of the household.

Another consequence is that value added of enterprises with establishments in more than one region will be allocated to the regions where the establishments are located and will not be allocated entirely to the head office or administrative address of the enterprise.

The territory concept

An alternative concept, which is generally not applied in the national and regional accounts, would be strictly territorial. This concept implies that activities are allocated to the territory where they actually take place, regardless of the residence of the units involved in the activity.

Though the residential approach takes precedence for the regional allocation of transactions of resident units, ESA 2010, par. 13.21 seems to give some limited scope for the application of the territorial approach. This occurs where notional units are created for land and buildings in the region or country in which the land or buildings are located. This is based on ESA 2010, par. 2.11, which states: 'All units in their capacity as owners of land and/or buildings that form part of the economic territory are resident units or notional resident units of the country in which the land or buildings in question are located' and ESA 2010, par. 2.49: 'Non-financial corporations include notional resident units which are treated as quasi-corporations'.

In the hypothetical case where units resident in a region only have activities within their regional territory, the residence concept coincides with the territory concept. This is also the case for the regional allocation based on notional units created for land and buildings and for unincorporated enterprises in other countries or in regions that are different from the region of residence of the owner.

The main question remains whether production activities without significant labour input at a fixed location (e.g. windmills, the extraction of oil and gas, internet hubs, telecommunication networks particularly for mobile phones) and utilities that are split into infrastructure and operation should be regarded as notional units. This will be discussed in par. 2.3.1.5, 'Units without permanent labour or fixed location'.

Commuting

Commuting can cross national boundaries but is more common between regions, particularly for smaller regions and around metropolitan centres. In the EU there are many of these metropolitan areas, such as: Bratislava, Brussels, Hamburg, Ile de France (Paris), Inner London, Lisbon, Luxembourg, Madrid, Milan, Prague, Rome, Utrecht, Vienna and Warsaw.

Commuters can be employees or self-employed. According to the residence principle, commuters contribute to GVA in the country and region in which the establishment where they work is resident. Thus the regional estimates for labour

costs reflect the wages and salaries at the place of work and not at the dwelling place of the employees or self-employed. As a result, commuting affects the interpretation of GVA and GDP per head of the population. Net commuter inflows into regions increase production beyond that possible by the resident active population. GDP per capita appears relatively high in regions with net commuter inflows and relatively low in regions with net commuter outflows (see ESA 2010, par. 13.45).

2.3. Selection of units

2.3.1. Statistical units and residence in the case of industries

2.3.1.1. Introduction

A feature of the system is the use of types of unit corresponding to three ways of subdividing the economy (ESA 2010, par. 2.03):

a. To analyse flows and positions, it is essential to select units which make it possible to study behavioural relationships among economic agents.

b. To analyse the process of production, it is essential to select units that bring out relationships of a technological-economic nature, or that reflect local activities.

c. To allow regional analyses, units that reflect local kinds of activity are needed.

Institutional units are defined to meet the first of these objectives. Behavioural relationships as described in (a) require units reflecting all of their institutional economic activity. The production processes, technological-economic relationships and regional analyses of (b) and (c) require units such as **local kind-of-activity units (local KAUs).**

Two types of unit are distinguished for the national economy. Firstly, records for the **institutional unit** reflect flows affecting income, capital and financial transactions, other flows and balance sheets. **Enterprises** are an example of an institutional unit. A characteristic of enterprises is that they can engage in production activities at more than one location, and for regional accounts it is necessary to allocate the activities to location. Where enterprises are partitioned by location, the partitioned parts are called **local units**.

Institutional units can be classified on the basis of economic activities, describing the economy's production activities by industry. This results in **heterogeneous industries**, as many enterprises have substantial secondary activities that are different from their principal activity. It also results in some industries having the principal product of the industry as a small proportion of total output. In order to obtain groups of producers whose activities are more **homogeneous** in terms of output, cost structure and technology

of production, **enterprises** are partitioned into smaller and more homogeneous units. These are called **kind-of-activity units (KAUs)**.

The local kind-of-activity unit (**local KAU**) is the part of a **KAU** which corresponds to a **local unit**. When a KAU is engaged in production activities in several regions, the information on the KAU is split in order to obtain regional accounts.

Secondly, records for the local KAU show flows occurring in the process of production and in the use of goods and services (ESA 2010, par. 13.13). For regional accounts, depending on the size of the regional level, two types of **institutional units** can be distinguished: **Uniregional units** and **multiregional units**.

2.3.1.2. Uniregional units

Uniregional units are units for which the centre of predominant economic interest is in one region.

Examples of uniregional units are: households; unincorporated enterprises; corporations whose **local KAUs** are all located in the same region; most local and regional governments; part of social security; and some non-profit institutions serving households (NPISH). All their transactions are allocated to the region in which they are resident.

2.3.1.3. Multiregional and heterogeneous units

Multiregional units are units for which the centre of predominant economic interest is in more than one region. Corporations and NPISH are examples of units which can span regions. Other examples are institutional units whose activities span the whole country, such as central government and a small number of corporations exercising monopolies or near-monopolies.

With regard to available data for regionalisation of activities of industries, two main possible situations can be distinguished:

1. Full data for the local KAUs can be provided. No problems arise; the compilation of aggregates by industry and their correct regional allocation is straightforward.

2. Full information exists only at enterprise level. The regional data have to be estimated for all enterprises or KAUs with local KAUs in different regions.

2.3.1.4. Ancillary units and activities

If an establishment undertaking only ancillary activities is statistically observable, in that separate accounts for the production it undertakes are readily available, or if it is in a geographically different location from the establishments it serves, it is recorded as a separate unit and allocated to the industrial classification corresponding to its principal activity, in both national and regional accounts. In the
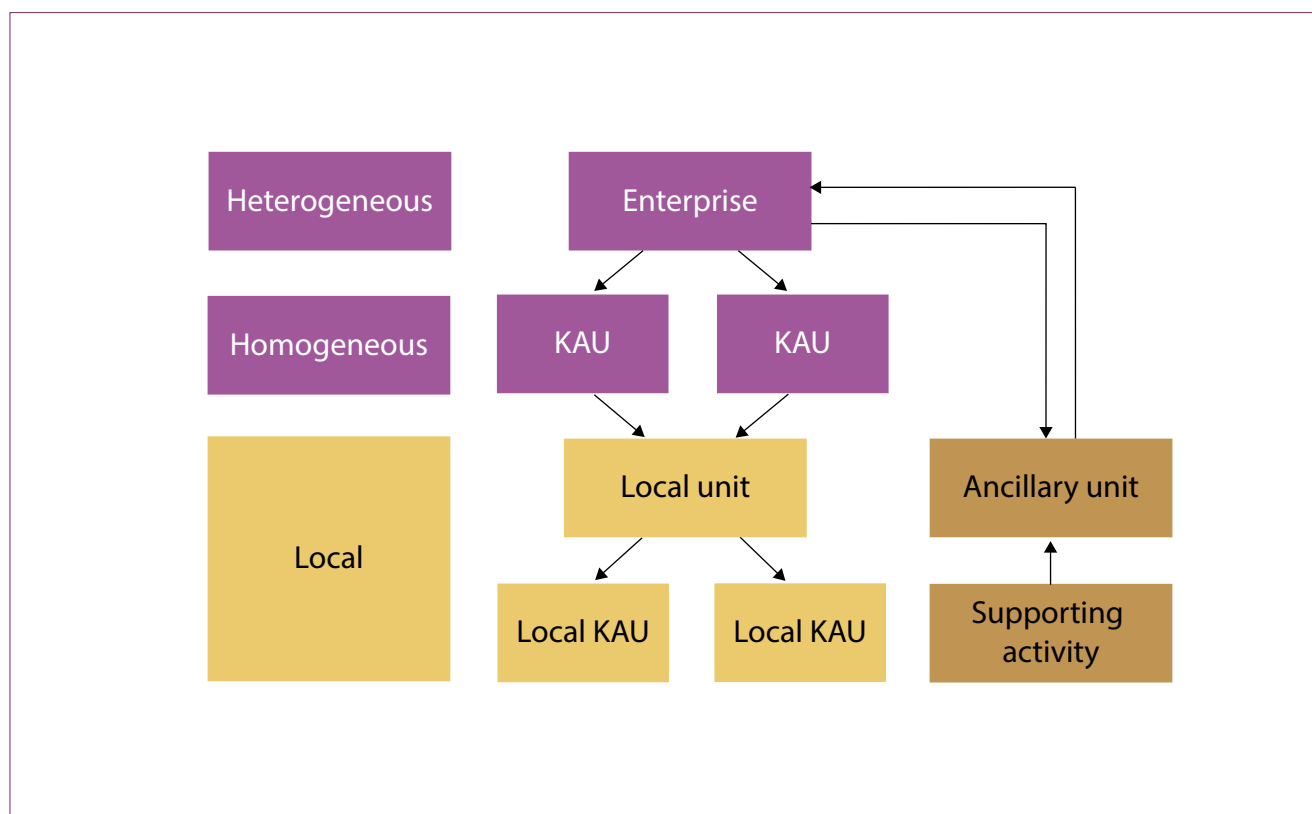
absence of suitable basic data being available, the output of the ancillary activity is estimated by summing costs (see ESA 2010, par. 1.31 and 13.23).

Production transactions between local KAUs which belong to the same institutional unit and which are located in different regions are recorded. However, no delivery of ancillary output between local KAUs is recorded, unless it is observable (see ESA 2010, par. 1.31 and 13.23). This implies that deliveries of principal or secondary output between local KAUs are only recorded, so far as this is practiced in national accounts.

2.3.1.5. Units without permanent labour or fixed location

When defining a **local KAU** there are three distinct cases (see ESA 2010, par. 13.21):

a. A production activity with significant labour input at a fixed location. Significant labour input, in this context, is at a minimum the yearly equivalent of one person regularly working half a day. Capital productivity is probably high in these cases and has to be reflected in the regional data.

b. A production activity without significant labour input at a fixed location is generally not to be considered as a separate local KAU and the production should be attributed to the local unit responsible for managing this production. However, there may be some exceptions to this case, examples being windmills, the extraction of oil and gas, internet hubs and mobile phone networks. These production activities may be located in one region and fully managed in a different region. This case will be discussed below.

c. For a production activity without a fixed location the concept of residence (see ESA 2010, par. 2.04) at the national level is applied. For example, major construction projects undertaken by contractors from other regions are registered as a separate local KAU. Examples of major construction projects are building bridges, dams and power stations, which take a year or more to complete and are managed through a local site office. For construction projects of less than a year, the residence of the parent construction company is used to allocate the production by region.

GFCF in fixed assets should be recorded in the same region as the associated output and value added. The sites may or may not be considered as notional units. The main problem is acquiring regional indicators that reflect the output of these (notional) 'units'. This is especially the case in the construction industry.

Discussions in the taskforce produced the following conclusions.

For GFCF and GVA the following rules apply:

1. GFCF and GVA have to be measurable in practice.

2. GFCF must be used for production for more than one year.

3. Tools which are not considered as GFCF are included in intermediate consumption.

4. GFCF will be allocated to regions according to the owner principle, i.e. where the owner uses the capital goods.

5. GVA and associated GFCF should be allocated to the same region.

6. Regarding insignificant activities, no notional unit will be distinguished. This implies that both GFCF and GVA are allocated to the local units which manage the activity.

On the basis of these principles we arrive at the following conclusions:

1. Windmills, plants for solar collection and the extraction of oil and gas fall within rules 1, 2, 4 and 5. Some observations (and probably practical limitations) can be made:

   — There might be different enterprises for the production, the exploitation of the network and the distribution and trade of electricity and gas. The problem of units without significant labour at a fixed location relates mainly to the production of electricity, the extraction of oil and gas, and the exploitation of the network for electricity and gas.

   — Electricity, oil and gas production are carried out by mainly larger enterprises, though unincorporated enterprises (for example farmers) sometimes produce electricity as a secondary (not main) activity. The value added of the latter producer should be shown in the GVA and GFCF of the agricultural industry.

   — The larger enterprises in electricity production can produce electricity by nuclear power, coal and gas, hydro installations or windmills. This implies that these enterprises should make data available about the regional distribution of output and intermediate consumption which are principally based on their inputs and different production processes.

   — The rules for multiregional enterprises (production units, ancillary units and head offices) apply generally for the larger enterprises. The A, B and C-classification to determine suitable methods for the allocation of GVA to these units should be applied (see par. 3.9).

   — There remains an environmental argument for allocating the extraction of oil and gas and the production of electricity and gas of unmanned stations to the physical place of production. The environment has by definition a regional dimension. Allocating the aforementioned economic activities to the production location enhances the potential for the analysis of regional economic and environmental effects.

2. With regard to internet hubs and mobile phone networks some observations can be made about the significance and measurability of the activity:

   — Theoretically one could argue that the enterprises can only create value added by a network of antennas or internet hubs which give the customers in a region access to the mobile telephone network or internet. This implies that the production takes place where the antennas or hubs are situated. The antenna and hub could be seen as a production unit without significant labour input. The production would be a function of capital (the antenna or hub) and the use of the network by the customers, which equates to the output of the network. However, it is doubtful that this approach is feasible and in line with previously mentioned rules of ESA 2010.

   — For each separate antenna, one could say that its activity is insignificant in relation to the activity of the total network of all antennas. To get a full coverage for a mobile phone network many antennas are required. Next to that, the investment value of one antenna is relatively low and is in many cases completely hidden in for example signposts and bill boards.

   — It might be questioned whether the enterprises in this communication industry can or will provide monetary or physical indicators to allocate GVA of these industries to the regions where the antennas or internet hubs are situated. This is relevant, for most communication enterprises do not only have this type of output, but are generally also involved in other activities.

   — Based on the factors of significance and measurability, GVA of the mobile network or internet hubs should be allocated to the unit responsible for their management. This rule is completely in line with the treatment of fixed networks by cables. In that case GVA is allocated to the units responsible for the management of the network.

2.3.1.6. Head offices

Head offices are institutional units. A head office is a unit that exercises managerial control over its subsidiaries. Head offices are allocated to the dominant non-financial corporations sector of their subsidiaries, unless all or most of their

subsidiaries are financial corporations, in which case they are treated as financial auxiliaries (S.126) in the financial corporations sector.

Where the head office undertakes business production and this business activity is predominant, the head office is classified to the corresponding industry. This class includes: the management of other units of the company or enterprise; undertaking strategic or organisational planning and the decision-making role of the company or enterprise; and exercising operational control and managing the day-to-day operation of their related units. The basic rule is that the head offices have to be described in a separate activity under NACE Rev. 2, M 70.10. However it is not certain that this will be practised in the national accounts.

The main rule for regional accounts is that the data have to add up to the corresponding national accounts data. This implies that if head offices are described in national accounts under the heading of NACE Rev. 2, division M 70.10, regional accounts have to follow that. If the head office is not separately distinguished from its subsidiaries, regional accounts also have to follow the industry classification given in the national accounts. The regional allocation of value added will be discussed in par. 4.3.1.

2.3.2. Statistical units and residence in the case of households

2.3.2.1. Definition

'A household is an institutional unit'. In ESA 2010, par. 2.12 such a unit is defined as follows:

'An institutional unit is an economic entity characterised by decision-making autonomy in the exercise of its principal function. A resident unit is regarded as constituting an institutional unit in the economic (⁹) territory where it has its centre of predominant economic interest if it has decision-making autonomy and either keeps a complete set of accounts, or is able to compile a complete set of accounts.'

ESA 2010, par. 2.13a also states that:

'Households are deemed to enjoy autonomy of decision in respect of their principal function and are therefore institutional units, even though they do not keep a complete set of accounts.'

Households as consumers may be defined as small groups of people who share the same living accommodation, who pool some or all of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food. The criteria of the existence of family or emotional ties may be added.

The principal resources of households are the following:

a. Compensation of employees.

b. Property income.

c. Transfers from other sectors.

d. Receipts from the disposal of market products.

e. Imputed receipts from the output of products for own final consumption.

2.3.2.2. The household sector

ESA 2010, par. 2.118: 'The household sector (S.14) consists of individuals or groups of individuals as consumers and as entrepreneurs producing market goods and nonfinancial and financial services (market producers) provided that the production of goods and services is not by separate entities treated as quasi-corporations. It also includes individuals or groups of individuals as producers of goods and non-financial services for exclusively own final use.'

ESA 2010, par. 2.119: 'The household sector includes:

a. Individuals or groups of individuals whose principal function is consumption.

b. Persons living permanently in institutions who have little or no autonomy of action or decision in economic matters (e.g. members of religious orders living in monasteries, long-term patients in hospitals, prisoners serving long sentences, old persons living permanently in retirement homes). Such people are treated as a single institutional unit: a single household.

c. Individuals or groups of individuals whose principal function is consumption and that produce goods and non-financial services for exclusively own final use. Only two categories of services produced for own final consumption are included within the system: services of owner-occupied dwellings and domestic services produced by paid employees.

d. Sole proprietorships and partnerships without legal status other than those treated as quasi-corporations, which are market producers. The production of goods and services by these unincorporated enterprises (market enterprises owned by households) is described in the household sector. Such enterprises have no assets or autonomy of decision-making separate from those of their owner. No distinction is made between them and the owners' household, which is an institutional unit in the household sector.

e. Non-profit institutions serving households, which do not have independent legal status or those which do but are of only minor importance' (see ESA 2010, par. 2.1302).

In ESA 2010, the household sector is subdivided into the following sub-sectors:

(⁹) ESA 2010, par. 13.51 states the following: 'The regional household accounts are based on the households that are resident in a regional territory. This implies that it is assumed that there are no households and thus population in the extra-regio territory.'

a. Employers (S.141) and own-account workers (S.142).

The sub-sector 'employers and own-account workers' consists of the group of households for which the (mixed) incomes (B.3) accruing to the owners of household unincorporated enterprises from their activity as producers of market goods and services, with or without paid employees, are the largest source of income for the household as a whole, even if it does not account for more than half of total household income.

b. Employees (S.143).

The sub-sector 'employees' consists of the group of households for which the income accruing from compensation of employees (D.1) is the largest source of income for the household as a whole.

c. Recipients of property income (S.1441).

The sub-sector 'recipients of property income' consists of the group of households for which property income (D.4) is the largest source of income for the household as a whole.

d. Recipients of pensions (S.1442).

The sub-sector, 'recipients of pensions', consists of the group of households for which the income accruing from pensions is the largest source of income for the household as a whole.

e. Recipients of other transfers (S.1443).

The sub-sector 'recipients of other transfer incomes' consists of the group of households for which the income accruing from other current transfers is the largest source of income for the household as a whole. Other current transfers are all current transfers other than property income, pensions and the income of people living permanently in institutions.

Households are allocated to sub-sectors according to the largest income category (employers' income, compensation of employees, etc.) of the household as a whole. When more than one income of a given category is received within the same household, the classification is based on the total household income within each category.

2.3.2.3. Residence of households

ESA 2010, par. 13.15: 'All transactions of the uniregional institutional units are allocated to the region in which they have their centre of predominant economic interest. For households, the centre of predominant economic interest lies in the region where they are resident, not the region where they work.'

SNA 2008, par. 4.15: 'The residence of individual persons is determined by that of the household of which they form part and not by their place of work. All members of the same household have the same residence as the household itself, even though they may cross borders to work or otherwise spend periods of time abroad. If they work and reside abroad so long that they acquire a centre of economic interest abroad, they cease to be members of their original households.'

SNA 2008, par. 24.17: 'All households are resident in the economy but of increasing interest is the phenomenon of a person abroad, often but not necessarily a family member, who remits significant amounts to the family in the domestic economy. (The same phenomenon also exists within a country, between urban and rural areas, for example.) The aspect of people moving abroad in response to better employment prospects may be seen as another facet of globalization and one that deserves to be monitored.' This paragraph is especially relevant for measuring the current transfers between households (see ESA 2010, par. 4.129).

A member of a resident household who leaves the economic territory but returns to that same household within one year continues to be a resident even if that individual makes frequent journeys outside the economic territory. The individual's centre of economic interest remains in the economy in which the household is resident (SNA 2010, par. 26.38).

All the following categories of such individuals are treated as residents; the illustrations of the categories are adapted for regional purposes:

a. Travellers or visitors, i.e. individuals who leave the region for less than one year for recreation, business, health, education (see point g), religious or other purposes.

b. Workers who work for part of the year in another region or country, in some cases in response to the varying seasonal demand for labour, and then return to their households.

c. Workers who regularly cross the border of the region or country where they live each day or somewhat less regularly (e.g. each week or month) to work in a neighbouring region or country.

d. The official, civilian or military representatives of the government of a country established in territorial exclaves. They are considered to have their residence in the economic territory of the home country (see ESA 2010, par. 2.10 and 13.51). However, disposable income of these representatives in the extra-regio territory will not be compiled (see par. 10.1).

e. The recruited staff of foreign embassies, consulates, military bases, etc. reside in the region where the households to which they belong maintain their dwellings.

f. The crews of ships, aircraft, or other mobile equipment operating partly, or wholly, outside the region or country, reside in regions where the households to which they belong maintain their dwellings.

g. People who go abroad for full-time study generally continue to be resident in the territory in which they were resident prior to studying abroad. This treatment is adopted even though their course of study may exceed a year. However, students become residents of the territory in which they are studying when they develop an intention to continue their presence in the territory of study after the completion of the studies. Members of the same household who are accompanying dependents of students are also considered to be residents of the same economy as the student. Patients who go abroad for the purpose of medical treatment maintain their predominant centre of interest in the territory in which they were resident prior to the treatment, even in the rare cases where complex treatments take a year or more. As with students, accompanying dependents are treated in the same way.

An exception could be envisaged at the regional level, whereby these students and patients would be treated as residents of the host region, if the host region is in the home country and when they stay there more than one year (ESA 2010, par. 13.52).

2.3.2.4. Notional households' units and their residence

ESA 2010, par. 18.15: 'When land located in a territory is owned by a non-resident entity, a notional unit that is treated as resident is identified for statistical purposes as being the owner of the land. This notional resident unit is a quasi-corporation. The notional resident unit treatment is also applied to associated buildings, structures and other improvements on that land, leases of land for long periods, and ownership of natural resources other than land. As a result of this treatment, the non-resident is owner of the notional resident unit, rather than owning the land directly, so there is an equity liability to the non-resident, but the land and other natural resources are always assets of the economy in which they are located. The notional resident unit usually supplies services to its owner, for example accommodation in the case of vacation homes.'

ESA 2010, Par. 2.13f: 'Quasi-corporations are entities which keep a complete set of accounts and have no legal status. They have an economic and financial behaviour that is different from that of their owners and similar to that of corporations. They are deemed to have autonomy of decision and are considered as distinct institutional units.'

Two examples of these units are:

1. A household which owns an unincorporated enterprise in another country or a region other than the region where it lives. Two different situations arise:

a. A household owns an unincorporated enterprise in **another country**:

ESA 2010, par. 2.09: 'A resident institutional unit may be a notional resident unit, in respect of the activity conducted in the country for a year or more by a **unit** which is resident in another country.'

According to ESA 2010, par. 2.13f, these units are treated as if they were quasi-corporations. Therefore for the household sector the income received by the owner has to be counted as income withdrawn from quasi-corporations (**property income**) transferred to its owner in the home region.

b. A household owns an unincorporated enterprise in **another region** of the home country:

The unincorporated enterprise is a resident (notional unit) of the host region and in this case belonging to the household sector. The income received by the owner has to be counted as **mixed income** transferred to its owner in the home region. This rule ensures coherence between national and regional accounts of households.

2. A household owns land and/or a second dwelling in another country or a region other than the region where it lives. Again two different situations arise:

a. A household owns land and/or a second dwelling in **another country**:

Land and/or second dwellings are non-resident units (notional units of the foreign country). The production of housing services (rented or owner-occupied) has to be allocated to the notional unit. For the household sector, the income received by the owner has to be counted as **property income** transferred to its owner in the home region.

b. A household owns land and/or a second dwelling in **another region** of the home country:

Land and/or second dwellings are non-resident (notional) units of the region where they are located. For the household sector, the income received by the owner has to be counted as **property income** (from land) and **operating surplus** for owner-occupied dwellings and rented dwellings (SNA 2008, par. 7.9), transferred to the home region.

These two situations also have to be considered when a household, non-resident in the home country, owns land, dwellings or unincorporated enterprises (treated as quasi-corporations) in a region of the home country. The imputation rules mentioned above have to be applied and therefore these units do not belong to the household sector of the home country.

Methods of regionalisation

3

3.1. Introduction

ESA 2010, par. 13.24: 'Regional accounts are based on transactions of units that are resident in a regional territory.' In the case of regional accounts by industry, data have to include the transactions and residence of the local KAUs and in the case of households, data include the transactions and residence of the households.

It is self-evident that source statistics are needed for both national and regional accounts. For the regional accounts by industry, data regarding their GVA, employment, wages and salaries, and GFCF need to be founded on the local KAU. Regional prices are needed for the constant price compilation of regional GVA. For the regional accounts of households, especially for an estimate of regional consumption expenditure of households and social transfers in kind, reliable regional data are necessary.

The main problem of the regional accounts by industry is that the source statistics are frequently designed for national and not for regional purposes. For instance, the Structural Business Statistics (SBS) ([10]) are based on the statistical unit 'enterprise' and not the 'local KAU' upon which the national and regional accounts by industry should be based.

The same is true for the regional accounts of households. For instance, family expenditure surveys are generally designed to obtain accurate national estimates and not regional estimates. That is why family expenditure surveys in many countries often cannot be used for estimating the regional distribution of the consumption expenditure of households.

Therefore the regional accounts methodology has to focus on data that can be used as regional indicators for the estimates of value added etc. where no direct regional data are available and also has to focus on preferred methods of regionalisation for both final and provisional estimates.

3.2. Data required for regionalisation

3.2.1. Regional accounts by industry

The regional accounts by industry require source data that enable the compilation of data on:

1. GVA at basic prices in current prices at NUTS 2 and NUTS 3 level.

2. GVA in basic prices in prices of the previous year at NUTS 2 level.

3. Growth rate of GVA at NUTS 2 level.

4. Compensation of employees in current prices at NUTS 2 level.

([10]) Regulation (EC) No 295/2008 of the European Parliament and of the Council of 11 March 2008 concerning structural business statistics (recast).

5. Total employment at NUTS 2 and NUTS 3 level.

6. Total employment in hours worked at NUTS 2 level.

7. Total number of employees at NUTS 2 and NUTS 3 level.

8. Total number of hours worked by employees at NUTS 2 level.

GVA at basic prices can be compiled according to the following definitions:

1. GVA (basic prices) = output at basic – prices intermediate consumption at purchasers' prices.

2. GVA (basic prices) = other taxes less subsidies on production + compensation of employees + consumption of fixed capital + net operating surplus / net mixed income.

For market-oriented activities the first approach is predominant. This is called the **production approach**. The SBS are the main source for this approach, but administrative sources are also used. For non-market activities the second approach is predominant. This is called the **income approach**. General governments' value added and other non-market services, such as health activities, can only be compiled using the income approach. The regional dimension of these sources for multiregional units is the main problem for which regional indicators have to be used for the regional allocation of GVA. The income approach will generally be applied for the regional allocation of GVA for multiregional enterprises. Annual reports of the multiregional enterprises might provide useful information for the regional allocation of value added.

The main problem of the income approach is the measurement of consumption of fixed capital. The valuation of consumption of fixed capital is (according to national accounts concepts) at purchasers' prices of the current period, which is equivalent to replacement values according to bookkeeping concepts (see ESA 2010, par. 3.141). However, enterprises generally do not apply the valuation of consumption of capital according to replacement prices. Instead enterprises generally use historic prices to compile depreciation of capital. This concept is unsuitable for national and regional accounts' purposes. Enterprises are unlikely to be able to provide information on consumption of fixed capital at purchasers' prices. This is the main reason why national accounts apply the Perpetual Inventory Method (PIM) which assumes long time series of GFCF, which however are not (yet) available at the regional level (see ESA 2010, par. 3.141).

Compensation of employees consists of wages and salaries (D.11) and employers' social contributions (D.12). This information is generally available in the SBS, and administrative records of government administrations. However, multiregional units might not have this information available for

their local KAUs. The regional allocation of compensation of employees has to be based on employment as an indicator. The Labour Force Survey (LFS) might provide some additional information at NUTS 2 level. The LFS is a household-based survey and thus linked to the residence of the households. The LFS however also provides data on the region of the workplace (at NUTS 2 level) of the surveyed persons. This information is considered less reliable and is generally only available at a high level of industry aggregation.

Generally speaking, regional information is available in greater detail for employment than for value added, compensation of employees and employment in hours worked. That is why employment is mainly used as an indicator for the regional allocation of related variables. In par. 4.3 we will discuss the dangers of such an approach. Regional data will be based on SBS, administrative records and the LFS (with previously mentioned restrictions).

For compilation in prices of the previous year, it would be highly preferable to use regional prices. In the case of regional accounts by industry this would mainly consist of regional producer prices in relation to output at basic prices and purchasers' prices in relation to the inputs. For the income approach it is conceptually impossible to collect prices on net operating surplus or net mixed income. This implies that the income method is not convenient for the compilation of GVA in prices of the previous year. In a Supply and Use table or the production approach, the compilation of net operating surplus or net mixed income in prices of the previous year would result as a balancing item. Regional accounts by industry however are not based on regional Supply and Use tables.

Most EU countries do not collect regional prices because of the burden on both enterprises and statistical offices. This implies that assumptions have to be made for the compilation of GVA in prices of the previous year and consequently for the estimation of the volume growth of GVA.

Growth rates of regional total GVA are defined as:

$$\left(\frac{\text{Total GVA (t) in average prices of the previous year}}{\text{Total GVA (t–1) in current prices}} \right) * 100 - 100$$

The compilation of the volume growth rates has to be based on detailed industry GVA data (at least NACE Rev. 2 division, A*38 and preferably A*64 or even in some cases 3 or 4-digit level) and preferably using double deflation. See chapter 6 for more detailed information.

3.2.2. Regional data on GFCF by industry

ESA 2010, par. 3.24: 'GFCF (P.51) consists of resident producers' 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 or institutional units.'

Fixed assets are produced assets used in production for more than one year. Regional data on GFCF by industry (A*10) are required at NUTS 2 level. A breakdown by type of assets is not currently required by Eurostat. However, for reasons of statistical plausibility it is recommended to take the type of assets into account in the compilation of the GFCF by industry data.

ESA 2010, par. 3.127: The following types of GFCF are distinguished:

1. Dwellings.

2. Other buildings and structures; this includes major improvements to land.

3. Machinery and equipment, such as ships, cars and computers.

4. Weapons systems.

5. Cultivated biological resources, e.g. trees and livestock.

6. Costs of ownership transfer on non-produced assets, such as land, contracts, leases and licences.

7. Research and development (R&D), including the production of freely available R&D. Expenditure on R&D will only be treated as fixed capital formation when a high level of reliability and comparability of the estimates by the EU Member States has been achieved.

8. Mineral exploration and evaluation.

9. Computer software and databases.

10. Entertainment, literary or artistic originals.

11. Other intellectual property rights.

ESA 2010, par. 3.129: GFCF includes the following borderline cases:

1. Acquisitions of houseboats, barges, mobile homes and caravans used as residences of households and any associated structures such as garages.

2. Structures and equipment used by the military.

3. Light weapons and armoured vehicles used by non-military units.

4. Changes in livestock used in production year after year, such as breeding stock, dairy cattle, sheep reared for wool and draught animals.

5. Changes in trees that are cultivated year after year, such as fruit trees, vines, rubber trees, palm trees etc.

6. Improvements to existing fixed assets beyond ordinary maintenance and repairs.

7. The acquisition of fixed assets by financial leasing.

8. Terminal costs, i.e. large costs associated with disposal, e.g. decommissioning costs of nuclear power stations or clean-up costs of landfill sites.

GFCF excludes transactions included in intermediate consumption, transactions recorded as changes in inventories, durables acquired for final consumption by households, holding gains and losses of fixed assets, catastrophic losses on fixed assets and funds set aside or put in reserve (see ESA 2010, par. 3.130).

GFCF by industry is based on investment statistics, general government administrations, other non-market service industries (such as the health industry) and annual administrative reports, in which the regional dimension, at least at NUTS level 2, is essential. The EU SBS does provide investment data, however not with a regional specification on a compulsory basis and, when available, only for tangible goods.

3.2.3. Regional accounts of households

ESA 2010, par. 13.50: 'Regional accounts of households are a regional specification of the corresponding accounts at the national level.' Regional household accounts are required at NUTS 2 level. In principle there are no conceptual constraints to compiling a complete set of regional accounts of households, namely: the production account with GVA as balancing item; the generation of income account with gross/net operating surplus and mixed income as balancing items; the allocation of primary income account with net primary income as balancing item; the secondary distribution of income account with gross/net disposable income as balancing item; the use of income account with net saving as balancing item and final consumption expenditure as a highly relevant transaction; and the capital account with net lending or net borrowing as balancing item.

There are however practical constraints:

1. The production account of households relates to the unincorporated enterprises which are not regarded as quasi-corporations. This would imply that the household sub-sectors Employers (S.141) and Own-account workers (S.142) have to be distinguished. Statistics for these sub-sectors are generally based on samples designed for national purposes, with lower accuracy at the regional level as a result.

2. The generation of income account of households will also not be compiled.

3. The use of (adjusted) income account is intended to be compiled (on a voluntary basis) for all households (see par. 1.2.5). The transactions in final consumption expenditure of households and social transfers in kind have to be estimated. Family expenditure surveys, in combination with other sources such as regional turnover data of retail trade, and government administrations' data on social transfers in kind, should be able to provide this information. It is doubtful that data from family expenditure surveys, which are generally based

on nationally designed samples, are sufficiently reliable at the regional NUTS 2 level or even at the NUTS 1 level.

The compilation of the allocation of primary income account and the secondary distribution of income account are generally based on administrative data from the tax authorities. The personal income distribution might also be based on this source. Other specific sources may be used, e.g. housing surveys, regional accounts for agriculture etc. It is not recommended to derive income transactions from household surveys such as the family expenditure survey. It is well known [11] that these surveys generally underestimate income and result in an underestimation of household savings. Moreover, samples of family expenditure surveys are generally designed for national and not regional purposes, probably leading to large sampling errors at the regional level.

3.3. Methods of regionalisation

Having outlined the general basis of the regional accounts regarding regional territory, NUTS, residence, statistical units and the data required for regionalisation, we now turn our attention to the methods used for estimating GVA in current and constant prices, employment, GFCF, primary and (adjusted) disposable income of households and final consumption expenditure of households.

For various reasons, Member States use different methods, which do 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.

3.3.1. Bottom-up methods

The **bottom-up** or ascending method of estimating a regional aggregate involves collecting data at the local KAU or the residence of households and aggregating these values to get a regional total. The method is called 'bottom-up' because the elements for compiling the aggregate are directly collected at the local KAU level or residence of the households. This method can be used for uniregional enterprises or KAUs and households if full information is available.

A **pseudo-bottom-up** method can be followed where data for the local KAU or residence of households are not available. Data for the local KAU can be estimated from enterprise, KAU or local unit data using regional indicators. The estimates can then be aggregated to obtain regional totals just as in a purely bottom-up method. This method can be used especially for multiregional enterprises or KAUs.

([11]) See for instance: *Are Household Surveys Like Tax Forms: Evidence from Income Underreporting of the Self-Employed*, Finance and Economics Discussion Series Divisions of Research & Statistics and Monetary Affairs Federal Reserve Board, Washington, D.C., December 2010.

3.3.2. Top-down methods

The **top-down** method accommodates a situation in which data are only available at for instance NUTS 3 level or municipality and not for the local KAU or local unit. The national figure from the national accounts is distributed using regional data (indicators) which are as close as possible to the variable to be estimated. For example wages and salaries might be allocated to regions using the regional distribution of the total number of full time equivalents of employees, multiplied by the average annual earnings per employee from a different statistical source. This results in the regional distribution of total earnings of employees, which can be used as a regional indicator for the allocation of wages and salaries to regions.

The method is called 'top-down' because the aggregate is allocated to a region and not to the local KAU or local unit. However, the notion of local KAU or local unit is usually still needed to produce a correct regional allocation. Therefore the regional distribution of the total number of full time equivalents of employees in the example quoted would need to be based on the local KAU or local unit.

The notion of a local KAU or local unit does not always underpin the estimates, for example, where the GVA of rail passenger transport is allocated to regions according to the number of passengers transported in a region. This type of method is described as a pseudo-top-down method and should be avoided, if possible, because the local KAU or local unit is not involved. In other words, the residence approach is not applied in this example but the territory approach has been applied instead.

3.3.3. 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 pseudo-bottom-up and/or top-down approach. Let us take the food industry as a theoretical example. The SBS for this industry is based on enterprises. The sample design might be as follows:

1. All uniregional enterprises with 20 or more employees are included.

2. All multiregional enterprises with 20 or more employees are included and there are no small multiregional enterprises.

3. A survey of uniregional enterprises with less than 20 employees is based on a 5 per cent sample.

Let us suppose that there is no non-response. For each local unit the number of employees is available. If we disregard the accuracy of this estimation, we can distinguish the methods of regionalisation used (see the illustration below in par. 3.3.4).

1. The regionalisation of the large uniregional enterprises is based on the bottom-up method (see column 1 in the illustration).

2. The regionalisation of the multiregional enterprises is based on the pseudo-bottom-up method, using regional indicators per multiregional unit applied for the regionalisation of the variables output, intermediate consumption and thus value added (column 2).

3. The regionalisation of the small enterprises is presumably based on a top-down method, because the limited size of the 5 per cent sample does not enable accurate regionalisation (e.g. of GVA). In this case one might use the regional distribution of employees and the national GVA estimate of the SBS for small enterprises for estimating the regional distribution of GVA of these enterprises (see column 3).

4. Regional estimates for uniregional, multiregional and small enterprises add up to column 4.

5. In the end the sum of the regional estimates of SBS has to add up to the corresponding national accounts total. This might be done by using the regional distribution of total GVA of the food industry based on the SBS (column 4) for the regional allocation of the difference between the national accounts GVA of the food industry and the comparable national total of SBS, as shown in column 5.

The mixed methods are the norm. This also applies to the regional accounts of households.

3.4. Theoretical concepts for the use of indicators for GVA by industry

There is of course no need to use indicators when comprehensive and reliable data about GVA or its components are available. When these are unavailable, we look for alternative data that are closely related to the variable to be estimated, in this case value added. A systematic approach may help to find a well-founded choice of indicators.

The diagram (see next page) consists of eight blocks, containing indicators on the basis of which GVA can be estimated. Some indicators are more closely related to GVA than others. Blocks one and two provide indicators for direct estimates of GVA in block zero. The other blocks are related in an indirect way, which means that we have to assume that there are no regional differences in the factors that influence the relationship between the indicator used and GVA. For instance in block 3, where hours worked has been used, the same labour productivity per hour worked is assumed for all regions.

The **core blocks** in the diagram are blocks one and two. Both contain the main elements of the system of national and regional accounts regarding the generation of GVA and the primary distribution of income, as we have seen in par. 3.2.1:

> **Output – intermediate consumption = GVA at basic prices (production approach in block 1)**

And:

> **Compensation of employees + net operating surplus + net mixed income + consumption of fixed capital + other taxes less subsidies on production = GVA at basic prices (income approach in block 2)**

The main problem of the income approach is the measurement of consumption of fixed capital. If no data are available for consumption of fixed capital one has to rely on information from blocks 3 or 7. See for the assumptions used blocks 3 and 7.

Block 6 defines the expenditure approach. Because of the fact that exports to and imports from other regions have to be measured, it is difficult to put the expenditure approach into practice. The definition is:

> **Exports (abroad and to other regions) + consumption of households and general government + GFCF of households, enterprises and general government + change in stocks – imports (from abroad and other regions) = GDP at market prices.**

Block 3 of the diagram represents the idea of a production function. This can be used to find closely related indicators for the estimation of regional GVA, when there is no or insufficient data available about the two core approaches in blocks one and two. The functions are as follows:

> **GVA by business units is a function of hours worked by employees and self-employed and labour productivity per hour.**

And:

> **Labour productivity is a function of the following variables: the level of education of employees and self-employed; the efficiency of the organisation; the quality and quantity of the capital stock; and the efficiency of the infra-structure.**

These relationships can be established at the level of economic production units as well as at the level of economic activities. For the purpose of national and regional accounts, we make a distinction between estimates of the level of GVA and the change in GVA.

If we use these relationships to compile the level of GVA for the production units in the same activity, we may expect a strong link between employed persons, number of employees or hours worked and the GVA of these units. This is only valid if the assumptions or circumstances are exactly the same, so we have to verify whether the assumptions made are satisfied.

The **first assumption** is that the different production units have exactly the same relationship between these variables, for instance no differences in part-time work.

The **second assumption** is that there are no differences in labour productivity per hour for these production units.

Generation and distribution of value added and its variables and related indicators

Block 3			Block 1		Block 0	Block 2	Block 5	Block 4	Block 8
Business units (could in practice be enterprise, KAU, establishment, local unit or legal or other units)							Households or persons		
Production factors			Production process		GVA	Generation of income, paid by business units (workplace)	Commuting	Primary distribution of income received (place of living or administration)	Household units and persons
Distinction between employees and self employed	Labour productivity	Jobs	Intermediate consumption (purchase prices)	Output (basic prices)	Gross value added (basic prices)	Compensation of employees	Workplace and place of living or administration address do not coincide	Compensation of employees	Employees
		Full-time equivalents				Net operating surplus		~~Net operating surplus~~	
		Hours worked				Net mixed income		~~Net mixed income~~	Self-employed
	Capital productivity	Equipment				Consumption of fixed capital			
		Buildings/ houses				Other taxes less subsidies on production			
		Land							

Block 7		Block 6	Block 8
Purchase of raw materials and semi-manufactured products and purchase of services	Turnover of final products and services	Export	Households/ population
		Consumption by households	
		Consumption by government	
		GFCF by enterprise	
		GFCF by government	
Change in stocks of raw materials and semi-manufactured products	Change in stocks of final products	GFCF by households	Households/ population
		Change in stocks	
		Import	

When introducing these relationships for regions, the **third assumption** is that the share of employees in total employment is the same for each activity in all regions.

The **fourth assumption** is that workplace (number of employees and hours worked) and dwelling place (employed persons) coincide.

If these four assumptions are not valid, we have to correct this information or consider whether the income approach provides sufficient data. Otherwise, we may judge the indicators weaker than the direct estimates in blocks one and two.

Another example in block 3 is land. Data on agricultural sowed areas or the number of cattle at a certain date in spring are available from agricultural statistical sources. In such cases, we have to assume that the counts in spring

reflect the regional allocation of output. We further have to assume that the ratios of intermediate consumption to output are the same, thus assuming the same GVA per unit output. It is obvious that crops lost due to heavy rainfall after the spring counts, or swine fever in certain regions, might cause quite different regional distributions than the counts in spring indicate.

For the estimation of changes in GVA, the assumption is that the relationships mentioned are stable for the periods concerned.

The relationship between labour and output is weaker because of a possibly different organisation of the production process. With the same output, production units may have quite different inputs. One car factory, for instance, may purchase more semi-manufactured products or services than other car factories. This implies that the output of the

number of cars per employee is not a fair indicator of the productivity of the production unit. An investigation of the Dutch manufacturing industries indicated large differences in input-output structure per production unit for almost all industries.

At the distribution of income side in **block 2** of the diagram, we may only assume a strong relationship between compensation of employees and GVA when the share of compensation of employees in GVA and the level of compensation is the same for all production units and stable for the periods concerned. This assumption is also valid for regions. When this assumption is not fulfilled we have to make use of the component elements of GVA.

If information about compensation of employees is available from the income tax registration (**block 4**), we have to take into account that there may be a difference between workplace and place of residence. This implies that we must correct for commuting (**block 5**).

In **block 6** of the diagram, we may distinguish an indirect relationship via turnover in **block 7** between output and the expenditure categories and GVA. We have to be very careful with this type of relationship, because of possible changes in stocks, the possibility of imports, and possibly different regional ratios between intermediate consumption and output. For instance, the export of certain chemical products can be directed to production units and thus to their regions. However, the question remains how much GVA has been generated in the region observed.

Another example is that the consumption of healthcare is assumed to be related to the age distribution of the population and the supply is tuned to that demand (**block 8**). Similarly, the output of the construction of houses is assumed to be related directly to the GFCF in houses. Generally speaking, such data can only be used in part, for instance to check the plausibility of data or to compile provisional data for a limited number of industries.

For early estimates about year t, the information is usually limited to the following available information: the regional structure of year t–1; provisional national estimates for year t; and, in the best cases, developments in the number of employees for year t compared to year t–1; turnover of large enterprises; and the development of the population for consecutive years. In these cases one has to ensure that the indicators are suitable for estimating the definite regional allocation. For these types of estimates the assumption of stability of structures is essential. If this is not the case, it is very hard to achieve accurate results.

3.5. Preferred methods of regionalisation

The choice between bottom-up and top-down methods depends mainly on the statistical sources available.

In principle, the advantage of the bottom-up method is that it measures the desired variable directly and allocates it correctly to region and industry. Bottom-up methods can produce estimates for any regional level by aggregating the data appropriately, while maintaining data confidentiality. They can also produce an alternative national estimate, if they are based on sources other than those used for the national accounts estimate. Such alternative estimates provide the opportunity to check the plausibility of both national and regional accounts estimates. In practice it is usually necessary to adjust the regional accounts estimates in accordance with the national accounts estimates. This is mainly due to national accounts adjustments for balancing the data in a Supply and Use framework and estimates for the non-observed economy at the national level not usually being available in the source statistics on which the regional accounts are based.

The main disadvantage of top-down methods is that the regional accounts estimates are not produced with direct data but with regional indicators. The accuracy of these estimates depends largely on whether the regional indicators used reflect the regional phenomenon to be measured. As a consequence this manual will focus its attention on a proper use of regional indicators. Though it is not a strong argument at all, one could say that top-down methods do have the advantage that the numerical coherence between national and regional accounts will be guaranteed automatically. These methods may also be cheaper to develop as they exploit existing data or can be based on nationwide sample surveys or administrations rather than requiring comprehensive new registers or annual census-type collections.

Reliability can be estimated for bottom-up methods. Sampling errors can be measured and something may be known about non-sampling errors and the results can be checked with the national accounts totals. Where indicators have been used in top-down and mixed methods, it is hard to assess accuracy, though an appropriate use of regional indicators can be assessed.

In conclusion, pure bottom-up methods are preferred over top-down methods and should be the first choice. In the case of multiregional KAUs or enterprises, pseudo-bottom-up methods should be used. Only in cases where no reliable information at local KAU level exists, should top-down methods be used. In such a scenario the emphasis will be on the suitability of the regional indicators used.

3.6. Improving pseudo-bottom-up, top-down and mixed methods

Pseudo-bottom-up, top-down and mixed methods, in the case of regional accounts by industry, can generally be improved by applying the following principles, where data permit:

Indicators should be as appropriate as possible.

a. Indicators should generally be applied to components. The regionalisation of the components generally applies to the application of the income method, for example:

— Other taxes less subsidies on production. The regional distribution depends highly on the industry in question.

— Compensation of employees based on, in order of preference, the regional distribution of wages and salaries, hours worked of employees or the number of employees.

— Consumption of fixed capital (if available) based on depreciation data or data taken from annual reports for bigger enterprises. This is highly relevant for multiregional enterprises in capital-intensive industries, e.g. the chemical industry.

— Net operating surplus/net mixed income. In the case of general government, net operating surplus is by definition zero.

— Regionalising gross operating surplus based on employment in capital-intensive industries would lead to an overestimation of value added of the regions where head offices, usually with a lot of staff, are established, generally the regions where the capital cities are located.

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

c. Different indicators can be used at NUTS 1, 2 and 3, if that will produce more accurate estimates. Sometimes more accurate data are available at NUTS 1 than for NUTS 2 and 3.

d. In judging an indicator it is useful to think of the 'reversal test'. For instance, we can ask whether wages and salaries could be estimated from data on GFCF in desktop computers, if wages and salaries data are used to estimate GFCF.

e. Indicators can be tested on real data. To choose between different indicators, one can compare the actual figures collected with the estimates obtained by using the indicator to break down the national aggregate. The higher the correlation, the more suitable the indicator.

f. Where there are no appropriate regional indicators across all EU Member States, for EU purposes the same indicator should preferably be used across the EU to ensure comparable regional data. This is for instance the case for the regional allocation of consumption of fixed capital (see par. 3.9.1).

3.7. Adjustment of regional to national values; the non-observed economy

3.7.1. Regional accounts by industry

The regional accounts are a regional specification of the corresponding accounts of the total economy. This implies that the regional accounts totals have to add up to the national accounts totals. The national accounts total is rarely equal to the total of the source statistics. This is generally due to corrections for adapting data which are based on bookkeeping concepts, national accounts concepts, data validation, exhaustiveness (the non-observed economy) and balancing supply and use.

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

— Regarding sample design, is the region for instance a stratum in the sample?

— How is non-response treated? Is there an imputation at unit level or at national level?

— Is there item non-response and how is this treated in the source statistics and the national accounts?

— Are all units covered in the source statistics? If not, what estimates have been made at the national level (exhaustiveness)?

— Does the timing of transactions in the statistical or administrative source differ from the national accounts?

— What corrections have been made for adjusting the concepts in the source data to arrive at the national accounts concepts?

— What corrections have been made to balance supply and demand in the Supply and Use table? On what information were these corrections based?

— What continuity corrections have been made for instability in the source data?

In the absence of specific regional information, differences are usually allocated to the regions in proportion to the regional values, so the same percentage adjustment is applied for all regions. For example, if the national total is 5 per cent higher than the sum of the regional values because of estimates for the non-observed economy, all the regional values are raised by 5 per cent. This pragmatic approach is not always appropriate for dealing with coverage differences or non-random errors.

Other solutions should always be considered using direct measurement with regional specifications. It should for instance be investigated whether the non-observed economy is different in urban or rural areas. In other words, compiling regional accounts requires extensive knowledge of the regional economic phenomena by using all existing appropriate data sources. This includes not only official statistics, but also government administrations, newspapers, trade journals etc.

A stopgap solution would be to make greater adjustments to the less reliable estimates (often smaller regions). This is rarely ever done because adjustments will have a significant effect on estimates for smaller regions and move them further from their original estimates. The opposite approach is to include adjustments in large regions where they have little effect, and this approach is generally recommended.

3.7.2. The non-observed economy

The non-observed economy is a phenomenon for which estimates should be made where possible in both the national and regional accounts. This manual focuses on the estimates for the regional accounts by industry and the regional accounts of households. The non-observed economy includes both legal and illegal transactions. In the national accounts, for some industries such as agriculture or construction, it may be possible by using various kinds of surveys and the commodity flow method to make satisfactory estimates of the total output of the industry without being able to identify or measure that part of it that is not observed.

Because the non-observed economy may account for a significant part of the total economy of some countries, it is particularly important to try to make estimates of its contribution to total production, even if it cannot always be separately identified (see ESA 2010, par. 11.26 and SNA 2008, par. 6.41). Because of this, it is generally difficult to find suitable regional sources for allocating these transactions to regions. This is especially true for illegal transactions. Therefore regional indicators have to be used that are considered to be close to the phenomenon to be described.

3.7.3. Regional accounts of households

There may be various reasons for the differences between the valuations in the source data obtained using the bottom-up method and those in the sector accounts of households. These reasons include, amongst others, the following:

1. **Population differences:**

    These relate to the additions necessary to achieve consistency between the population of the source and that of the national accounts household sector. They relate to people or households that are not observed in the source data and concern for example people who died or emigrated during the survey.

2. **Differences in transaction concepts:**

    Transaction concepts used in the statistical source may differ from the concepts used in the national accounts. For example, the income components as measured in the statistical source can differ from the corresponding income components in the national accounts as to definition, recording, observation and valuation:

    a. Transactions in national accounts may be missing from the statistical source.

    b. Transactions in national accounts may be only partially observed in the statistical source.

    c. Transactions in the statistical source may be classified differently in the national accounts.

    d. Transactions in the statistical source may differ from the national accounts at the time of recording.

    e. Transactions in the statistical source may have a different valuation to those in the national accounts.

3. **Statistical discrepancies:**

    After correction for the differences mentioned above, there remains a discrepancy between the adjusted data from the statistical source and the national accounts data. It includes, amongst other things:

    a. Sampling errors in the statistical source. The source used for the regional accounts is the same as for the national accounts, but is not entirely representative at the regional level.

    b. In specific cases, data from regional accounts could be more accurate than those from national accounts.

    c. The non-observed economy. Data in tax registrations could underestimate income because of tax evasion. In national accounts corrections are made for this phenomenon. The question is whether tax evasion has a regional dimension.

    d. The sources used for regional accounts have been processed in much less detail.

The simplest way of adjusting the valuation of the regional accounts of households to the corresponding data in the national accounts is to apply a single coefficient to the values obtained for each region. This will be the ratio of the national accounts value to the total of the regional values in the regional accounts. The difference is thus divided up in proportion to the regional valuations obtained by the bottom-up method.

The constraint whereby the regional accounts have to be consistent with the valuations of the national accounts' household sector accounts turns the bottom-up method into a mixed method for the resulting data in the regional accounts. The data on the basic units can be used to determine levels for each region, acting as a base for the regional

distribution of the national flow. However, the bottom-up method is an essential back-up to obtain valid regional results.

It may be useful to compare the valuations included in the regional accounts of households with those of other regional accounts as they relate to a given transaction and a given region. For example, the compensation received by employees in households resident in a region may be compared with the compensation paid by the production units resident in the same region. The difference between the two figures is in principle the compensation received by residents but paid by production units outside the region; minus the compensation paid to non-residents by resident production units (regarding income for commuters).

If the transaction is obtained by the bottom-up approach, the method of adjustment to the national accounts flow (single coefficient) will first have to be re-examined, and only then will the regional values prior to adjustment be considered for revision. If the transaction is obtained by the top-down method, the reliability of the indicator will have to be investigated. For example, the figures may be compared with those obtained using a less closely related indicator for the transaction in question, but more representative at regional level.

It may also be useful to compare the resulting balancing items, in particular disposable income and saving, with direct information on the corresponding balancing items.

3.8. Final and early regional estimates; revisions

The final estimates for regional accounts variables follow in principle the periodicity of the final estimates in the national accounts. These final regional accounts are generally based on statistical sources that provide the detailed information needed for the compilation of the national accounts. In many cases regional accounts use the same sources as the national accounts. Data at the requested level of detail need time for collection and processing. For example, the detailed SBS ([12]) survey ultimately provides final data after 18 months. Preliminary data have to be delivered within 10 months. Use of administrative data also faces delays in the availability of finalised data. This phenomenon is reflected in both national and regional accounts. Consequently, one can make a distinction between final estimates and early or preliminary estimates. As the word 'final' suggests, the final estimates do not change any more, unless in the case of a major revision. The early estimates are generally based on indicators of economic growth and assumptions about the stability of relationships between datasets.

([12]) Regulation (EC) No 295/2008 of the European Parliament and of the Council of 11 March 2008 concerning structural business statistics (recast), article 8, section 2.

For instance, national accounts of year (t-2) might provide final estimates and the estimates for the years (t-1) and (t) are provisional and generally based on short-term indicators and assumptions. Because of this the provisional estimates are less accurate than the final estimates. When new data become available, the years (t-1) and (t) have to be revised. These revisions should be as small as possible.

When provisional estimates are made for regional accounts, it is clear that these provisional accounts cannot be based on the previously mentioned detailed sources. Just like the national accounts, the provisional regional accounts are based on extrapolation with the aid of short-term indicators and assumptions. This leads to the following methods:

1. The simplest method consists of extrapolating the regional data on the basis of the development of the corresponding national totals, using the regional distribution of the transactions in the most recent definitive year. This method of regionalisation is basically a rough top-down method. Checks have to be made to see whether such a relatively rough and simple method produces a good forecast of the final regional accounts. In using this method, one has to remember that revisions in principle have two causes:

   a. Revisions in the national accounts have to be reflected in the regional accounts. There might for example be large revisions for the chemical industry at the national level. Provisional data for GVA of this industry are mainly based on extrapolating output by an indicator such as change in turnover, and intermediate consumption is estimated on the assumption that the share of intermediate consumption in output remains the same. However, if this share changes this might lead to big revisions, because of the large share of intermediate consumption.

   b. Secondly the regional distribution might change because some regions demonstrate different patterns of growth when using the finalised data.

2. A mixed method could be used. The amounts for each region as they figure in the latest final regional accounts are extrapolated using appropriate indicators, and the projection thus obtained is then used to apportion the national total.

3. These two methods do not, of course, rule out the possibility of estimating some transactions in a provisional account on the basis of direct information or statistical indicators relating to the year under consideration.

Whether extrapolation methods could be refined depends on the timeliness of relevant regional short-term indicators.

Because of the assumptions one has to use when compiling provisional regional GVA estimates, it is recommended to compile these estimates at the same level of industrial detail as the final regional estimates, which should be at least at

the industrial detail of A*38 or preferably in greater detail of NACE Rev 2. Moreover it is recommended not to publish the data at the same level of detail of the final accounts but at a more aggregated level.

Revisions to the regional accounts have to be analysed carefully on an annual basis. This analysis could result in recommendations for the compilation of national accounts, but also in recommendations for the compilation of regional accounts estimates.

3.9. Accuracy of regional accounts estimates (A, B and C-methods)

3.9.1. Introduction

This manual describes possible methods that can be used for the estimation of regional accounts indicators such as GVA in current and previous year's prices, GFCF, employment, primary and disposable income of households, and final consumption expenditure of households.

The methods are classified according to their suitability. They can be divided into three groups (¹³), as follows:

1. **A-methods** represent the actual values or approximate the ideal as closely as possible.

2. **B-methods** are acceptable alternatives: they are further away from the ideal but still provide an acceptable approximation.

3. **C-methods** are too far away from the ideal to be considered as acceptable and should be improved if possible.

This classification will be used throughout this manual.

The A, B and C-classification aims to improve current practice. The main goal is achieving greater comparability between the regional data of the EU countries. The classification is also a tool for self-assessment. It sets out in what direction improvements can be made. In this way, it becomes clear where the biggest problems exist in terms of missing data and how far current practice is away from best practice. Nevertheless, it may well be that in specific cases the ideal methods are impractical in the short or medium term because of a lack of suitable source data.

That might for instance be the case for the estimation of the GVA of local KAUs of a multiregional enterprise or general government. It might be that the capital intensity of the production processes of the local KAUs varies for each local KAU, for instance between ancillary units and production units. In the case of multiregional enterprises the main components of GVA of a local KAU, i.e. compensation of employees, consumption of fixed capital and net operating surplus should, according to the income method,

be taken into account. This implies that, for a local KAU, besides compensation of employees there should also be information available about the stock of fixed assets and the expected average economic life of the different categories of those goods that enable the application of the Perpetual Inventory Method (PIM) for measuring consumption of fixed capital (see ESA 2010, par. 3.141). However this information will not be available in the short or medium-term (see par. 3.2.1). Also the regional allocation of net operating surplus to the local KAU is highly arbitrary. This implies that the allocation of net operating surplus can only be based on a convention.

This example demonstrates that at present the ideal method cannot be applied because of a structural lack of regional data for consumption of fixed capital. Therefore comparability between the methods that are applied by EU countries for the estimation of regional GVA of local KAUs of a multiregional enterprise is the highest achievable goal. Based on these observations it is, for the time being, acceptable that GVA estimates for local KAUs of a multiregional unit that account for the regional distribution of compensation of employees, but not that of consumption of fixed capital and net operating surplus, can still be considered a **B-method**. However, in some cases gross operating surplus might be regionalised on the basis of indicators that are considered to reflect capital intensity. Some examples will be discussed in more detail in chapters 4 and 5.

The classification of methods can differ at different NUTS levels; it can differ for uniregional and multiregional enterprises, for small and large enterprises, from indicator to indicator, from industry to industry and from economic accounts by industry to household accounts. What is considered a good method for one indicator can be less suitable or even unacceptable for another. For example, the use of labour figures for the estimation of GVA might be classified as a **B-** or **C-method** while being an **A-method** for employment.

Institutional differences between countries may lead to different data sources being available and therefore different applicable methods. The results of the different methods can nevertheless be comparable. The A, B and C-classification shows which methods are considered to give acceptable results and which methods give unacceptable results. It provides the framework for a harmonised approach to improving the reliability and comparability of transactions and balancing items in the regional accounts.

The most appropriate method for estimating the regional variables will depend largely on the particular circumstances, however a few general criteria can be specified for regional accounts data. See also par. 4.3 about the choice of indicators for the regional accounts by industry.

Before going into detail, eight observations have to be made:

(¹³) See also the *Handbook on price and volume measures in national accounts*, Eurostat 2001.

I.   Regional accounts staff should be aware of the reliability of the source statistics for regional purposes and the methods used to compile the source statistics and the national accounts (see par. 3.7).

II. Surveys are generally based on samples and are designed for national purposes. Samples might be partly census based, for instance for bigger enterprises, and partly based on a fraction of the total population of smaller enterprises. It is necessary to verify whether the sample for small enterprises is representative for the regions at levels NUTS 1, 2 and 3. If the latter is not the case for a regional level, for instance NUTS 3 level, one should use a small area estimation method (¹⁴).

III. The regional accounts estimates can never have a higher classification than the classification of the source statistics used for the regional accounts estimates (see par. 3.7). That might for instance be the case if employment data of LFS are used, without any correctivn, for the regionalisation of GVA at NUTS 3 level, for the LFS sample survey is not designed for reliable data at NUTS 3 level.

IV. For reasons of consistency, regional accounts should try to use the same data sources as the national accounts.

V.   Accuracy of the data might be improved by using the most suitable regional indicators (when available) at for instance NUTS 1 or NUTS 2 level, and less suitable indicators at NUTS 3 level. The estimates at NUTS 1 or NUTS 2 level are then compiled prior to the estimates at NUTS 3 level (see also par. 3.4). The data at NUTS 2 level are crucial for the purpose of the allocation of the Structural Funds.

VI. The regional accounts by industry in current prices at NUTS 2 level should be based on at least NACE Rev. 2 division, A*38 (see Annex 3a) and for some industries even the industrial detail of A*64 or beyond is preferred for the purpose of early estimates and estimates in prices of the previous year.

VII. The use of the rules of ESA 2010 is essential.

VIII. The A, B or C-classification cannot be given in precise confidence intervals, but merely focuses on the methods and statistical indicators used for the compilation of the regional aggregates.

(¹⁴) See for instance: The EURAREA Consortium, Enhancing Small Area Estimation Techniques to meet European Needs, EURAREA, August 2004.

3.9.2. Regional accounts by industry

3.9.2.1. Compilation of GVA, output and intermediate consumption or components of GVA in current prices

This paragraph is closely related to paragraph 3.4, in which the theoretical concepts are described for a correct use of indicators for estimating regional GVA by industry.

1. **Bottom-up** methods for which the sum of the regional totals generally does not add up to the national accounts total can be considered as **A-methods** if the following conditions are satisfied:

   a. Issues causing a difference between the national accounts total and the corresponding regional total have to be investigated, especially where the issues have a regional dimension. The national accounts process tables are of help to approach this in a systematic way. The causes might be, for example: adjustments in the national accounts for the non-observed economy, data validation, concepts, and the balancing of the Supply and Use tables. The main question is whether the differences have a regional dimension. When the adjustments are based on statistical units they do, by definition, have a regional dimension and the regional accounts estimates should account for this. The same can be true for estimates of the non-observed economy.

   b. If the presence of a regional dimension to the difference has not been investigated, the method would become a **B-method**.

   c. Differences caused by balancing do not generally have a specific regional origin. Because of this, such differences can be allocated to regions pro rata. This would be an **A-method**.

2. **Pseudo-bottom-up:** using these methods, data for local KAUs have to be estimated for multiregional enterprises, using either the output or the income approach.

   a. Output and intermediate consumption for multiregional enterprises are available for the local KAUs. This would be an **A-method**. This method may also be classified as a bottom-up method.

   b. For large multiregional enterprises estimates of GVA for local KAUs have been made for which:

      — **For the income approach:** this method is considered an **A-method** if the labour input and the capital intensity of the local KAUs has been separately taken into account or when there are no big differences in capital intensity for the local KAUs. The latter might be the case for a chain of shops in the retail trade. However, be aware of distribution centres for such industries that generally have much higher capital intensity. If

the capital intensity of the local KAUs has not been separately taken into account, the method would become a **B-method** when the distribution centres do have high capital intensity. The result is based on a mixed method (see also par. 3.9.1).

— For the **output approach:** this method is considered an **A-method** if the regional indicators used are closely related to the regional distribution of output and intermediate consumption. For instance if the output of local KAUs is estimated by the turnover of the local KAUs, it is assumed that there are no changes in stocks (see par. 3.4). If intermediate consumption is estimated by using a fixed proportion of output, it is assumed that the production processes are exactly the same for each local KAU. The assumptions need to be verified. If the verification has been done and the results show acceptable results, the method is considered a **B-method**. The method is a **C-method** if the verification has not been done.

3. **Top-down output methods** for industries where comprehensive regional data on produced goods and their prices and intermediate consumption are available can be classified as **A-methods**. This is for example the case for agriculture where data can be based on the agricultural census and collected producer prices. If estimates for intermediate consumption are model-based, then the GVA estimate becomes a **B-method**.

4. **Top-down methods** for the regionalisation of GVA where the regional indicator is closely related to GVA would be an **A-method**. For instance, this might be the case with the regional distribution of GVA of central government and the compensation of central government employees. The additional condition is that consumption of fixed capital is also closely related to compensation of employees. However, the regionalisation of GVA by compensation of employees would be a **B-method** if consumption of fixed capital is not closely related to compensation of employees.

5. Methods that do not fulfil the criteria of the A or B-methods are **C-methods**. That is generally the case for **top-down** methods where no appropriate indicators have been used. Such methods need to be avoided as far as possible.

3.9.2.2. Compilation of GVA, output and intermediate consumption or components of GVA in prices of the previous year

The *Handbook on price and volume measures in national accounts* ([15]) gives guidelines for appropriate methods to

compile GVA in prices of the previous year. One of the principles is that the compilation should be based at least at P*64 of CPA 2008. However, the compilation of regional GVA in current prices is not directly product based, but based on aggregated transactions such as output and intermediate consumption.

The compilation of regional GVA in current prices is recommended to be based at least at A*38 of NACE Rev. 2 (see par. 3.9.1). However, this level of aggregation is probably inadequate for the compilation of regional GVA in prices of the previous year. Therefore it is recommended to compile regional GVA in prices of the previous year in greater detail than A*38. This will be discussed further in chapter 6. This chapter also discusses in detail which methods are considered A, B, or C-methods.

3.9.3. Regional labour data by industry

1. **Bottom-up** methods, based on the residence of the local KAU or the region for compensation of employees, total employment and total of employees in numbers of persons and hours worked can be considered as **A-methods**. This implies that if the sum of the regional totals does not add up fully to the national accounts total, the difference has been investigated to establish if it has a regional component. If a substantial difference has not been investigated and is proportionally allocated to regions top-down, the method would become a **B-method**. If there is a regional component, corrections should be made. If these corrections are not made the method becomes a **C-method**.

2. **Bottom-up** methods, based on the residence of self-employed and employees would be an **A-method**, if corrections have been made for commuting, the employer's part in compensation of employees and if the industry of the employed persons can be determined in an accurate way. This is rarely the case.

3. **Top-down** methods, based on the residence of the local KAU and indicators which are closely related could be an **A-method**. For example, the regional distribution of the number of employees may be used to allocate the national accounts total of wages and salaries to regions, if the composition of employees regarding wage level, education levels, part-time work etc. is (almost) exactly the same in each region. If indicators are less closely related or the wage level etc. varies between regions and no corrections have been made, the method would become a **B- or even a C-method** where the composition of employees differs highly for the different regions.

3.9.4. Regional data on GFCF

To become an **A-method** regional data on GFCF have to be based on surveys, administrative data, or technical, professional and trade journals which at least contain the required

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([15]) *Handbook on price and volume measures in national accounts*, Eurostat and European Commission, 2001 edition.

regional breakdown, GFCF classification, ownership, valuation and time of recording. It is in fact very difficult to find indicators that are closely related (see par. 1.2.4), especially for investment in all kinds of machinery, buildings and civil engineering works.

Some investment in assets, such as personal computers, is related to employed persons. If one can assume a close relationship between the indicator employed persons and investment in 'personal' assets, such a method becomes a **B-method**.

This implies that methods which are not based on the above conditions become **C-methods**. See chapters 7 and 8 for more details.

3.9.5. Regional sector accounts of households

Regional accounts of households are generally based on a variety of sources. The regional distribution of household income is mainly based on fiscal registrations. It is acknowledged that fiscal registrations underestimate household income because of tax evasion. There are several techniques to provide estimates for this phenomenon in national accounts, without attempting to get regional data on the non-observed economy (see also par. 3.7.2). In most of the cases regionalisation of the national estimates for the non-observed economy will be done on the regional distribution of households or other variables.

The regional distribution of household primary income might also be based on compensation of employees, operating surplus (from owner-occupied dwellings) and mixed income of self-employed people from the regional accounts by industry. This is conditional on corrections being made for commuting and cross-border workers. Besides that, separate estimates for self-employed people and the non-observed economy should be available at the required regional level.

The regional distribution of final consumption expenditure of households is generally based on different statistics or registrations. Household budget surveys are of limited use as they are generally designed for national purposes and do not usually cover institutional households, such as homes for the elderly etc. The non-observed economy might also be important. Non-response in the household expenditure surveys may lead to biased results. This implies for example that data for the retail trade might serve as a basis for the estimates of food consumption by households. In national accounts domestic consumption data are corrected for the consumption of non-residents in the country and the consumption by residents in other countries. In regional accounts it is almost impossible to correct for these flows.

The main conclusion is that it seems practically impossible to apply **A-methods** for the compilation of regional final consumption expenditure of households.

3.9.5.1. Primary and disposable income of households

1. **Bottom-up methods** applied to income transactions that constitute the balancing items primary and disposable income would be **A-methods,** if the sum of the regional totals is close to the corresponding national accounts total and the difference between the regional and the national accounts totals is proportionally allocated to regions by income transaction. The resulting data are thus based on a mixed method. There are separate regional estimates for the non-observed economy (see also par. 3.7.2 and 10.4) using for instance the regional distribution of mixed income as an indicator.

2. **Top-down** methods applied to income transactions that constitute the balancing items primary and disposable income can be considered **A-methods**, if appropriate regional indicators are used to allocate the national accounts total to regions. There are separate regional estimates for the non-observed economy using for instance the regional distribution of mixed income as an indicator.

3. If no separate estimates have been made for the non-observed economy, the method would become a **B-method** or, if none of the aforementioned methods are used, a **C-method**.

3.9.5.2. Final consumption expenditure of households

1. **Bottom-up** methods cannot be applied because sufficient reliable data sources on final consumption are lacking. Thus **top-down** methods are the norm for the regionalisation of final consumption expenditure of households. When appropriate regional indicators can be used for the regionalisation of final consumption, this will be classified as a **B-method**.

2. **Top-down** methods using inappropriate regional indicators, such as using the regional distribution of the resident population to estimate the consumption of electricity, are classified as **C-methods** that are unacceptable and should be improved. See par. 10.4 for more details.

General principles and methods for the compilation of regional GVA by industry and regional GDP

4

4.1. Introduction

Regional GVA is a measure of the economic activity of local KAUs 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 production unit carrying out the activity is resident. The activities may be categorised as production activities and ancillary activities.

The local KAUs for production activities may be farms, mines, oil platforms, factories, building sites, shops, airports, railway stations, harbour installations, offices of lawyers, government buildings, hospitals etc.

Separate local KAUs for ancillary activities, which are located in different regions to their associated production units, may be administrative centres (head offices of multi-regional enterprises), distribution centres for retail and wholesale trade and post, maintenance centres for mobile equipment etc. Mobile equipment is explicitly excluded as a production unit and its activity has to be attached to a local unit.

The residence of the local unit is an essential criterion for the allocation of the GVA generated in local units to a particular region (see par. 2.3).

The quality of the estimated GVA per region clearly depends on the availability and quality of the statistical sources. For national and regional statisticians, the ideal world would be one where comprehensive and perfect data were available that perfectly suit the economic concepts of the system of national and regional accounts. In reality the available data are far from comprehensive or perfect (see par. 3.9.2).

A key requirement of the compilation of national accounts is that the results of the process have to fit into a set of macro-economic identities in which supply equals demand. When this condition is not fulfilled, the national statisticians have to balance the data through an iterative adjustment process. In this process the statisticians have to consider possible divergences from the definitions, the universe from which the data are drawn, sampling errors etc. The outcome of the balancing process is a complete set of consistent data.

Because of this balancing process and because of non-sampling errors, it is impossible to describe the statistical results in terms of standard errors. Therefore the accuracy of the national accounts results cannot be quantified using statistical confidence intervals. This fact, and public interest in the national and regional accounts data, make it necessary to clarify the compilation process in terms of sources and methods used. The Gross National Income (GNI) inventories and process tables provide a profound clarification of the compilation of the national accounts. Process tables are meant to provide transparency in the description of the statistical process from source data, adaptations and integration, to the final results. This transparency contributes to a better standardisation of the process with reproducible results.

The choice of sources and methods used to compile regional GVA also has to be clarified. As we have seen, two methods can be used: the production approach and the income approach. Should it be one method or a combination of methods? Each method requires the availability of suitable sources, but why is one source better suited than another? This question requires a profound knowledge of the possible sources in terms of the sample frame, sample size, response rate, imputation method for non-response, sampling and non-sampling errors, grossing-up methods, stability of the results in time, definitions used, divergence from the national accounts definitions, sources for adapting data to the national accounts definitions, timely availability of the data etc. Is the level of regional GVA the main purpose or is the focus on changes in regional GVA in current prices or in prices of the previous year? This may require the use of different sources, so the statisticians must judge the suitability of sources for national and regional accounts purposes.

Generally speaking, there are more potential sources for the compilation of national accounts than for the regional accounts. The regional accounts generally have to rely on limited information. The main limitations are the following:

1. Although the local KAU (establishment in SNA) is recommended by ESA2010 and SNA2008, most countries only have available data at the enterprise level for the description of the production process. Therefore data for multiregional enterprises have to be allocated to regions according to economic indicators such as persons in employment, number of employees, compensation of employees or other data that have some relationship with the value added of these local KAUs.

2. In most countries, the statistical results in the regional accounts are based on a mixed method using comprehensive information for large enterprises and samples or administrative data for small enterprises. Economic indicators have to be used to compile the results for the sampled part or administrative data may be used.

3. Generally, comprehensive data are available for finalised years, which is not the case for provisional years. For provisional years, both the national and regional accounts estimates of GVA are generally based on indicators.

4. In some countries, surveys face growing (unit and item) non-response, so that indicators or data from alternative sources have to be used to impute data for the non-responding units.

5. Some countries use registrations. This might give problems with timeliness, the fit with the national accounts

definitions, information not reported to the administration (the non-observed economy) and changes in legislation that affect the comparability of the data. Again indicators have to be used for an accurate description of the (regional) economy.

By the end of this paragraph we have to stress that this manual is limited to the concept of accuracy as used in the Eurostat quality reports (see par. 1.7). In these quality reports accuracy is one of the principal aspects of quality. Other aspects, such as timeliness and punctuality, accessibility and clarity, comparability, coherence and completeness also play an important role in the quality reports, but these aspects have been left aside in the process tables.

4.2. Applying the production and/or income approach

GVA by industry can be estimated in two ways (see par. 3.2.1): the output and the income approaches. The two methods lead to the same GVA and both methods are generally applied at the national level. The output and income measures of GVA by industry at national level can be used together in Supply and Use tables to validate each other.

Both approaches can also be used for regional accounts by industry. Ideally two estimates would be calculated independently and the results used together. In practice Member States only have regional data for one set of estimates. Most Member States use an output method supplemented with the income method for general government, the health industry and some service industries for which little output data are available.

The income and production approaches can be used in combination with the various bottom-up and top-down methods discussed in par. 3.3. There is no obligation for Member States to adopt the same approach. The choice depends mainly on the statistical sources available and methods should be designed to make the best possible use of whatever detailed regional data exist.

1. For the *production approach* output (basic prices) and intermediate consumption (purchasers' prices) should be available.

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

   a. **Compensation of employees:**

      — Wages and salaries.

      — Employers' social contributions.

   b. **Gross operating surplus (GOS):**

      — Net operating surplus of corporations.

      — Net mixed income of unincorporated enterprises.

— Net operating surplus from owner-occupied dwellings.

— Consumption of fixed capital.

c. **Other taxes less subsidies on production.**

4.3. The choice of indicators in the case of multiregional KAUs, ancillary units and units without permanent labour

4.3.1. Value added of ancillary units of a multiregional enterprise

No delivery of ancillary output between local KAUs is recorded, unless it is observable (see ESA 2010, par. 1.31 and 13.22). This implies that the outputs of ancillary units are only recorded as far as this is practised in the national accounts. If output of an ancillary unit is recorded, the main rule in national accounts is that 'output of the ancillary unit may be estimated by summing costs' (ESA 2010, par. 1.31 and 13.23). It may be unlikely that the ancillary unit, as local unit, will be distinguished. This doubt is based on the regulation regarding the business register (No 177/2008). This regulation states in the Annex that the stratification characteristic 'Activity carried out in the local unit constituting an ancillary activity of the enterprise to which it belongs' is optional. Therefore this information may not be available in a systematic and organised way.

The rule of summing costs (ESA 2010, par. 1.31 and 13.23) implies that information should be made available about compensation of employees, consumption of fixed capital and other taxes less subsidies on production.

We can now distinguish the following situations:

1. An ancillary unit is a local unit which resides in a region different from the regions where the production units reside. Information about the ancillary unit is **available** in the national accounts. This implies that information is also available for the regional accounts. In this case we can apply the bottom-up method with exactly the same valuation of output and intermediate consumption as in the national accounts. This can be labelled as an **A-method**.

2. An ancillary unit is a local unit which resides in a region different from the regions where the production units reside. Information about the ancillary unit is however **not available** in the national accounts. This case is more complicated, for in the national accounts no separate estimate has been made for the output of the ancillary unit. In this case we have to solve the contradiction that, according to ESA 2010, par. 3.13, we have to allocate ancillary activities to the 'region where the ancillary activities are situated' and at the same time we have to fulfil the condition that the regional accounts variables

have to add up to the corresponding national totals (see ESA 2010, par. 13.02).

I.   The scenario in which the national accounts estimate is based on all local units, excluding the ancillary unit, with available information about output, intermediate consumption, compensation of employees, consumption of fixed capital (CFC) and the balancing items GVA and net operating surplus (NOS), is shown in Table 1. For the ancillary unit, information is only available about compensation of employees, hours worked and an estimate for CFC, which plays a role because of its importance as part of GVA. Intermediate consumption by the ancillary unit is already allocated to the production units. According to ESA 2010, par. 13.23 NOS is by definition zero. The costs of the ancillary unit serve the production processes of the production units in the other regions, by which intermediate consumption of the production units will be increased. Hours worked of employees of the production units have been used to allocate the sum of costs to the regions of the production units. It might be assumed that the ancillary activities mainly involve activities, such as accounting, data processing, maintenance, purchasing, distribution etc., which are strongly related to the number of hours worked of employees. This is a pseudo-bottom-up method with a top-down element for the regional allocation of the sum of the costs of the ancillary unit, which would be labelled an **A-method**.

II.   For GVA of the ancillary unit, the same situation results when the output of the ancillary unit (160) is estimated as the sum of the costs, in our example compensation of employees (150) and consumption of fixed capital (10). The estimated output of the ancillary unit has to be allocated to the production units, using the same regional distribution key as in scenario I. As a consequence, the corrected output and intermediate consumption of the enterprise differs from the originally estimated data, while the estimate of total GVA of the enterprise remains unchanged (see Table 2). Regional GOS will be compiled as the difference between the corrected regional GVA and the sum of compensation of employees and other taxes less subsidies on production per region.

This method for the estimation of regional GVA will be an **A-method**, as in the first scenario. However, two remarks have to be made.

1.   Firstly, output and intermediate consumption do not add up to the national accounts totals, if the national accounts estimates are directly based on the SBS. This may pose problems where output and intermediate consumption are grossed up to the corresponding national accounts totals. If this is the case, method I is preferred.

2.   Secondly, the compilation of GVA in prices of the previous year favours the double deflation method, for which correct data for output and intermediate consumption are necessary. In this case, method I is again preferred.

The examples I and II are a simplification of reality because other taxes less subsidies on production are not taken into account. However, including these taxes and subsidies will not fundamentally change the method.

Scenarios I and II will probably almost never occur and might be described as the ideal situation. They might however serve as a benchmark for situations in which less favourable data are available.

III. The main problem is that, for the ancillary units, data are generally only collected for compensation of employees and employment, as is generally the case for local KAUs of a multiregional enterprise or KAU (number of employees or hours worked). This implies for the ancillary unit a lack of data for output and intermediate consumption, and probably also for CFC and NOS. With the absence of regional data for the previously mentioned variables, a solution for estimating GVA of the ancillary unit might be the adoption of a combination of the income approach and top-down method.

So, we need at least the regional distribution of compensation of employees and of national gross operating surplus (GOS). The regional distribution of compensation of employees is generally available and the regional distribution of GOS is generally not available. Therefore the focus is on which regional indicators should be applied to GOS where no direct regional indicators are available. Table 3 provides a possible solution.

GVA of the ancillary unit may be estimated by summing compensation of employees of the ancillary unit and CFC of the ancillary unit. By definition NOS is zero. It is essential that an estimate of CFC of the ancillary unit should be made. The main reason is that the share of CFC in GVA of the ancillary unit generally differs largely from the share of CFC of the production units. One should try to avoid over or under estimation of GVA for the ancillary unit. The next step is to allocate GOS (excluding GOS of the ancillary unit) to the production units in the different regions.

The regional distribution of compensation of employees might be a suitable indicator if the share of compensation of employees in GVA is similar across different regions. If this is the case and a separate estimate for CFC has been made for the ancillary unit, this method may be classified as a **B-method**.

Where no separate estimate can be made for CFC of the ancillary unit and an indicator has to be used such as the number of employees or hours worked of employees, this

Table 1: Correction of intermediate consumption of production units with the sum of compensation of employees and consumption of fixed capital using the output method

Regions		Output	Intermediate consumption	Sum of costs	GVA of which already corrected with intermediate consumption of ancillary unit	Corrected GVA	Comp. of employees	CFC	NOS	Hours worked of employees	GOS
		1	2	3	4	5	6	7	8	9	10
		Given data	Given data	Using distribution of 9 regarding production units	4=1-2	5=6+7+8 and 5=4-3 Balancing item	Given data	Given data	8=5-6-7 Balancing item	Given data	10=7+8 Balancing item
Ancillary unit	1	0	0	-160	0	**160**	150	10	0	20	10
Production unit	2	400	190	16	210	**194**	95	40	59	10	99
Production unit	3	800	425	24	375	**351**	170	60	121	15	181
Production unit	4	3 000	1 850	80	1 150	**1 070**	500	200	370	50	570
Production unit	5	700	375	40	325	**285**	150	60	75	25	135
National		**4 900**	**2 840**	**0**	**2 060**	**2 060**	**1 065**	**370**	**625**	**120**	**995**

Table 2: Correction of intermediate consumption of production units with the sum of compensation of employees and consumption of fixed capital using the output method

Regions		Output	Intermediate consumption	Correction for intermediate consumption of ancillary unit	Corrected intermediate consumption	GVA without correction for intermediate consumption of ancillary unit	Corrected GVA	Comp. of employees	CFC	NOS	Hours worked of employees	GOS
		1	2	3	4	5	6	7	8	9	10	11
		Given data	Given data	Using distribution of 10 regarding production units	4=2+3 and autonomous correction for unit 1 and 4	5=1-2 and no GVA for ancillary unit	6=1-4 Balancing item	Given data	Given data	9=6-7-8 Balancing item	Given data	11=6-7 Balancing item
Ancillary unit	1	**160**	0	0	**0**	0	**160**	150	10	0	20	**10**
Production unit	2	400	190	16	206	210	**194**	95	0		10	**99**
Production unit	3	800	425	24	449	375	**351**	170	0		15	**181**
Production unit	4	3 000	1 850	80	**1 930**	1 150	**1 070**	500	0		50	**570**
Production unit	5	700	375	40	415	325	**285**	150	0		25	**135**
National corrected total		**5 060**	**2 840**	**160**		**2 060**	**2 060**	**1 065**	**X**	**X**	**120**	**995**
National original total		**4 900**	**2 840**	**160**	**3 000**	**2 060**	**2 060**	**1 065**	**X**	**X**	**120**	**995**
Difference		**160**			**160**							

method would still be considered a **B-method** (see par. 3.9.1). Table 4 gives the results of this exercise. It is clear that this method, when the ancillary unit or head office has the majority of employment, gives an overestimation of the GVA of an ancillary unit with low capital intensity and an underestimation of the production units with high capital intensity. The opposite might be the case when ancillary units have high capital intensity and the production units low capital intensity, e.g. for high tech distribution centres. However, in the short-term these problems cannot be solved.

The head office supplies mainly ancillary services to the production units. If the head office is in a region different from the regions where the production units are resident, one could apply the method as previously explained.

4.3.2. Value added of units without significant permanent labour

It is obvious that employment is not an indicator that can be used to allocate GVA of enterprises to their sites without significant permanent labour. This implies the use of physical indicators, such as the regional distribution of kWh of electricity produced, barrels of extracted oil, number of m³ of gas extracted etc.

4.4. Transition from regional GVA to regional GDP

4.4.1. 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.

Regional GDP is valued at market prices by adding the regionalised taxes less subsidies on products and imports, and the Value Added Tax (VAT), to regional GVA at basic prices (see ESA 2010, par. 13.35).

Other taxes and subsidies linked to production, such as real estate tax, environmental taxes, motor vehicle tax and wage subsidies, form part of regional GVA at basic prices and should be allocated to the local KAU or local unit where the production takes place. They should be distinguished from taxes and subsidies on products, imports and VAT, which are different in impact and need to be allocated separately for the estimation of regional GDP.

4.4.2. Regional allocation of Value Added Tax (VAT) and taxes and subsidies on products and imports

Taxes on products include, amongst others: VAT, import duties, excise duties on motor spirits, tobacco and alcohol, energy levies, taxes on passenger cars etc. Subsidies on

products include, for example: subsidies on food, public transport subsidies, research and development (R&D) subsidies, rent subsidies, subsidies on recreation, culture and sport.

ESA 2010, par. 13.43 states that 'by convention, these supra-regional taxes and subsidies are allocated on the basis of the relative size of GVA of all industries in the region, valued at basic prices.'

Alternative methods of regional allocation can be applied on a case-by-case basis for territories with specific fiscal systems, resulting in significantly different rates of taxes and subsidies on products within a country (ESA 2010, par. 13.43).

Alternative methods need to be requested by the Member States and authorised by Eurostat on a case-by-case basis.

4.5. Regional GDP per capita and regional population

Regional GDP per capita plays an important role in the allocation of the EU Structural Funds to the less prosperous regions ([16]). This section devotes attention to the regional population. The definition of population is based on chapter 11 of ESA 2010.

According to ESA 2010, par. 11.05, the regional population as used for regional accounts purposes is defined as follows: on a given date, the total population of a region consists of all persons, national or foreign, who are permanently settled in the economic territory of the country, even if they are temporarily absent from it.

The paragraphs 11.06-11.08 in ESA 2010 provide information about which people are included in the total population and which are not included for the national economic territory. The biggest groups concerned are members of the armed forces stationed abroad and students studying abroad. However, ESA 2010, chapter 13 par. 13.52 makes an exception to the main rule by allocating students and long-term patients as residents of the host region in the home country if they stay there for more than one year.

If population data as per ESA 2010, par. 11.05 to 11.08 are not available, it is considered acceptable that the average regional population is based on registered or similar regional population data.

GDP per capita figures for the extra-regio territory will not be calculated (ESA 2010, par. 13.44). The reason is that there is no resident population in the extra-regio territory.

([16]) In areas with a high proportion of commuters, regional GDP per inhabitant can be extremely high, particularly in economic centres such as London (United Kingdom), Vienna (Austria), Hamburg (Germany), Prague (Czech Republic) or Luxembourg, and relatively low in the surrounding regions, even if households' primary income in these regions is very high. Regional GDP per inhabitant should, therefore, not be equated with regional primary income (Eurostat regional yearbook 2011).

Table 3: Only available are national GVA, regional distribution of compensation and hours worked of employees and national GOS and an estimate for CFC of ancillary unit; compensation of employees gives distribution key of 9, using the income method

Regions		Output	Intermediate consumption	Correction intermediate consumption	GVA	Corrected GVA	Comp. of employees	CFC estimate ancillary unit	Hours worked of employees	GOS
		1	2	3	4	5	6	7	8	9
						5=6+9	Given data		Given data	
Ancillary unit	1					**160**	150	10	20	**10**
Production unit	2					**197**	95		10	**102**
Production unit	3					**353**	170		15	**183**
Production unit	4					**1 038**	500		50	**538**
Production unit	5					**311**	150		25	**161**
National						**2 060**	**1 065**	**10**	**120**	**995**

Table 4: Only available are national GVA, regional distribution of compensation and hours worked of employees and national GOS; hours worked by employees give distribution key of 9 using the income method

Regions		Output	Intermediate consumption	Correction intermediate consumption	GVA	Corrected GVA	Comp. of employees	CFC estimate ancillary unit	Hours worked of employees	GOS
		1	2	3	4	5	6	7	8	9
						5=6+9	Given data		Given data	
Ancillary unit	1					**316**	150	0	20	**166**
Production unit	2					**178**	95		10	**83**
Production unit	3					**294**	170		15	**124**
Production unit	4					**915**	500		50	**415**
Production unit	5					**357**	150		25	**207**
National						**2 060**	**1 065**	**0**	**120**	**995**

The annual average of head counts of the regional total population will provide an appropriate denominator to enable comparisons.

A necessary condition is that the compilation method of the annual average population is the same for annual national and regional GDP per capita estimates. The methods for the compilation of the annual average population differ between countries because of the varying availability of population data sources.

The compilation of the annual average population may be based on the following methods:

1. 12 monthly averages.

2. 4 quarterly averages.

3. The average of the population at January 1 of two consecutive years.

4. A mid-year estimate.

Monthly or quarterly population figures are preferred for consistency with quarterly national GDP per capita estimates and annual national and regional GDP per capita estimates.

The most important condition is that the sum of the annual regional average population must be equal to the annual national average population, which is the case when the same compilation method has been used at the national and regional levels.

Applying the principles for the regional allocation of GVA in current prices to particular industries (NACE Rev. 2)

5

5.1. Introduction

This chapter discusses regional GVA estimates for industries where statisticians have encountered specific difficulties with principles, methods and data. It illustrates the practical application of the concepts of ESA and the general principles of chapter 4. All the principles in chapter 4 apply to these industries and are referred to rather than reiterated in this chapter.

This chapter also gives practical guidelines, for instance for GOS (see also par. 3.9.1), and numerical examples (par. 5.5.5.) on methods and data for the industries concerned. These recommendations should be applied across the European Union, improving the comparability of the estimates.

5.1.1. Industries covered

Regional tables of GVA by industry are based on NACE Rev. 2 sections. Therefore GVA by industry should be evaluated according to this standard classification.

The following industries, which correspond to sections of NACE Rev. 2, need further consideration:

B   Mining and quarrying

D   Electricity, gas, steam and air conditioning supply

E   Water supply; sewerage, waste management and remediation activities

F   Construction

H   Transportation and storage

J   Information and communication

K   Financial and insurance activities

L   Real estate activities

The main issues specific to these industries are as follows:

— Mining and quarrying activity is usually located in the regional territory of a country. However, some countries do have an element of production in the extra-regio territory.

— Activities of sections D, E and J are all affected by cross-border activities using a network of cables, pipelines or wireless networks.

— Construction may take place in a region different from the fixed establishment of the producer.

— Transportation includes an element of cross-border activity by road, rail, water and air.

— Financial intermediation services indirectly measured (FISIM) face data issues.

— Real estate activities have the important element 'imputed rent of owner-occupied dwellings'. The element 'imputation' especially needs clarification.

These industries will be discussed in more detail in the following paragraphs.

5.1.2. Other industries

Methods for agricultural accounts are covered in: *Manual on the economic accounts for agriculture and forestry EAA/ EAF 97 (REV. 1.1).* This manual provides comprehensive information on the regional accounts for agriculture. These accounts are based on a regulation ([17]) and are in line with ESA. The data are provided to Eurostat at NUTS 2 level. Regarding accuracy issues, see par. 3.9.2.

Regarding the industries of sections C, G, I and M to T there are fewer difficulties in understanding how the general principles should be applied, although there may be data and other practical problems. The principles described in chapter 4 can be applied for these industries.

5.2. Mining and quarrying (Section B)

Section B consists of the following activities (see NACE Rev. 2, A*88):

05   Mining of coal and lignite

06   Extraction of crude petroleum and natural gas

07   Mining of metal ores

08   Other mining and quarrying

09   Mining support service activities

Discussion here will focus on industry 06, Extraction of crude petroleum and natural gas. In this case we have the general problem of multiregional enterprises with (sometimes) unmanned production stations, ancillary units and head offices. The production stations are located in the regional territory or in the extra-regio territory and extract crude petroleum and natural gas. The majority of the production of crude petroleum and natural gas will be allocated to these production units, whether they are manned or unmanned. If the production unit is permanently situated at the continental shelf, or in international waters under the country's sovereignty, then the production and value added will be allocated to the extra-regio territory. However, value added also has to be allocated to the ancillary units and the head office. For this general problem reference can be made to par. 4.3, which provides the principles for the allocation of value added to the aforementioned units. The section about 'value added of ancillary units (*and head offices) of a*

([17]) Regulation (EC) No 138/2004 of the European Parliament and of the Council of 5 December 2003 on the economic accounts for agriculture in the Community.

multiregional enterprise' and the classification of A, B and C-methods are especially relevant.

Loss-making units in this industry may be difficult to identify and measure correctly because they are part of a multiregional enterprise. Most methods using regional indicators for the regional allocation of GVA or GOS of a multiregional enterprise implicitly assume that GOS has the same sign (positive or negative) in all production units of the enterprise.

5.3. Electricity, gas, steam and air conditioning supply (Section D) and Water supply; sewerage, waste management and remediation activities (Section E)

Sections D and E consist of the following activities (see NACE Rev. 2, A*88):

35 Electricity, gas, steam and air conditioning supply

36 Water collection, treatment and supply

37 Sewerage

38 Waste collection, treatment and disposal activities; materials recovery

39 Remediation activities and other waste management services

Discussion here will focus on industries 35 and 36 which often have different kinds of local units.

Distinctive features of industries 35 and 36 are:

— They have a few large capital-intensive units such as power stations, parks of windmills and solar collectors, but they also have a large number of labour-intensive administrative local units (ancillary units and head offices).

— They also have distribution networks of pipelines (gas, water, steam, air conditioning) and cables (electricity), which may cross regional boundaries.

— In general these industries consist of a small number of enterprises (electricity production).

— Often electricity will be produced by enterprises that are different from the enterprises that distribute the electricity.

— The leading enterprises in these industries are active throughout the entire national territory or at least in several regions.

GVA of these industries must be allocated to the residence of the local producer and ancillary units and the head office of the enterprise (multiregional unit) according to the

principles and A, B and C-classification, provided in chapters 3 and 4. Therefore GVA should not be allocated to the regions of the consumers.

Recent developments are that production, distribution and trade in electricity and gas are increasingly done by different enterprises. This makes the description for these industries more complex because there are enterprises that have an output of electricity and gas, enterprises that distribute electricity and gas (which is a service) and trading companies that produce a margin. Sometimes enterprises combine part of all of these activities. It might be relevant to distinguish, if possible, enterprises that produce (NACE Rev. 2, 35.11), transmit (35.12), distribute (35.13) and trade (35.14) electricity. For the production, distribution and trade of gas we should distinguish the manufacture of gas (35.21), distribution of gaseous fuels through mains (35.22), and trade of gas through mains (35.22).

5.4. Construction (Section F)

Section F consists of the following activities (see NACE Rev. 2, 3-digit level):

41.1 Development of building projects

41.2 Construction of residential and non-residential buildings

42.1 Construction of roads and railways

42.2 Construction of utility projects

42.9 Construction of other civil engineering projects

43.1 Demolition and site preparation

43.2 Electrical, plumbing and other construction installation activities

43.3 Building completion and finishing

43.9 Other specialised construction activities

The construction industry has some distinctive features. They are:

— Subcontracting is a feature of the construction industry.

— The output of the subcontractors is intermediate consumption for the main contractor.

— The main contractor is generally involved for more than one year in projects for constructing buildings, roads, bridges etc. The subcontractors will rarely be involved for more than one year.

— 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.

— Construction projects are done at building sites which could be located either in the region where the

enterprises have their permanent establishment(s) or in other regions or even in other countries.

— The production processes can differ significantly. For example, a dwelling might be built with prefabricated elements or with a traditional construction. This implies a different cost structure and labour input. Another example is the difference in production processes for the construction of residential buildings and the construction of railways.

— ESA 2010, par. 13.21c states: 'major construction projects undertaken by contractors from other regions are registered as a separate local KAU'.

— The population of construction enterprises consists generally of a large number of small enterprises, which implies the use of samples or registrations. The construction industry can be classified according to size class of the number of employed persons ([18]). The division in percentages for the EU-27 for employed persons in 2005 is as follows:

- 1-9 employed persons: 42.3 %
- 10-49 employed persons: 30.5 %
- 50-249 employed persons: 15.4 %
- 250 or more employed persons: 11.9 %

The following conclusions may be drawn:

1. Building sites should be treated as notional units of an enterprise when they are present for a year or more his guideline is for regional purposes based on ESA 2010, par. 2.09). It is clear that only when they meet this requirement are building sites likely to have the statistical information required.

2. Uniregional units may become multiregional units when they work for a year or longer as the main contractor on a building site which is located in a region different from their permanent establishment in another region.

3. Consortia must be counted as local units.

4. There is one main criterion for allocating value added to the building site. That is that the enterprises have to work for a year or longer on the building site. If the period is shorter than one year, value added should be allocated to the residence of the parent local unit.

5. The other criterion is the size of the construction project. However, we also have to think of the consistency between the output of the main contractors in the construction industry in a region and the fixed capital formation in the same region. Therefore the construction of a dwelling that lasts a year or longer, which might

be seen as a small project, has for reasons of consistency to be allocated to the region where the building takes place.

6. Because of the completely different nature of the production processes of the activities under the heading of the construction industry, it is recommended to compile the data at the 3-digit level.

7. From the breakdown by size in the previous paragraph it is clear that the majority of enterprises in the construction industry are small. These small enterprises do not generally encounter the problems of the larger enterprises with ancillary units, head offices and building sites.

5.4.1. Allocation of GVA

Data for the construction industry can generally be derived from the SBS or administrative sources. Generally speaking one can use the same principles, mentioned in par. 4.3, to allocate GVA to regions. One may distinguish production units, ancillary units and head offices for the larger enterprises, which might be uniregional but become multiregional when they work on a building site in a different region for a year or longer. The only difference is that the production units might be building sites in regions that are different from the region of the permanent local unit(s). So the main question is whether data or indicators are available for a proper allocation of value added to the building site.

The following information might be available in SBS or alternative sources:

1. An appropriate sample, designed for national estimates, might be drawn for smaller enterprises. The following points have to be taken into account:

   a. It may be assumed that these small enterprises generally work locally or operate in other regions for less than one year. As a consequence these data will be allocated to the region of the permanent local unit.

   b. It depends on the sample design and (non-) response rate, whether the distribution of the grossed-up regional GVA data can be used, which is in fact a bottom-up method. This might be classified as an **A-method** when the sample covers the small units sufficiently (see also par. 3.9.1). It will become a **B or even C-method** when the sample does not sufficiently cover the small units.

   c. If the regional distribution of the grossed-up data of the sample cannot be used, the national estimate of SBS data for small enterprises should be allocated to regions using indicators, which is a top-down method. The indicator is usually the regional distribution of the number of employed persons (and not only employees). The compensation of employees is unsuitable when industry data are used because the

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([18]) Eurostat, Number of persons employed by enterprise size-class in the EU-27 (% of sectorial total) 2005, Code: tin00052, update 18-04-2012.

share of self-employed persons in the total number of persons employed in the construction industry is generally relatively high. However, in a combined sector-industry approach, self-employed persons might be an acceptable basis for the regional allocation of GVA for the household sector. For the construction industry, one may expect relatively stable productivity data per employed person. When this is the case, this method becomes a **B-method**.

d. Administrative data might be used instead of the sample for small enterprises in the construction industry. The data must include the region of the residence of the enterprise and not the region of the residence of the auditor. This might be regarded as a bottom-up method and classified as an **A-method**. When the administrative data do not adequately cover GVA of the small enterprises, because of gaps in or the timeliness of the information, this method will be classified as a **B-method** or a **C-method** if the gaps are big or the timeliness is unacceptable.

2. Larger enterprises are covered comprehensively in SBS or administrative data. These enterprises are usually legal entities and not unincorporated enterprises, which implies that self-employed persons do not have a major role in them. The population of these enterprises consists of uniregional and multiregional enterprises. The following points have to be taken into account:

a. Uniregional enterprises that, as the main contractor, only work in their home region or in other regions for less than one year do not pose any problems. Value added will be allocated to their home region and this method will be classified as an **A-method**.

b. Some uniregional enterprises also work as the main contractor on a building site in a region other than their home region for a year or longer. This implies that the uniregional unit becomes a multiregional unit. The value added will be allocated to the region according to the guidelines for multiregional units (see c).

c. A multiregional enterprise consists of permanent units that may be production units (prefabricated elements for the market), ancillary units, a head office, and building sites where they work for a year or longer. The principles and classification of A, B and C-methods given in par.3.9 apply for the units at points b and c. With regard to the indicators which can be used, one might have the following considerations:

i. The role of unincorporated enterprises is minor. This implies a better indication of the regional distribution of the activity of these enterprises by the regional distribution of compensation of

employees and the number of employees of these enterprises.

ii. However, the capital element in value added of these enterprises might be considerable.

iii. The output of these enterprises (where they are the main contractor) in a region can be related to fixed capital formation in that region. This is not the case for the output of sub-contractors. Output of the main contractors might also have a close relationship with building permits when the variables, address (region), value of the project, and period of building, are available on the building permit.

d. The difference between the aggregate of the regional totals of SBS and the corresponding national accounts total can be allocated to regions according to the principles described in chapter 4.

5.5. Transportation and storage (Section H) and Information and communication (Section J)

Sections H and J consist, amongst others, of the following activities (see NACE Rev. 2, 2 and 3-digit level):

Section H

49 Land transport and transport via pipelines

49.1 Passenger rail transport, interurban

49.2 Freight rail transport

49.3 Other passenger land transport

49.4 Freight transport by road and removal services

49.5 Transport via pipeline

50 Water transport

50.1 Sea and coastal passenger water transport

50.2 Sea and coastal freight water transport

50.3 Inland passenger water transport

50.4 Inland freight water transport

51 Air transport

51.1 Passenger air transport

51.2 Freight air transport and space transport

52 Warehousing and support activities for transportation

52.1 Warehousing and storage

52.2 Support activities for transportation

53 Postal and courier activities

53.1 Postal activities under universal service obligation

53.2 Other postal and courier activities

Section J

61   Telecommunications

61.1 Wired telecommunications activities

61.2 Wireless telecommunications activities

61.3 Satellite telecommunications activities

61.9 Other telecommunications activities

There are severe conceptual and practical problems for the transportation, storage and telecommunication industries which require careful treatment. Comprehensive local data for these industries do not exist in any Member States. However, there are usually some transport enterprises in the public sector and data may be available for these.

There are also some transportation sub-groups where local KAUs or local units may present problems, e.g. for rail transport of passengers and freight. Specific features of this industry are: the existence of a network of railway lines; stations; traffic centres; the trains; the passengers departing or arriving at the station; freight loaded or unloaded; maintenance of the railway network and trains by supporting units; the head office etc.

Because of their different nature the following groups are distinguished:

— Land and water transport (49.3, 49.4, 49.5, and 50).

— Rail and air transport (49.1, 49.2, and 51).

— Support activities for transportation (52.2).

— Postal and courier activities (53).

— Telecommunications (61).

One should be aware that the operation of railway infrastructure has to be classified to division 52.21 and the transportation of passengers or freight in, respectively, 49.1 and 49.2. However, in practice information might only be available for a combination of these activities.

5.5.1. Land and water transport

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

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

Mobile equipment cannot be production units (see ESA 2010, par. 2.05). They must be attached to the local unit where they are based or from which they are deemed to be operated. For example, lorries and buses should be allocated to the depot at which they are based. Ships should be allocated to their home base local unit. This could be the place the ship docks if a local unit is there, or alternatively it could be the office paying wages or arranging cargo and supplies.

This allocation may result in some apparent anomalies. Mobile equipment may be allocated to a region different from that in which it mainly operates, even when the equipment has been there for a long time. For instance, ships sailing in international waters may be allocated to an inland unit.

Very rarely, there may not be a 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 territory.

Pipeline networks have to be attached to a local unit according to the residence principle in chapter 2, par. 2.2.4. Their GVA should be allocated to the local units responsible for the activity.

SBS or administrative sources are available for the aforementioned industries. The principles and the A, B, C-classification explained in chapters 3 and 4 apply to these industries.

5.5.2. Rail transport

In the past railway companies in the EU generally consisted of companies for interurban transport that carried out passenger and freight transport, including the maintenance of the railway network, the trains, the stations, traffic control and railway capacity allocation.

Some countries have split their national railway company into separate companies, dealing with infrastructure (NACE Rev. 2, 52.2) and transportation activities (NACE Rev. 2, 49.1 and 49.2) respectively. Other countries have not done so, and as a consequence the national railway company still carries out all previously mentioned activities.

It should be mentioned that, according to the basic classification rules of NACE Rev. 2 and ESA 2010, a railway enterprise should be split into local KAUs using the relevant divisions of NACE Rev. 2. Whether this can be achieved depends on practical considerations, which may differ between EU Member States.

In general, we might expect the following situations:

1. Countries that have split infrastructure and transportation:

   a. The management of the railway infrastructure (mainly rail infrastructure management, capacity allocation and traffic control) is managed by a legal entity (generally government-owned).

   b. Transportation of passengers and freight (mainly transport, employing train drivers and conductors, operation of stations, station facilities, train

maintenance). Sometimes transportation of passengers and freight has also been split, and some of the activities may be outsourced.

2. Countries that have not split infrastructure and transportation.

3. Countries in the process of splitting infrastructure and transportation.

In all situations we have to deal with multiregional units that have production units dealing with the main activity, and ancillary units and head offices. For the regionalisation of the GVA of the railway company, the rules of chapter 4 should be applied wherever possible. In practice, information about the consumption of fixed capital by ancillary units and head offices of the railway companies may be scarce. In that case the following methods might be applied.

Re 1.a:

GVA of the companies that manage the railway infrastructure consists mainly of compensation of employees and consumption of fixed capital. The latter is generally the main part of GVA. If possible, the regionalisation should be based on these two elements. The annual accounts of the railway company may provide information on these elements.

— The regionalisation of compensation of employees could be based on the regional distribution of compensation of employees (would be an **A-method**), or the total number of hours worked by employees (would be an **A-method** if there are no regional differences in salaries paid per employee), or the total number of employed persons (would be a **B-method** if part-time work is minor and regional differences in wages and salaries are limited). It would be a **C-method** if the conditions of the A or B-method are not fulfilled.

— The regionalisation of gross operating surplus could be based on a physical indicator, such as the regional distribution of the length of the railway tracks (this would be a **B-method**). It is assumed that the railway tracks have the largest share of consumption of fixed capital and that net operating surplus is relatively minor. It should be noted that the railway tracks have to be assigned to a related local unit.

Re 1.b:

With regard to the transportation of passengers, there is unlikely to be enough data for a bottom-up approach as most of these enterprises are large and multiregional. 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 unit. However, we can use a pseudo-top-down approach to compile regional aggregates without identifying indicators based on local units.

— For compensation of employees, see 1.a above.

— Gross operating surplus should be allocated to regions according to indicators relating to the activity of the trains. Passenger and freight transport should be estimated separately if possible. The indicators proposed are passengers and freight, loaded and unloaded in the stations of each region, carried by enterprises contributing to national GVA (this would be an **A-method**). It is assumed that consumption of fixed capital by ancillary units and head offices is estimated implicitly by this method.

Re 2:

If the railway company manages both the railway infrastructure and the transportation of passengers and freight, it is recommended to distinguish at least three elements of GVA: compensation of employees, consumption of fixed capital and net operating surplus.

— Compensation of employees should be allocated to the region where the people are employed (this would be an **A-method**).

— The regional allocation of consumption of fixed capital could be based on the regional distribution of the length of the railway tracks (this would be a **B-method**).

— The regional allocation of net operating surplus could be based on the regional distribution of passengers and freight, loaded and unloaded in the stations of each region, carried by enterprises contributing to national GVA (this would be an **A-method**). It is assumed that consumption of fixed capital by ancillary units and head offices is estimated implicitly by this method.

Re 3:

The main condition for the transition from situation 2 to situation 1 is that the regional distribution of the sum of GVA of industries 49.1, 49.2 and 52.2 should not change too much when railway companies are split into companies that manage infrastructure and companies that manage transportation. However, some activities may be outsourced or sold abroad, and this might affect the regional GVA of these industries.

5.5.3. Air transport

This activity includes passenger air transport (51.10), freight air transport (51.21) and space transport (51.22).

The main activities of (51.10) are: transportation of passengers by air over regular routes and on regular schedules; charter flights for passengers; scenic and sightseeing flights; renting of air transport equipment with operator for the purpose of passenger transportation; and transportation of passengers by aero clubs for instruction or pleasure.

The main activities of (51.21) are: transportation of freight by air over regular routes and on regular schedules; non-scheduled transportation of freight by air; and renting of air transport equipment with operator for the purpose of freight transportation.

The main activities of (51.22) are: launching of satellites and space vehicles; and space transportation of freight and passengers.

Airport activities, such as airport and air traffic control activities, and the loading and unloading of goods or passengers' luggage, belong to NACE Rev. 2 (52.2). In general the airline companies do not carry out these support activities.

Airline companies are usually multiregional companies for which the rules of chapter 4 have to be applied. If there is not enough information available to apply the production approach, the income method may be used for the regionalisation of the GVA of multiregional airline companies. Applying this method means:

1. Compensation of employees should be allocated to the region where the people are employed. The regional distribution could be based on the regional distribution of compensation of employees (this would be an **A-method**), the total number of hours worked by employees (would be an **A-method** if there are no regional differences in salaries paid per employee), or the total number of employed persons (would be a **B-method** if part-time work is minor and regional differences in wages and salaries are limited). If the conditions of the A- or B-method are not fulfilled, a **C-method** will apply.

2. Gross operating surplus should be allocated to regions according to indicators relevant to the activity of the airline company. Passenger and freight transport by the airline company should be estimated separately if possible. The indicators proposed are passengers and freight, loaded and unloaded in the airports of each region, carried by enterprises contributing to national GVA (this would be an **A-method**). An estimate for the airline company based on its total activity (both passenger and freight transport) would be a **B-method**. It is assumed that consumption of fixed capital by ancillary units and head offices is estimated implicitly by this method.

5.5.4. Postal and courier activities

This industry includes the activities of postal services operating under a **universal service obligation by one or more designated universal service providers (NACE Rev. 2, division 53.1)**. The activities include the use of the universal service infrastructure, including retail locations, sorting and processing facilities, and carrier routes to pick up and deliver the mail. The delivery can include letter-post (letters, postcards), printed papers (newspapers, periodicals, advertising items etc.), small packets, goods or documents.

Also included are other services necessary to support the universal service obligation. The industry also includes **firms operating outside the scope of a universal service obligation (NACE Rev. 2, division 53.2)**.

The main characteristic of the **designated universal services providers** is that they include multiregional enterprises with a great variety of local units (see above). Moreover, postal and courier activities are generally very labour-intensive, and the share of part-time work in these activities might change over time. The sorting and processing facilities can however be very capital-intensive. It is therefore recommended to apply the income method for this activity. Applying this method means:

1. Compensation of employees should be allocated to the region where the people are employed. The regional distribution could be based on the regional distribution of compensation of employees (this would be an **A-method**), the total number of hours worked by employees (would be an **A-method** if there are no regional differences in salaries paid per employee), or the total number of employed persons (would be a **B-method** if part-time work is minor or about the same in each region and regional differences in wages and salaries are limited). If the conditions of the A or B-method are not fulfilled a **C-method** will apply.

2. Gross operating surplus might be allocated to regions using physical indicators, such as the regional distribution of the number of letters and parcels. This would be a **B-method**.

5.5.5. Telecommunications

The regionalisation of all the different activities under the heading of telecommunications will be treated in the same way. The main rule is that the value added of telecommunication enterprises using infrastructure such as telecommunication lines, and networks of antennas for wireless communication, must be allocated to the local unit responsible for managing the infrastructure.

Telecommunication enterprises are mainly large multiregional enterprises consisting of a head office, mainly managing the fixed and/or mobile network, a large number of telephone shops supplying services and selling telephones and contracts on behalf of the enterprise, and more technical ancillary units. The shops might be seen as a secondary activity of the enterprise. Usually, comprehensive data are only available at enterprise level and not at local unit level. With regard to the shops, data are generally only available on compensation of employees, hours worked, and the number of employees.

For a better understanding, we will examine the following example, starting with a benchmark table for a mobile telephone enterprise. The company consists of a production unit / head office that is responsible for the mobile network.

Besides that the enterprise owns retail shops in different regions. The shops sell mobile telephones and make up mobile phone subscriptions. In the benchmark table full information is available for each local unit. Table 1 might be seen as the benchmark table.

In Table 1, the consumption of fixed capital is completely allocated to the region of the head office, because the head office is responsible for maintaining the network of antennas. The retail shops generate a trade margin for their work. It is assumed that they have not invested heavily in capital goods, and therefore do not have consumption of fixed capital.

Table 1: Original data

Regions		Output	Intermediate consumption	Correction intermediate consumption	GVA	Corrected GVA	Comp. of employees	CFC	NOS	Hours worked of employees	Capital stock	Compensation per hour worked of employees	Capital coefficient	Consumption quote	Share of compensation of employees in GVA	Share of CFC in GVA	Share of NOS in GVA
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Given data	Given data	Using distri-bution of 9	4= 1-2		Given data	7= 10 % of 10	8= 4-6-7	Given data	Given data	11= 6/9	12= 10/4	13= 2/1*100	14= 6/4*100	15= 7/4*100	16= 8/4*100
Retail shops	1	130	100		30		25	0	5.0	2.6	0	9.6	0.0	77	83	0	17
Retail shops	2	115	80		35		30	0	5.0	3.2	0	9.4	0.0	70	86	0	14
Retail shops	3	270	210		60		50	0	10.0	4.9	0	10.2	0.0	78	83	0	17
Production unit / head office	4	3 000	1 800		1 200		500	150	550.0	40.0	1 500	12.5	1.3	60	42	13	46
Retail shops	5	200	150		50		40	0	10.0	4.8	0	8.3	0.0	75	80	0	20
National		**3 715**	**2 340**	**0**	**1 375**		**645**	**150**	**580.0**	**55.5**	**1 500**	**11.6**	**1.1**	**63**	**47**	**11**	**42**

Average margin ancillary units   1.21=175/145

Let us now assume a more realistic situation, in which production statistics are only available for the enterprise as a whole. Thus we only have a total value for their output, intermediate consumption, GVA, compensation of employees, consumption of fixed capital, and hence net operating surplus. For the enterprise the regional distribution of wages and salaries, hours worked by employees, and the number of employees are also available.

In this case we can follow the general procedure of par. 4.3.1 regarding the imputation of GVA for ancillary units. However, one might assume that the retail shops generate a trade margin and therefore probably have a net operating surplus. This implies that compensation of employees of the retail shops has to be corrected by a factor 'GVA/compensation of employees', which can be obtained from independent comparable retail shops. In this example case we have a correction factor of 1.21. If we apply this factor to wages and salaries we can impute a negative correction of intermediate consumption for the retail shops, and a positive correction of intermediate consumption for the head office. The resulting corrected GVA in Table 2 is close to the original data in the benchmark Table 1. The method described would be an **A-method**.

Table 2: Correction of intermediate consumption with average margins

Regions		Output	Intermediate consumption	Correction intermediate consumption	GVA	Corrected GVA	Comp. of employees	CFC	NOS	Hours worked of employees	Capital stock	Compensation per hour worked of employees	Capital coefficient	Consumption quote	Share of compensation of employees in GVA	GVA per hours worked of employees	NOS per hours worked of employees
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Given data	Given data	3=6*margin for ancillary units	4=1-2	5=6+7+8 and 5=4-3	Given data	7=10% of 10	8=5-6-7	Given data	Given data	11=6/9	12=10/5	13=2/1*100	14=6/5*100	15=5/9	16=8/9
Retail shops	1	0	0	-30.2	0	**30.2**	25	0	5.2	2.6	0	9.6	0	X	83	11.6	2.2
Retail shops	2	0	0	-36.2	0	**36.2**	30	0	6.2	3.2	0	9.4	0	X	83	11.3	1.9
Retail shops	3	0	0	-60.3	0	**60.3**	50	0	10.3	4.9	0	10.2	0	X	83	12.3	2.1
Production unit / head office	4	3 715	2 340	175	1 375	**1 200**	500	150	550	40	1 500	12.5	1.3	63	42	30	13.8
Retail shops	5	0	0	-48.3	0	**48.3**	40	0	8.3	4.8	0	8.3	0	X	83	10.1	1.7
National		3 715	2 340	0	1 375	1 375	645	150	580	55.5	1 500	11.6	1.1	63	47	24.8	10.5

Table 3: Regionalisation using compensation of employees, hours worked by employees, or number of employees

Regions		Output	Intermediate consumption	Correction intermediate consumption	GVA	Corrected GVA based on distribution of 8	Corrected GVA based on distribution of 9	Corrected GVA based on distribution of 10	Comp. of employees	hours worked of employees	Number of employees	Capital stock	Compensation per hour worked of employees
		1	2	3	4	5	6	7	8	9	10	11	12
		Given data	Given data		Given data				Given data	Given data	Given data	Given data	12=8/9
Retail shops	1					**53**	**64**	**62**	25	2.6	2.8	0	9.6
Retail shops	2					**64**	**79**	**99**	30	3.2	4.5	0	9.4
Retail shops	3					**107**	**121**	**132**	50	4.9	6	0	10.2
Production unit / head office	4				1 375	**1 066**	**991**	**927**	500	40	42	1 500	12.5
Retail shops	5					**85**	**119**	**154**	40	4.8	7	0	8.3
National					1 375	1 375	1 375	1 375	645	55.5	62.3	1 500	11.6

Table 3 shows the resulting regional GVA if we apply the regional distribution of compensation of employees, or the hours worked by employees, or the number of employees.

The results of Table 3 differ considerably from those in Table 1, because consumption of fixed capital is allocated implicitly to all regions when using employment data. In our example, however, we did not assume any relationship between the activity of the retail shops and the consumption of fixed capital by the wireless network of antennas. Besides that, there are differences between the results from the different indicators because of regional differences in part-time work and average wages paid. However, the use of employment indicators in this example might be classified as a **B-method (see par. 3.9.1)**.

It must be stressed that the previous judgement depends entirely on the organisational structure of the enterprise. If, for instance, the enterprise has ancillary units that are responsible for their part of the maintenance of the mobile phone network, a method is required whereby in addition to compensation of employees, consumption of fixed capital and net operating surplus (so GOS) also have to be imputed for each region. In such a case, the number of employees could be an acceptable indicator if it is related to the density and use of the mobile phone network and there are no regional wage differences or different levels of part-time working. This would be a **B-method**.

The treatment of a telecommunication company with fixed lines is similar in principle to the treatment of the mobile phone network.

5.6. Financial and insurance activities (Section K)

Section K consists of the following activities (see NACE Rev. 2, 2 and 3-digit level):

64 Financial service activities, except insurance and pension funding

65 Insurance, reinsurance and pension funding, except compulsory social security

66 Activities auxiliary to financial services and insurance activities

We recommend that financial intermediation and insurance activities should be treated separately.

5.6.1. Financial service activities, except insurance and pension funding

Financial intermediation services (excluding insurance services and pension funding services) consist of ([19]):

([19]) See ESA 2010, chapters 3 and 14.

1. Financial intermediation services **directly** charged by financial intermediaries to their clients and measured as the sum of fees and commissions charged. Financial intermediaries can charge explicitly for the intermediation services which they provide. The output of such services is valued on the basis of fees and commissions charged.

2. Financial intermediation services **indirectly** charged and indirectly measured (**FISIM, P.119**):

   a. Financial intermediaries provide services for which they do not explicitly charge fees and commissions. Instead they pay lower rates of interest to those who lend them money and they charge higher rates of interest to those who borrow money from them.

   b. The **output** of 'other financial institutions' and 'other financial intermediaries', excluding insurance corporations and pension funds except investment funds, is valued on the basis of the difference between the **actual rates** of interest payable and receivable and a **'reference'** rate of interest.

   c. For those to whom the intermediaries lend funds, both resident and non-resident, it is measured by the difference between the effective interest charged on loans and the amount that would be paid if a reference rate were used.

   d. For those from whom the intermediaries borrow funds, both resident and non-resident, it is measured by the difference between the interest they would receive if a reference rate were used and the effective interest they actually receive.

Financial intermediation services are also provided by the central bank. However, the central bank must not be included in the calculation of FISIM; its output is measured as the sum of costs.

Financial intermediation except insurance and pension funding in NACE Rev. 2 includes the following groups:

64.1 Monetary intermediation (central banking and other monetary intermediation)

64.2 Activities of holding companies

64.3 Trusts, funds and similar financial entities

64.9 Other financial service activities, except insurance and pension funding

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

1. Compensation of employees should be allocated to the local units where the people are employed. This would be an **A-method**.

2. For central banking authorities GOS should be allocated to local units in proportion to the compensation of employees. This would be a **B-method**. The method will be an **A-method** if the central bank is a uniregional enterprise.

3. For other institutions GOS should be allocated to local units in proportion to the sum of loans and deposits. This would be an **A-method**. If the sum of loans and deposits is not available, the regional distribution of compensation of employees might be used instead. This would be a **B-method**. When the regional distribution of the total number of employees is used, it will be a **B-method** if the average wages and salaries and the share of part-time work in total employment for this industry are the same for each region. It will become a **C-method** when these conditions cannot be fulfilled.

4. For financial intermediation directly charged by financial intermediaries, data for the regional allocation of output (based on fees and commissions charged, non-FISIM) are generally not available. The allocation of non-FISIM on the basis of the regional distribution of compensation of employees would be classified as a **B-method**. See the previous point for the use of the regional indicator 'total number of employees'.

5.6.2. Insurance, reinsurance and pension funding, except compulsory social security

Insurance, reinsurance and pension funding, except compulsory social security in NACE Rev. 2 includes the following groups:

65.1 Insurance

65.2 Reinsurance

65.3 Pension funding

These industries cover 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. The local units are the offices carrying out the insurance activities, as explained above. These offices may serve a large area or even the whole country.

The absence of regional data (inherent in the way these enterprises operate) means that bottom-up methods cannot be used for the regionalisation of GVA. 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.

1. Compensation of employees should be allocated to the regions where the local units are situated. This is an **A-method** when the regional distribution of compensation of employees is used.

2. GOS should be allocated to regions using the regional distribution of insurance premiums. This would be an **A-method** if local units provide the insurance services. The regional distribution of compensation of employees might be used when this indicator is not available. This method would be a **B-method**. It might be expected that consumption of fixed capital is about the same for each local unit. It might further be assumed that the regional distribution of compensation of employees is a good reflection of these activities. The regional distribution of the number of employees might be a suitable indicator if there are no regional differences in wage level and if the share of part-time work in total employment is about the same in each region. This would be a **B-method** as well. The method will become a **C-method** if the conditions required for the **B-method** are not fulfilled and no corrections are madeto compensate for the differences.

5.7. The allocation of FISIM to user industries

Part of the output of bank services is net interest payments from production units, households and government to the banks. It has been included in the output of banks. The output of FISIM must therefore be allocated to user sectors/industries. Only part of total FISIM is allocated to regions as intermediate consumption of industries. That part of total FISIM is provided by the national accounts.

ESA 2010, par. 13.40: 'The allocation of intermediate consumption of FISIM by user industries to regions poses a problem, because estimates of stocks of loans and deposits of the user industries are usually not available by region.' However, if this information is available, this method will be considered an **A-method**.

Where no data are available about the regional distribution of the aggregate stock of loans and deposits, the allocation of FISIM to user industries is made with a second-best method: regional output or GVA by industry is used as the distribution indicator. This method will be considered a **B-method**.

5.8. Dwelling services of owner-occupiers

Regional accounts methods are often related to national accounts methods. In the case of the estimation of dwelling services of owner-occupiers, it is obvious that there is a close relationship between the regional and national methods, because regional stratification of the national estimates of these services is generally applied.

The *Handbook on price and volume measures in national accounts* ([20]) provides useful information about the estimation of the **output of dwelling services of owner-occupiers**, which can also be used for the regional estimates of these services.

The 'Handbook' states the following:

'The output of dwelling services of owner-occupiers at current prices is in many countries estimated by linking the actual rents paid by those renting similar properties in the rented sector to those of owner-occupiers. This allows the imputation of a notional rent for the service owner-occupiers receive from their property. This calculation is usually only carried out for a benchmark year, as few countries have the necessary data to apply the method on an annual basis. The benchmark is then interpolated and extrapolated using indicators that reflect the change over time in the price of rent and the volume of dwellings.'

'The benchmark estimate makes use of detailed data on the housing stock broken down between owner-occupied and rented property and by attributes of these properties that influence the rent they can be expected to generate. Examples of these attributes are the floor area, number of rooms, location and the existence of facilities (bathrooms, heating etc.) of the dwellings.' For regional purposes, the age of the building should be added to the attributes.

'This method is known to some as the "stratification method" because it is based on the stratification of dwelling attributes and rent. This is the approach agreed by EU Member States for the satisfactory estimation of the output of dwelling services and set down in Commission Decision 95/309/EC. The approach can be seen simply as the use of price and quantity data, at a detailed level, for the estimation of output for a particular year.'

Estimates for years other than a benchmark year are produced by projecting forward the housing stock and rents, using indicators that reflect the development of these variables over time. The indicators are chosen to reflect the three separate components of change: change in price, change in the quantity of the stock, and change in the quality of the stock.

The stratification method contains, in its calculation of estimates at current prices, all the data necessary for the decomposition of the value of output into its price and volume components. The use of this same price, quantity and quality information to produce estimates at constant prices ensures consistency between the final results at current and constant prices.

The choice of indicators for the extrapolation and interpolation of the benchmark estimates of dwelling services is an important factor in the quality of the resulting estimates. This is true for the quality of both the current and constant price estimates, provided that the same basic data are used for both. Therefore it could be argued that when the same price index is used for both the calculation at constant prices and the current price estimates, this would be the most appropriate method.

The method will be an **A-method** when the stratification method is used adequately. The method will become a **B-method** when the quality of the dwellings can only be taken into account at a higher aggregated level, and the prices are considered to give an acceptable reflection of the regional prices. The method will become a **C-method** when the current prices do not reflect the current regional prices adequately or the quality has not been taken into account.

The regional estimate of **intermediate consumption** for owner-occupied dwellings might be based on maintenance data and service costs (for instance for flats or apartments) for these dwellings, if available. This would be an **A-method**. If these data are not available, one may base the estimate on the national relationship between output and intermediate consumption of rented dwellings, preferably by type and construction period of the dwellings. This would be a **B-method**. It will be a **C-method** when the regional estimate of intermediate consumption of owner-occupied dwellings is based on the regional distribution of the output of dwelling services of owner-occupiers.

The compilation of regional GVA in prices of the previous year; volume development of GVA

6

6.1. Introduction

According to the *Handbook on price and volume measures in national accounts* price and volume measurement is related to the decomposition of transaction values in current prices into their price and volume components. 'In principle, the price components should include changes arising solely from price changes, while all other changes (relating to quantity, quality and composition changes) should be included in the volume components'. This is also referred to as measurement in prices of the previous year, implying the analysis of economic transactions valued at certain fixed prices.

Generally speaking, regional GVA estimates in current prices are mainly based on the production method, without decomposition for products, or are based on the income method (see par. 3.2.1). No country compiles regional GDP based on the expenditure method (see par. 1.2.2), so the expenditure approach cannot be used for the compilation of regional GDP in prices of the previous year.

The compilation of regional GVA in prices of the previous year assumes the existence of regional prices, which however are unavailable in the majority of the EU Member States ([21]). In some countries, regional prices exist only for specific industries.

Thus the guidelines of the *Handbook on price and volume measures in national accounts* cannot be applied fully because of the distinctive features of the compilation of regional GVA in current prices (generally the absence of information about produced goods and services), and because of the absence of regional prices in the majority of the EU Member States.

This chapter devotes attention to the criteria for the compilation of national GVA in prices of the previous year from which the criteria to compile regional GVA in prices of the previous year are adapted. It then looks in more detail at the compilation of GVA in prices of the previous year for some particular industries.

6.2. The three principles provided by the 'Handbook' ([22])

6.2.1. The elementary level of aggregation

The **first principle** for price and volume measurement in the national accounts as provided in the 'Handbook' is the following:

> 'In the measurement of prices and volumes a detailed level of aggregation of products shall be used. This level of aggregation, which is referred to as the elementary

([21]) See ESA 2010, par. 13.46–13.48.
([22]) See footnote 13.

level of aggregation, shall be at least as detailed as the P64 level of ESA 2010, for output as well as all categories of (intermediate and final) use.'

> 'The measurement of prices and volumes should start from a detailed breakdown of products for the different transaction categories. For each product distinguished for each transaction category, a price index should be found with which the current value can be deflated, or a volume indicator should be found to extrapolate a base year value.'

This first principle has to be adapted for the compilation of regional GVA in prices of the previous year.

The main reason is that the compilation of regional GVA generally cannot be directly based on product information, but on the aggregates output and intermediate consumption or on the income components. This implies that the compilation of regional GVA of an industry in prices of the previous year, according to the production method, needs to be based on the deflation of regional output and intermediate consumption of this industry, assuming an equal composition of goods and services produced and consumed for this industry for all regions.

To get a more homogeneous composition of goods produced and consumed, it is desirable to base the compilation of GVA in prices of the previous year on the highest attainable level of disaggregation of industries. The same arguments are valid when using the components of GVA according to the income method, where we have to assume that the qualities of labour and fixed capital of an industry are evenly distributed across the regions.

With regard to current practices of regional GVA compilation in current prices, a level of goods and/or industry detail at P*64 or A*64 is not attainable as a general guideline for the regional GVA compilation in prices of the previous year. In line with the basic rule of par. 3.9.1 the guideline is to compile regional GVA in prices of the previous year at least at A*38 of ESA 2010. However, because of the aforementioned reasons, it is recommended to compile regional GVA in prices of the previous year at a greater detail than A*38, if possible.

6.2.2. The choice of index formula and base year

The **second principle** relates to the choice of index formula to be used for the purpose of deflation. This issue is related to the choice of the base year, which is dealt with by the third principle.

The volume measures available at the elementary level of aggregation should be aggregated using the Laspeyres formula to obtain the volume measures of regional accounts aggregates. Price measures available at the elementary level of aggregation should be aggregated using the Paasche

formula to obtain price measures of all regional accounts aggregates.

The **third principle** regards volume measures derived at the elementary level of aggregation that are aggregated using weights derived from the previous year, which becomes the base year.

For the purpose of the compilation of regional GVA in prices of the previous year, a **fourth principle** will be added: regional GVA per industry in prices of the previous year has to add up to the corresponding national total in prices of the previous year.

6.2.3. Regional GVA time series in prices of a reference year

For the compilation of regional GVA time series one should make a distinction between a base year and a reference year:

1. The **base year** is the year whose current price values are used to weight the volume measures derived at the elementary level of aggregation. In this case the weights of the previous year.

2. The **reference year** is the year which is used for the presentation of a time series of constant price data. In a series of index numbers, it is the year that takes the value 100.

According to the third principle of par. 6.2.2, the base year changes each year. Time series in prices of a reference year can be compiled by 'chain-linking' the year-to-year changes. It is important that a change of the reference year does not affect the year-to-year indices. One should be aware of the non-additivity problem in time series of 'chained' values. To keep all year-to-year growth rates of each variable unchanged when the reference year is changed, one should re-reference each variable separately, be it an elementary index, a sub-total or an overall aggregate such as the regional GVA of all industries. These discrepancies should remain in the published data without adjustment. See par. 2.2.3., 'The non-additivity problem' of the *Handbook on price and volume measures in national accounts*.

6.3. Criteria for appropriate regional price and volume indicators

6.3.1. National criteria

The 'Handbook' discusses appropriate price and volume indicators for **national accounts purposes**.

> 'There is duality in the measurement of prices and volumes: one can either deflate a current year value with a price index, or alternatively extrapolate a base year value with a volume index to arrive at an estimate in prices of the base year. Therefore, only one of the two possible measures is required, and the other can be derived as a residual.'

'The two alternative approaches are in practice however not entirely equivalent. Deflation with a price index is generally preferred. There are two reasons for this:

1. A sample of price observations is normally more representative than an equally sized sample of quantity observations. In an open market there cannot be large differences in the changes of the prices charged for the same product by different producers. There can however be significant differences in the changes of the quantities of that product produced by different companies. This makes it necessary to have larger samples for quantity indicators than for price indicators. In fact, for quantity indicators one would prefer to have nearly exhaustive observation of all transactions.

2. Price index compilation is usually based on the fixed-basket methodology: the prices of a fixed basket of precisely specified goods and services are compared between two periods. In this way, the quality of the goods and services compared is held constant, and the price index measures pure price changes. If a quantity or volume index is compiled directly, there is no guarantee that the units counted in one year are of the same quality as in the next year, unless one has very detailed quantity information dealing with homogeneous products. It is therefore more difficult to control for quality changes when volume indicators are used.'

'For each approach there is a variety of different indicators that can be chosen. To assess the appropriateness of an indicator the following **general criteria** at the national level can be used:

1. The completeness of the *coverage* of the product heading by the indicator. For example whether the indicator covers all of the products under the heading or just a selection of them, such as only those products sold to households.

2. The *valuation basis* of the indicator. For e.g. market output, this should be basic prices, rather than, for example, purchasers' prices or input costs, whilst for e.g. final consumption expenditure it should be purchasers' prices.

3. The indicator should take *quality changes* into account, recording them within the volume estimates (see par. 2.4 of the 'Handbook').

4. The *conceptual consistency* between the indicator and the national accounts concepts.'

Based on these criteria, the following methods for the compilation of **national GVA** in prices of the previous year are generally applied:

1. **Production approach for market activities:** national price information should be available for output (producer price indices; basic prices) and for intermediate consumption (consumer price indices; purchasers' prices). This information enables the compilation of GVA in prices of the previous year by applying the method of double deflation. The 'Handbook' advises against the use of quantity indicators because of the quality issue. Quantity development might be used if the output regards homogeneous products.

2. **Income approach:** this approach is mainly used for **non-market activities**. The components of the income method are (see par. 3.2.1): compensation of employees; consumption of fixed capital; other taxes less subsidies on production; and net operating surplus. In the case of non-market activities the net operating surplus is zero. **Direct national prices** are not available for deflating net operating surplus. However, **implicit national deflators** might become available as a result of the compilation of the production approach, or Supply and Use tables in prices of the previous year. The main compilation methods for national volume development are:

Compensation of employees:

— **Extrapolation method:** direct measurement of the quantity of labour, broken down by type of employees.

— **Deflation method:** this method should be based on actual cash wages per hour and broken down in sufficient detail to provide a deflator for groups of staff of homogeneous skill (see the *Handbook on price and volume measures in national accounts* par. 3.10.2 for more details).

Consumption of fixed capital:

— By use of the Perpetual Inventory Method (see par. 3.2.1).

— Or deflation by suitable price indices.

Other taxes less subsidies on production:

— Volume development is mainly based on quantity indicators such as the total number of employees for payroll taxes, use of assets, turnover in case of taxes related to pollution etc. (see the 'Handbook' par. 3.10.1 for more details).

6.3.2. Regional criteria for appropriate price and volume indicators

The availability of regional information for the compilation of **regional GVA in prices of the previous year** is generally limited. Regional price data for the application of the **deflation method** are rarely available. This implies that generally **national price indices**, as a proxy for regional price indices, have to be used for deflating regional GVA. Regional quantity indicators for the application of the **extrapolation method** are generally limited, for instance the development

of employment (number of employees or hours worked), total number of passengers arrived and departed etc.

The implication is that some criteria of the *Handbook on price and volume measures in national accounts* have to be adapted for regional purposes, while the aim remains to be as close as possible to the national criteria of the 'Handbook'.

The regional criteria are:

1. The index formula and the base year are the same for both the national and regional GVA estimates in prices of the previous year. Consequently, one has to use the Paasche formula for the price index and the Laspeyres formula for the volume index. The weights for volume development are based on the previous year.

2. The level of compilation of regional GVA in prices of the previous year is at least based at the industry detail of A*38 of NACE Rev. 2. Because of the desired homogeneity of the activities per industry in terms of produced goods and services, it is recommended to base the compilation of regional GVA in prices of the previous year at the greatest possible detail of industries. This available detail of compilation may differ by country.

3. Regional price indices regarding market activities, if available and measured according to the guidelines of the 'Handbook', are preferred to national price indices for deflating the components of regional GVA at current prices. However, national price indices can be a good proxy for regional price indices when goods and services are expected to be produced for the national or international markets.

4. Deflation of the components of regional GVA by a national price index is preferred to the method of extrapolating the GVA components of the previous year by a regional quantity indicator. However, if there is evidence that the national price index is not a good indicator of the regional price development, it is acceptable to apply the extrapolation method.

5. When the production approach has been used for the compilation of GVA in current prices, it is preferable to apply the method of double deflation instead of directly deflating the regional GVA of an industry. The main reason for this recommendation is that the production process of a particular industry may differ between regions, resulting in a different implicit price and volume development for the GVA of this industry in different regions.

6. When the income approach has been used for the compilation of GVA in current prices, as is the case for non-market activities with reference to collective services, it is recommended to base the estimate of GVA in prices of the previous year on a regional (if available) or national price deflator with regard to the components of regional GVA (see par 6.2.1). Alternatively one may

apply the extrapolation of the components of GVA of the previous year by suitable quantity indicators, provided that changes in the quality or the composition of the components are minor. With reference to individual services, according to the 'Handbook', it is recommended, if possible, to use a direct volume measurement of regional output.

7. The regional GVA estimates in prices of the previous year have to add up to the corresponding national estimates.

A remark has to be made about the use of national price indices for deflating regional GVA. It might be expected that regional prices of a homogeneous product develop at about the same pace in different regions in an open and competitive economy (see for instance par. 2.3 of the *Handbook on price and volume measures in national accounts*). However, there are exceptions in cases where regional markets are more or less closed, such as the regional housing markets. Non-market activities, such as general government, are by definition not competitive and in these activities no prices exist for their output.

It should also be noted that there are industries in an open economy that are competitive, but which might be very heterogeneous, as is the case for the agriculture industry. The price development of different agricultural products or services might behave completely differently. This is important when the composition of the output of agriculture (which could consist of the products of cattle breeding, sheep farming, arable farming, viniculture, horticulture, supporting activities etc.) differs by region, especially when the agriculture industry is an important part of the economy for a region.

The implication is that for industries with market activities national price development might be a good proxy for regional price development in the absence of regional price indices, if sufficient detail of industries or products has been used. For agriculture, it is recommended to apply the method of double deflation at a very detailed industry level or even at a product level.

The use of the deflation method or extrapolation method for non-market activities depends on institutional circumstances, which can differ by country and by region. For instance, it might be the case that the wage negotiations for central government are centralised whereas for state and local governments they are decentralised, resulting in a different wage development per region. Therefore the institutional circumstances have to be taken into account when a choice has to be made between the use of national deflators and regional volume development of, for instance, the number of or hours worked by government employees.

6.4. A, B and C-methods for the compilation of regional GVA in prices of the previous year

Based on the criteria of par. 6.3, we can distinguish an A, B and C-classification of the methods to compile regional GVA in prices of the previous year (see par. 3.9.1 for a clarification of the A, B and C-methods).

The following combinations of regional criteria are classified as **A-methods**:

I. The combination of criteria 1, 2, 3, 5, 6 and 7 has been fulfilled.

— Re criterion 1: the correct formula has been used.

— Re criterion 2: the industrial detail used is close to A*64 or for some industries at A*88 or even 4-digit level of NACE Rev. 2.

— Re criterion 3: the **regional** price indices used at or close to A*64 are a good reflection of the goods and services produced in the regions. For instance, regional price indices for agricultural products and real estate activities (rents and imputed rents of owner-occupied dwellings) have been taken into account.

— Re criterion 5: the method of double deflation has been used. Direct deflation of regional GVA in current prices is an **A-method** if the production process of an industry is close to identical for each region.

— Re criterion 6: **regional** price indices are available for deflation of compensation of employees. Deflation of GOS per industry and region has been based on the corresponding **national** implicit deflator. When using the extrapolation method, the condition is that quality changes of the regional volume indicators need to be minor from one year to another.

— Re criterion 7: regional GVA of the regions in prices of the previous year add up to the corresponding national GVA.

II. The combination of criteria 1, 2, 4, 5, 6 and 7 has been fulfilled.

— Re criteria 1, 2, 5 and 7: see the remarks above (for combination I).

— Re criterion 4: the **national** price indices used at or close to A*64, or for some industries A*88 or even beyond, are considered a good proxy for regional price indices, and separate regional price indices for agricultural products and real estate activities (rents and imputed rents of owner-occupied dwellings) have been taken into account.

— Re criterion 6: **national** price indices are available for deflation of compensation of employees. Deflation of GOS per industry and region has been based on the corresponding **national** implicit deflator. When using the extrapolation method, the condition is that quality changes of the **regional** volume indicators, such as employment, need to be minor from one year to another.

The following combinations of regional criteria are classified as **B-methods**:

III. The combination of criteria 1, 2 (A*38 of NACE Rev. 2), 3, 5, 6 and 7.

— Re criteria 1, 5, 6 and 7: see the remarks above (for combination I).

— Re criterion 2: the industrial detail used is A*38.

— Re criterion 3: whether the **regional price indices** at A*38 are a good reflection of the goods and services produced in the regions cannot be assessed. However, if the regional price indices are expected to be a good reflection, the method might be regarded as an **A-method**.

IV. The combination of criteria 1, 2, 4, 5, 6 and 7.

— Re criteria 1, 5, 6 and 7: see the remarks above (for combination II).

— Re criterion 2: the industrial detail used is A*38.

— Re criterion 4: whether the **national price indices** at A*38 are a good proxy for regional price indices cannot be assessed fully. However, the method might be considered as an **A-method** if the national price indices are expected to be a good reflection of the regional price indices and separate regional price indices have been made for agricultural products and real estate activities (rents and imputed rents of owner-occupied dwellings).

Methods for the compilation of regional GVA in prices of the previous year are **C-methods** if one or more of the criteria of the B-methods regarding the production or income approach are not fulfilled.

6.5. Applying the criteria for the compilation of regional GVA in prices of the previous year to some particular industries

6.5.1. Introduction

For various reasons it is relevant to provide further explanation for some particular industries. This section covers the following industries:

NACE Rev. 2	Description
01–03	Agriculture, forestry and fishing (Section A)
41–43	Construction (Section F)
45–47	Wholesale and retail trade; repair of motor vehicles and motorcycles (Section G)
55–56	Accommodation and food service activities (Section I)
64–66	Financial and insurance activities (Section K)
68	Real estate activities (Section L); of which, imputed rent of owner-occupied dwellings
84	Public administration and defence; compulsory social security (Section O)
85	Education (Section P)
86	Human health activities (part of Section Q)

'Agriculture, forestry and fishing' is a very heterogeneous industry, for which greater detail in produced goods and services is relevant for a proper compilation of regional GVA in prices of the previous year. The construction industry operates in both national and local (more or less closed) markets with possibly different regional price development. Financial and insurance activities will be discussed because of the complex nature of this industry. Imputed rent of owner-occupied dwellings receives attention because of its importance and the possibility of different price development of the rents in different regions. The non-market activities also receive attention because of the complex nature of these activities.

For industries which are based on the SBS, the criteria of par 6.3 and 6.4 for the compilation of GVA in prices of the previous year can be applied without further explanation. The *Handbook on price and volume measures in national accounts* provides some supplementary guidance for the industries which are not mentioned, for instance for 'Water supply; sewerage, waste management and remediation activities' (divisions 36–39), 'Telecommunications' (division 61), 'Social work activities' (divisions 87–88) and 'Activities of households' (divisions 97–98).

6.5.2. Agriculture, forestry and fishing (Section A)

Agriculture is a heterogeneous industry. Even at A*64 of NACE Rev. 2, division 01 includes crop and animal production, hunting and related service activities; division 02 concerns forestry and logging, and division 03 covers fishing and aquaculture. The main feature is that these activities are generally not evenly distributed over the regions, while the prices of the crop products, animal products, fishing products etc. might develop completely differently. Therefore, one might conclude that the regional production of this industry is very diverse. Consequently, there is no single composite price index that can be used for deflating regional GVA of agriculture (division 01 of NACE Rev. 2) for all regions.

For this reason, it is recommended to compile regional GVA of Section A in current prices in a much greater detail of industries (4-digit level), which is close to the different products produced. The 'Farm Structure Survey (FSS)'[23], which is carried out every 2 to 3 years, provides the data needed.

See par. 6.4 for the A, B-classification. If the deflation or extrapolation has been based on the 2 or 3-digit level, the method becomes a **C-method**. This is an exception to the general classification rules, because it might be assumed that the FSS and available prices for agricultural products will enable the compilation in prices of the previous year at the 4-digit level. When these data cannot be made available at 4-digit level, a 2 or 3-digit level compilation will become a **B-method**, if the different activities of the agriculture industry at the 2 or 3-digit level in a region have a similar composition to the activities at the national level, or if the contribution of agriculture to the total regional GVA of all industries is minor.

6.5.3. Construction (Section F)

The 'Handbook' discusses [24] some key aspects of construction work. 'Construction output covers a wide range of products including one-dwelling and multi-dwelling buildings, industrial and commercial buildings, highways, railways, and other major civil engineering projects. The output covers new construction, major improvement of existing structures and regular repair and maintenance. In addition to this broad coverage, other features of the constructing sector require close attention in measuring output at both current prices and *prices of the previous year*.'

The 'Handbook' draws the conclusion that 'whichever method selected will have to satisfy the basic criteria

— be consistent with National Accounts concepts; using the appropriate "basic" price basis; provide full coverage of the activities under the classification heading (both functionally and geographically); treat quality changes as volume changes; use actual rather than artificial prices; and ensure that all measures are appropriate to the time period.'

The 'Handbook' considers the use of input prices as a **C-method**. To get an **A-method**, the 'Handbook' discusses the following methods for estimating output prices:

— The 'actual prices' method; this approach is considered resource intensive.

— The 'model pricing' method (for instance for a one-family dwelling); such an approach is also resource intensive at the regional level.

— The 'hedonic' method; it is unlikely that this method will be generally applicable.

The main conclusion is that, while it is already difficult to compile national deflators according to the guidelines of the 'Handbook', it will become even more difficult to apply these guidelines for the compilation of regional deflators. This leads to the following guidelines for the compilation of regional GVA of the construction industry in prices of the previous year.

Because of the wide variety of activities under the heading of 'construction', for deflation purposes it is strongly recommended to base the compilation in prices of the previous year at least at the following 2-digit level:

41 Construction of buildings
42 Civil engineering
43 Specialised construction activities

It might be expected that it will be extremely difficult to compile regional price indices, and the extrapolation method cannot be used because of the great variety of production processes.

Both phenomena lead to the use of national deflators at the 2-digit level of the construction industry.

See par. 6.4 for the A, B-classification. If the deflation has been based on the section level, the method becomes a **C-method**.

6.5.4. Wholesale and retail trade; repair of motor vehicles and motorcycles (Section G)

The focus in this paragraph is on wholesale and retail trade, where **output** will be measured in margins. The trade margin is the difference between the sales price and the purchase price of a good that is being traded (see ESA 2010, par. 3.56 for a more precise definition). The trade margin can be seen as the price the buyer pays for the trade service although there is no direct transaction.

The 'Handbook' states the following about the volume of output of services: 'In principle an analysis should be made of the actual services provided by the trader to the customer. Generally speaking, the service provided is to make available various goods

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[23] The FSS is based on two regulations: Regulation 1166/2008 of 19 November 2008 on farm structure surveys and the survey on agricultural production methods and repealing Council Regulation 571/88 and Regulation 1200/2009 of 30 November 2009 implementing Regulation 1166/2008 on farm structure surveys on agricultural production methods, as regards livestock unit coefficients and the definitions of the characteristics.

[24] *Handbook on price and volume measures in national accounts*, par. 4.5, and page 74.

at location and time convenient for the customer. There are many aspects consumers (implicitly or explicitly) consider in deciding in which shop their purchases will be made. These include the price level, the quality of the products and the quality of the trade service provided.' The latter regards: the range of products on sale, the accessibility of the shop, and the general service level of the staff. 'Different forms of trade provide different services and these services change continuously over time.'

The 'Handbook' provides a method in which quality change can be taken into account. To achieve an **A-method** at the national level requires an approach that accounts for the difference between deflated sales and deflated purchases (see 'Handbook', par. 4.6.1). However, this method is still in an experimental phase. 'As a B-method can be used the assumption that the volume of margins follows the volume of sales, or – equivalently – that the margin-to-sales ratios are constant in constant prices.' The **B-method** is generally applied at the national level. Any other methods, in particular the deflation of margin output directly by a sales price index, are **C-methods**. The 'Handbook' makes clear that for the application of the A- and B-method (regional) sales prices are a necessary condition for the compilation of regional output margins in prices of the previous year. These regional sales prices, however, are not available in most of the EU Member States.

Therefore it is recommended to apply the implicit price indices at the 2-digit level of NACE Rev. 2 as compiled in the national accounts for deflating the output margins of the previous year. This is considered a **B-method**.

6.5.5. Accommodation and food service activities (Section I)

'This section includes the provision of short-stay accommodation for visitors and other travellers and the provision of complete meals and drinks fit for immediate consumption. The amount and type of supplementary services provided within this section can vary widely.' (NACE Rev. 2, Statistical classification of economic activities in the European Community, pages 243-246).

Section I comprises:

55   Accommodation

55.1   Hotels and similar accommodation

55.2   Holiday and other short stay accommodation

55.3   Camping grounds, recreational vehicle parks and trailer parks

55.9   Other accommodation

56   Food and beverage service activities

56.1   Restaurants and mobile food service activities

56.2   Event catering and other food service activities

56.3   Beverage serving activities

The *Handbook on price and volume measures in national accounts* (page 82) considers 'three major issues to be considered when compiling data for these services:

1. Quality — The wide coverage of this product heading means that very different qualities of products are included — youth hostels and five star hotels, take-away kebab stalls and Michelin-rated restaurants. Proper price and volume measurement would imply that the greatest possible product detail is obtained in the data, so that separate prices and values are collected, and any aggregate data are constructed using appropriately weighted subsets. For example, in hotel services, separate collection of data for different ratings of hotels enhances the measurement of price and volume movements.

2. Group bookings and discounts — One common feature of the hotel trade is that there can be considerable discounts available for block bookings, for example when a tour operator purchases a block of rooms for a season. Changes in these discounts should be viewed as a price effect and recorded in the price index.

3. Household and Business consumption — Whilst the product consumed is unlikely to differ for household and business consumption (business people and private persons can stay in the same hotels and eat in the same restaurants), it is possible that the weighting structure will be rather different, with private persons consuming a greater proportion of the cheaper products. Of course, the discounting of rooms for tour operators could mean that some private persons can afford higher quality rooms than they would be able to afford at the regular hotel price.'

Besides these national issues one needs to consider some regional issues.

1. The nature of these activities might differ between metropolitan, urban and rural areas, and for touristic regions.

2. Price development of the activities at the 3-digit level might be different for the different regions due to the popularity of certain regions.

One might draw the conclusion that the compilation of GVA in prices of the previous year is preferred to be at the 3-digit level of Section I and, if possible, regional price indices are preferred. This would be an **A-method** when the other criteria, described in par. 6.4, methods I or II, have also been applied. It would be a **B-method** when the criteria in par. 6.4, methods III or IV have been applied. It would become a **C-method** if one or more of the criteria of the **B-methods** regarding the production or income approach are not fulfilled.

6.5.6. Financial and insurance activities (Section K)

6.5.6.1. Financial intermediation services

The 'Handbook' states the following about the output of financial intermediation services: 'The output of financial intermediation services consists of two main components: financial intermediation services directly charged by financial intermediaries to their clients and FISIM, the English acronym for "financial intermediation services indirectly measured". As far as volume measurement and deflation are concerned, FISIM causes some major conceptual and practical problems. This is related to the way FISIM has been defined and has to be calculated.'

FISIM

The compilation of financial intermediation services and especially FISIM suffer from both conceptual and practical problems when compiling output in prices of the previous year.

The generally applied national method for the compilation of FISIM in prices of the previous year is the following: base period interest margins on loans and deposits, applied to the stock of loans and deposits, will be re-valued to base period prices, as described in the FISIM Regulation. The revaluation is generally based on a general price index such as the implicit price deflator for domestic final demand. The 'Handbook' concludes: 'The ideal deflator for this purpose would measure the actual change in price of money. However, this is not possible in practice, so deflation by a general price index is seen to be the best approximation that can be found, as this measures the change in purchasing power of money. Examples of a general price index that can be considered an acceptable measure of the purchasing power of money are, in order of suitability: the GDP deflator, the deflator of domestic final demand and the overall CPI'. The 'Handbook' considers these methods, used at the national level, as **B-methods**.

The regionalisation of FISIM in prices of the previous year faces the same problems as for the corresponding national estimate. Because the financial activities generally operate at the national level, it is entirely acceptable to use the national deflator for deflating regional FISIM. This is a **B-method**, which is in line with national accounts practice.

Financial intermediation outside FISIM

Apart from FISIM, the output of financial intermediation services consists of selling products for which fees or commissions are charged directly to the customers, for example:

— A charge for the provision of a credit card or a handling fee associated directly with a financial transaction.

— The fee for the management of an investment fund.

— The charge for conversion of one currency into another currency.

The data required at regional level are generally unavailable. It is, for the same reasons as for FISIM, acceptable to use the national deflator. This would be an **A-method**.

If no separate information is available for both FISIM and financial information outside FISIM, and the national deflator for this industry is used, this would become a **B-method**.

6.5.6.2. Insurance and pension funding services

Output of insurance and pension funding services is measured as (see ESA 2010, par. 16.51 and par. 16.52):

— Total premiums earned

— *plus* total premium supplements

— *minus* adjusted claims incurred

— *minus* benefits due

— *minus* increases (*plus* decreases) in technical reserves and with-profits insurance.

The 'Handbook' (Par. 4.9.2, page 95) states that 'from a purely theoretical viewpoint it seems impossible to implement a concept of deflating the service output on the basis of output statistics. The main reason is that there is no directly observable price or quantity that is truly representative of the output. An **A-method** is therefore considered not possible.'

This industry generally operates at a national level, which implies that the national implicit deflators may be used for deflating the output of insurance activities. This would be considered a **B-method**, which is in line with the national classification.

6.5.7. Real estate activities (Section L); of which, imputed rent of owner-occupied dwellings

See par. 5.8 for the proper method to compile the output of imputed rent of owner-occupied dwellings in current prices.

The compilation method for imputed rent of owner-occupied dwellings in prices of the previous year is considered to be an **A-method** if based on the stratification method, and appropriate regional volume indices for extrapolation or appropriate regional price indices for deflation have been used.

If the stratification method is not used then regional price indices or regional volume indicators need to be constructed. Quality change of the dwellings is an important factor that needs to be reflected in any method to ensure that they are correctly recorded as part of the volume change and not as changes in price. In constructing price indices, it is also important to ensure that they adequately reflect what is

being measured by the output of owner-occupied dwelling services. The concept of dwelling services for owner-occupied rents is that these should be related to the actual rents that could be expected from the dwelling. Such a rent is more likely to be comparable with that from private rented dwellings than that from all rented dwellings or only those from the public rented sector, which may include an element of social housing. This is because of the possible existence of pricing differentials between public and private rented dwellings, from subsidies, rent controls or other factors.

The method will be an **A-method** when the stratification method is used in regional prices of the previous year. The method becomes a **B-method** when the quality of the dwellings can only be taken into account at a higher aggregated level and the prices are considered to give an acceptable reflection of the regional prices. The method becomes a **C-method** when the prices of the previous year do not reflect the regional prices adequately or the quality has not been taken into account.

6.5.8. Public administration and defence; compulsory social security (Section O)

The general rule in national accounts is that output methods are preferred for all individual services. For collective services the only possible method is the input method, which in national accounts is classified as a **B-method**. See ESA 2010, par. 3.104–3.106 for a definition of individual and collective services.

With regard to the output method for individual services, the approach to be followed is 'to determine the universe of producing government units (ministries, institutions, agencies, local authorities, etc.). For a representative sample of producers, one or several outputs should be defined in co-operation with those producers. The changes of these outputs should then be weighted by the sum of the costs of each producer.'

> 'The problem of measuring prices and volumes for non-market output arises from the fact that by definition no market prices exist. For that reason, the value of output at current prices is defined as the **sum of costs**. Without prices for the output, there are only two options for constant price measurement: **deflating inputs** and **direct volume measurement**.

Current practice for constant prices is mostly based on **deflating inputs**. This implies an assumption that the change in the volume of inputs is representative for the change in the volume of output. However, it is not certain that more or better inputs lead automatically to more or better output. Using this assumption makes it impossible to analyse changes in productivity, and will wrongly estimate the true output change if this differs from the change in inputs.

Volume indicators can relate to:

— **Inputs,** for example the number of employees.

> This would simply assume that twice as large a public service would mean twice as much output, irrespective of how those additional personnel were deployed. The advantage of the method is the ease of implementation, and the ready availability of data. This method however ignores all changes in productivity due to e.g. improved equipment (for example increased use of PCs) or more efficient procedures.

— **Output**, the preferred approach.

> It is not always easy to define exactly what the unit of output is. For individual goods and services it is in principle possible to define the output, since an actual delivery of that output takes place from the producer to the consumer(s) (cf ESA95, par. 3.82a). For example, for education, the output is the amount of teaching consumed by a pupil. For hospital services, the output is the amount of care received by a patient.' (See *Handbook on price and volume measures in national accounts*, par. 3.1.2.1)

It is probable that the national approach for the estimation of regional GVA in prices of the previous year is unattainable. For instance, it might be expected that the information needed to follow the national approach of the volume measurement for individual services provided by the different production units is not available at the regional level.

The implication is that the main approach for the estimation of regional GVA in prices of the previous year for general government and social security is based on the following approaches:

1. A distinction should be made between the different government sub-sectors (central government, state government, other local authorities, and compulsory social security). The main reason for this distinction is that the price indices for compensation of employees can be different for the different government sub-sectors and can therefore differ by region.

2. Regional volume development of GVA is based on the elements of the income approach for both collective and individual services: compensation of employees, consumption of fixed capital, and other taxes on production. Net operating surplus is zero for non-market services. Compensation of employees generally has the largest share in GVA. It is assumed that the capital stock of the government sub-sectors is related to the number of government employees, though there may be exceptions for civilian infrastructure, such as dykes, roads, tunnels, bridges and military infrastructure. If possible, this should be taken into account.

3. The regional indicators for the estimation of the regional volume development of GVA of general government are generally limited to:

a. The regional development of the number of hours worked by government employees; or

b. Implicit national price indices, taken from the national accounts estimates.

This approach will become a **B-method** when the elements 1 and 2 have been taken into account and the estimate of the regional volume development of GVA has been based on element 3a. The regional allocation of national GVA in prices of the previous year of **general government** based on the regional distribution of corresponding GVA in current prices is a **C-method**. The latter method is equivalent to deflating regional GVA in current prices by the implicit national price index. This is also a **C-method**. However, the use of implicit national price indices might become a **B-method** when one can assume that the regional price indices for compensation of government employees and consumption of fixed capital change at the same pace as the corresponding national price indices.

6.5.9. Education (Section P)

For measuring education services in prices of the previous year it is necessary to make a distinction between non-market services and market services.

For the **market education** services applies the general rule, which means that regional GVA of these services should be deflated by appropriate prices. This would be an **A-method**. When national price indices taken from the national accounts compilation are used, this will be a **B-method**. An input-based method will be a **C-method**.

Since output prices are not available for **non-market education services**, the only **A-method** for these services is to use the regional development of 'pupil hours' to extrapolate the current price regional output from the previous year, provided that the compilation is based on a stratification of types of education (primary, secondary and higher education) by region. The method becomes a **B-method** when this stratification is not applied and the extrapolation is based on the regional development of the total number of pupils and/or students. The method will also be a **B-method**, when the corresponding implicit national deflator has been applied. Any input-based method is a **C-method**, for instance the use of numbers of 'teacher hours'.

6.5.10. Human health activities (Division 86, part of Section Q) [25]

Human health services can be organised in many different ways. They are by definition provided for individuals and can be delivered as market or non-market output. The providers include government, non-profit institutions and non-financial corporations. The services may be funded through

payments by patients (with or without reimbursement by third parties) or through direct financing by government or corporations. The services regard at the 3 and 4-digit level:

86.1   Hospital activities

86.2   Medical and dental practice activities

86.21   General medical practice activities

86.22   Specialist medical practice activities

86.23   Dental practice activities

86.9   Other human health activities

The 'Handbook' states that 'currently, almost all countries measure the volume of health output as the sum of deflated costs. It is an easy method because data on costs are usually readily available. However, such input methods do not allow the productivity of the health sector to be analysed.' The 'Handbook' therefore makes a strong case for adopting output methods but recommends a detailed level of compilation, which cannot be reached for the regional human health activities without imposing an excessive response burden.

Consequently, it seems impossible to apply the output method for the compilation of the output of human health activities in prices of the previous year. One might also expect that regional prices for the human health output will only be available in rare cases.

Therefore it is recommended to follow the generally applied approach of measuring the volume of health as the sum of deflated costs, using the national implicit price indices compiled by the national accounts. This would be an **A-method** if applied at the 4-digit level of the human health activities, and a **B-method** if applied at the 3 or 2-digit level. It would become a **C-method** if the A or B-method cannot be applied. The main reason for this classification is that implicit national price development might differ between the various categories of human health services. However, if the implicit price development has a similar rate of growth for the different human health services, the 2-digit level of these activities might be considered a **B-method**.

6.6. Volume growth rates of regional GVA

Volume development is derived as regional GVA of period (t) in prices of the previous year divided by regional GVA of period (t–1) in current prices, multiplied by one hundred, minus one hundred.

Revisions to volume development are mainly caused by revised data in the national accounts in current prices and changes in the regional distribution in current prices, because prices of products or compensation of employees are almost never revised.

[25] See the *Handbook and price and volume measures in national accounts*, par. 4.13.

General principles for allocating Gross Fixed Capital Formation (GFCF) to regions

7

7.1. Introduction

Gross Fixed Capital Formation (GFCF; P.51g) is part of gross capital formation (P.5). The latter (P.5) consists of GFCF (P.51g), changes in inventories (P.52) and acquisitions less disposals of valuables (P.53). This manual only deals with GFCF (P.51g) (see Annex 1b for the classification of transactions in products).

According to ESA 2010, 3.124 'GFCF consists of resident producers' 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 or institutional units. Fixed assets are produced assets used in production for more than one year.'

7.2. Allocation principle

Acquisitions in the GFCF context can be interpreted in different ways, and the choice is a crucial one for GFCF. Production units can 'acquire' assets to use in the production process without actually owing them. The assets might be legally owned by another part of the same enterprise, or by other enterprises.

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 2010, 13.33, 'GFCF is allocated to regions by **ownership**.

1. Fixed assets **owned by a multiregional unit** are allocated to the local KAUs where they are **used**.

2. Fixed assets used under an *operational lease* are recorded in the region of the **owner** of the assets, and those used under a *financial lease* are recorded in the region of the **user**.'

7.3. Sales of existing assets

Production units sell existing assets to each other, e.g. 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 industry or region.

Transaction costs, such as legal fees on sales of land and existing buildings, are counted as additional GFCF.

7.4. 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 highly volatile, and more stable indicators such as wages and salaries are not particularly appropriate.

In summary, regional data for GFCF should preferably be based on comprehensive surveys, for which NUTS 2 level is one of the strata, or on administrative data. Indicators such as employment data should not be the major source of GFCF estimates for any industry and should only be used to fill gaps.

7.5. Preferred methods

The compilation of regional GFCF by industry should preferably be based on an investment survey and administrative data with a regional dimension of at least NUTS 2 level, and the national accounts GFCF table by industry (NACE Rev. 2) and by type of asset (CPA 2008) or by institutional sectors.

One may distinguish two main approaches. The first regards an approach in which regional GFCF data about the types of asset are available. This method will be discussed in par. 7.5.1. The second approach is based on regional GFCF data for institutional sectors and will be discussed in par. 7.5.2. The chosen approach depends entirely upon the data available.

7.5.1. The industry by type of asset approach

This approach assumes that the national accounts provide the necessary data on national GFCF by industry and type of asset, and that the regional distribution of the fixed assets can be based on an investment survey or on administrative data. The compilation will be explained by three related tables. A national table (Table 1) provides the starting point. A table of GFCF for each industry (A*10) by type of asset and regions at NUTS 2 level will be compiled; Table 2 serves as an example. In Table 3, GFCF by industry and region is derived.

The national accounts (Table 1) provide information about investment by industries (the rows) according to the owner principle. The columns provide information about the invested assets by industry.

Explanation of the data in Table 1:

The **capital letters** refer to the **types of asset**. The **subscripts** refer to the **industries**. For instance, the variable E_1 is the investment of the agriculture industry in other vehicles, such as tractors etc. The $SUM(A_1:A_{11})$ is the investment of all industries in dwellings. The $SUM(A_1:N_1)$ is the total investment in all assets by the agriculture industry.

The information on sales of existing assets is in principle only available at the national level for the total of industries (see par. 3.2.2 for the classification of assets).

The estimate of regional GFCF by industry should preferably be based on an intermediate step, by compiling tables of GFCF by region (NUTS 2) and type of asset for each separate industry A to U (A*10) and manufacturing (industry C) (see Table 2).

The data in Table 2 refer as an example to the industry 'Agriculture, forestry and fishing':

For instance, the variable $E_1 1$ is the investment in other vehicles by the agriculture industry in **region 1**. The $SUM(A_1 1 : N_1 1)$ is the **total investment** by the agriculture industry in **region 1**. The sum E_1 is the sum of the investment in other vehicles by the agriculture industry in all regions. This sum must be equal to E_1 in the national table. The $SUM(A_1 : N_1)$ is the aggregated sum of total investment by the agriculture industry and must be equal to the corresponding investment in the national accounts.

The advantages of this approach are twofold:

1. The aggregated regional data per type of asset can be checked against the national accounts data.

2. There might be alternative indicators available for some types of asset, for example:

   — Dwellings → building permits.

   — Passenger cars → automobile organisations.

   — Computers → related to the number of employed persons.

The data in Table 3 are a summary of the results of the tables per industry (Table 2 for each industry) by type of asset and region.

Table 1: National GFCF by industry and type of assets

Nace Rev.2 sections	Nace Rev.2	Dwellings (1)	Non-residential buildings, including major improvement of land (2)	Civil engineering works (3)	Transport equipment — Passenger cars (4)	Transport equipment — Other vehicles (5)	Transport equipment — Trains and trams (6)	Transport equipment — Ships (7)	Transport equipment — Aircraft (8)	Machinery and equipment excluding transport equipment and computers (9)	Computers (10)	Other tangible fixed assets (11)	Cultivated assets (12)	Transfer costs of ground (13)	Intangible fixed assets (14)	Sales of existing fixed assets (15)	Gross fixed capital formation (16)
A	Agriculture, forestry and fishing	A_1	B_1	C_1	D_1	E_1	F_1	G_1	H_1	I_1	J_1	K_1	L_1	M_1	N_1	-	$=SUM(A_1:N_1)$
B, D and E	Mining and quarrying; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities	A_2	-	-	-	-	-	-	-	-	-	-	-	-	N_2	-	$=SUM(A_2:N_2)$
C	Manufacturing	A_3	-	-	-	-	-	-	-	-	-	-	-	-	N_3	-	$=SUM(A_3:N_3)$
F	Construction	A_4	-	-	-	-	-	-	-	-	-	-	-	-	N_4	-	$=SUM(A_4:N_4)$
G, H and I	Wholesale and retail trade; repair of motor vehicles and motor cycles; transportation and storage; accommodation and food service activities	A_5	-	-	-	-	-	-	-	-	-	-	-	-	N_5	-	$=SUM(A_5:N_5)$
J	Information and communication	A_6	-	-	-	-	-	-	-	-	-	-	-	-	N_6	-	$=SUM(A_6:N_6)$
K	Financial and insurance activities	A_7	-	-	-	-	-	-	-	-	-	-	-	-	N_7	-	$=SUM(A_7:N_7)$
L	Real estate activities	A_8	-	-	-	-	-	-	-	-	-	-	-	-	N_8	-	$=SUM(A_8:N_8)$
M and N	Professional, scientific and technical activities; administrative and support service activities	A_9	-	-	-	-	-	-	-	-	-	-	-	-	N_9	-	$=SUM(A_9:N_9)$
O, P and Q	Public administration and defence; compulsory social security; education; human health and social work activities	A_{10}	-	-	-	-	-	-	-	-	-	-	-	-	N_{10}	-	$=SUM(A_{10}:N_{10})$
R, S, T and U	Arts, entertainment and recreation; other service activities; activities of households as employers; undifferentiated goods- and service-producing activities of households for own use; activities of extraterritorial organizations and bodies	A_{11}	B_{11}	C_{11}	D_{11}	E_{11}	F_{11}	G_{11}	H_{11}	I_{11}	J_{11}	K_{11}	L_{11}	M_{11}	N_{11}	-	$=SUM(A_{11}:N_{11})$
	Total	$SUM(A_1:A_{11})$	$SUM(B_1:B_{11})$	$SUM(C_1:C_{11})$	$SUM(D_1:D_{11})$	$SUM(E_1:E_{11})$	$SUM(F_1:F_{11})$	$SUM(G_1:G_{11})$	$SUM(H_1:H_{11})$	$SUM(I_1:I_{11})$	$SUM(J_1:J_{11})$	$SUM(K_1:K_{11})$	$SUM(L_1:L_{11})$	$SUM(M_1:M_{11})$	$SUM(N_1:N_{11})$	0	$=SUM(A:N)-0$

Columns 1–14: Type of assets based on CPA 2008 and ESA 2010, par. 3.127

Table 2: GFCF by industry x, type of asset and region (¹)

Regions (NUTS-II)	Type of assets based on CPA 2008 and ESA 2010, par. 3.127			Transport equipment												
	Dwellings	Non-residential buildings, including major improvement of land	Civil engineering works	Passenger cars	Other vehicles	Trains and trams	Ships	Aircraft	Machinery and equipment excluding transport equipment and computers	Computers	Other tangible fixed assets	Cultivated assets	Transfer costs of ground	Intangible fixed assets	Sales of existing fixed assets	Gross fixed capital formation
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	A_i1	B_i1	C_i1	D_i1	E_i1	F_i1	G_i1	H_i1	I_i1	J_i1	K_i1	L_i1	M_i1	N_i1	-	=SUM(A_i1:N_i1)
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n	$A_i n$	$B_i n$	$C_i n$	$D_i n$	$E_i n$	$F1n$	$G_i n$	$H_i n$	$I_i n$	$J_i n$	$K_i n$	$L_i n$	$M_i n$	$N_i n$	-	=SUM($A_i n$:$N_i n$)
Total industry 1	SUM(A_i)	SUM(B_i)	SUM(C_i)	SUM(D_i)	SUM(E_i)	SUM(F_i)	SUM(G_i)	SUM(H_i)	SUM(I_i)	SUM(J_i)	SUM(K_i)	SUM(L_i)	SUM(M_i)	SUM(N_i)	-	=SUM(A_i:N_i)
NA Total industry 1	A_i	B_i	C_i	D_i	E_i	F_i	G_i	H_i	I_i	J_i	K_i	L_i	M_i	N_i	-	=SUM(A_i:N_i)

(¹) These are at least 11 tables.

Table 3: GFCF by industry and region

Regions NUTS-II	Nace Rev. 2 sections											
	A	B, D and E	C	F	G, H and I	J	K	L	M and N	O, P and Q	R, S, T and U	Total
	1	2	3	4	5	6	7	8	9	10	11	12
1	$=SUM(A_1 1{:}N_1 1)$	$=SUM(A_2 1{:}N_2 1)$	$=SUM(A_3 1{:}N_3 1)$	$=SUM(A_4 1{:}N_4 1)$	$=SUM(A_5 1{:}N_5 1)$	$=SUM(A61{:}N61)$	$=SUM(A71{:}N71)$	$=SUM(A_8 1{:}N_8 1)$	$=SUM(A_9 1{:}N_9 1)$	$=SUM(A_{10}.1{:}N_{10}1)$	$=SUM(A_{11}1{:}N_{11}1)$	$\mathbf{=SUM(A_{1\text{-}11}1{:}N_{1\text{-}11}1)}$
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n	$=SUM(A_1 n{:}N_1 n)$	$=SUM(A_2 n{:}N_2 n)$	$=SUM(A_3 n{:}N_3 n)$	$=SUM(A_4 n{:}N_4 n)$	$=SUM(A_5 n{:}N_5 n)$	$=SUM(A_6 n{:}N_6 n)$	$=SUM(A_7 n{:}N_7 n)$	$=SUM(A_8 n{:}N_8 n)$	$=SUM(A_9 n{:}N_9 n)$	$=SUM(A_{10}n{:}N_{10}n)$	$=SUM(A_{11}n{:}N_{11}n)$	$\mathbf{=SUM(A_{1\text{-}11}n{:}N_{1\text{-}11}n)}$
Total	$\mathbf{=SUM(A_1{:}N_1)}$	$\mathbf{=SUM(A_2{:}N_2)}$	$\mathbf{=SUM(A_3{:}N_3)}$	$\mathbf{=SUM(A_4{:}N_4)}$	$\mathbf{=SUM(A_5{:}N_5)}$	$\mathbf{=SUM(A_6{:}N_6)}$	$\mathbf{=SUM(A_7{:}N_7)}$	$\mathbf{=SUM(A_8{:}N_8)}$	$\mathbf{=SUM(A_9{:}N_9)}$	$\mathbf{=SUM(A_{10}{:}N_{10})}$	$\mathbf{=SUM(A_{11}{:}N_{11})}$	$\mathbf{=SUM(A\text{-}N)}$

7.5.2. The industry by sectors approach

This approach assumes that the national accounts provide the necessary data on national GFCF by industry and by institutional sector. The compilation will be explained by three related tables. A national table (Table 4) provides the starting point. A table of GFCF for each industry (A*10) by sector and regions at NUTS 2 level will be compiled; Table 5 serves as an example. Table 6 is a summary of the results in Table 5 for each industry.

In the industry by sectors approach, it is assumed that GFCF data (without information about types of asset) are available for units that belong to an institutional sector. Regarding multiregional enterprises, it is assumed that data on total GFCF are available for their local units, otherwise one needs appropriate indicators for the regional allocation of GFCF.

The national accounts (Table 4) provide information about the investment by industries according to the owner principle. The columns provide information about GFCF by sector.

Explanation of the data in Table 4:

The **capital letters** refer to sectors. The **subscripts** refer to the **industries**. For instance, the variable A_1 is the investment of non-financial corporations in agriculture, forestry and fishing. The **SUM(A_1:A_{11})** is total GFCF by non-financial corporations. The **SUM(A_1:I_1)** is the total investment by all sectors in the agriculture, forestry and fishing industry.

The estimate of regional GFCF by industry should preferably be based on an **intermediate step**, by compiling tables of GFCF by region (NUTS 2) and sector for each separate industry A to U (A*10) and manufacturing (industry C) (see Table 5).

The data in Table 5 refer as an example to the industry 'Agriculture, forestry and fishing':

The variable $A_1$1 is the investment in **region 1** by the sector non-financial corporations which are classified to the industry agriculture, forestry and fishing. The **SUM($A_1$1:$N_1$1)** is the total investment by the agriculture industry in r**egion 1**. The sumA_1 is the sum of the investment of non-financial corporations, belonging to the agriculture industry, in all regions. This sum must be equal to A1 in the national table. The **SUM(A_1:I_1)** is the aggregated sum of total investment by the agriculture industry and must be equal to the corresponding investment in the national accounts.

The data in Table 6 are a summary of the results of the tables per industry (Table 5 for each industry) by sector and region.

Table 4: National GFCF by industry and sector

Nace Rev. 2 sections	Nace Rev.2	Sectors									
		Non-financial corporations	Financial corporations	General Government (S.13)				Households (S.14)		Non-profit institutions serving households	Total economy
				Central government	State government	Local government	Social security funds	Self-employed	Other households		
		S.11	S.12	S.1311	S.1312	S.1313	S.1314	S.141+S.142	S.143+S.144	S.15	S.1
		1	2	3	4	5	6	7	8	9	10
A	Agriculture, forestry and fishing	A_1	B_1	C_1	D_1	E_1	F_1	G_1	H_1	I_1	=SUM(A_1:I_1)
B, D and E	Mining and quarrying; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management aJd remediation activities	A_2	-	-	-	-	-	-	-	I_2	=SUM(A_2:I_2)
C	Manufacturing	A_3	-	-	-	-	-	-	-	I_3	=SUM(A_3:I_3)
F	Construction	A_4	-	-	-	-	-	-	-	I_4	=SUM(A_4:I_4)
G, H and I	Wholesale and retail trade; repair of motor vehicles and motor cycles; transportation and storage; accommodation and food service activities	A_5	-	-	-	-	-	-	-	I_5	=SUM(A_5:I_5)
J	Information and communication	A_6	-	-	-	-	-	-	-	I_6	=SUM(A_6:I_6)
K	Financial and insurance activities	A_7	-	-	-	-	-	-	-	I_7	=SUM(A_7:I_7)
L	Real estate activities	A_8	-	-	-	-	-	-	-	I_8	=SUM(A_8:I_8)
M and N	Professional, scientific and technical activities; administrative and support service activities	A_9	-	-	-	-	-	-	-	I_9	=SUM(A_9:I_9)
O, P and Q	Public administration and defence; compulsory social security; education; human health and social work activities	A_{10}	-	-	-	-	-	-	-	I_{10}	=SUM(A_{10}:I_{10})
R, S, T and U	Arts, entertainment and recreation; other service activities; activities of households as employers; undifferentiated goods- and service-producting activities of households for own use; activities of extraterritorial organizations and bodies	A_{11}	B_{11}	C_{11}	D_{11}	E_{11}	F_{11}	G_{11}	H_{11}	I_{11}	=SUM(A_{11}:I_{11})
Total		SUM(A_1:A_{11})	SUM(B_1:B_{11})	SUM(C_1:C_{11})	SUM(D_1:D_{11})	SUM(E_1:E_{11})	SUM(F_1:F_{11})	SUM(G_1:G_{11})	SUM(H_1:H_{11})	SUM(I_1:I_{11})	=SUM(A:I)

Table 5: GFCF of industry X by sector and region

Regions NUTS-II	Non-financial corporations	Financial corporations	General Government (S.13)				Households (S.14)		Non-profit institutions serving households	Total economy
			Central government	State government	Local government	Social security funds	Self-employed	Other households		
	S.11	S.12	S.1311	S.1312	S.1313	S.1314	S.141+S.142	S.143+S.144	S.15	S.1
	1	2	3	4	5	6	7	8	9	10
1	$A_{1,1}$	$B_{1,1}$	$C_{1,1}$	$D_{1,1}$	$E_{1,1}$	$F_{1,1}$	$G_{1,1}$	$H_{1,1}$	$I_{1,1}$	$=SUM(A_{1,1}:I_{1,1})$
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
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n	$A_{i,n}$	$B_{i,n}$	$C_{i,n}$	$D_{i,n}$	$E_{i,n}$	$F_{i,n}$	$G_{i,n}$	$H_{i,n}$	$I_{i,n}$	$=SUM(A_{i,n}:I_{i,n})$
Total	$SUM(A_1:A_{i,n})$	$SUM(B_{i,1}:B_{i,n})$	$SUM(C_{i,1}:C_{i,n})$	$SUM(D_{i,1}:D_{i,n})$	$SUM(E_{i,1}:E_{i,n})$	$SUM(F_{i,1}:F_{i,n})$	$SUM(G_{i,1}:G_{i,n})$	$SUM(H_{i,1}:H_{i,n})$	$SUM(I_{i,1}:I_{i,n})$	$=SUM(A_{i,n}:I_{i,n})$
Reference table 4	A_1	B_1	C_1	D_1	E_1	F_1	G_1	H_1	I_1	$=SUM(A_1:I_1)$

Sectors

Table 6: GFCF by region and industry

Regions NUTS-II	Nace Rev. 2 sections											
	A	B, D and E	C	F	G, H and I	J	K	L	M and N	O, P and Q	R, S, T and U	Total
	1	2	3	4	5	6	7	8	9	10	11	12
1	=SUM($A_1$1:I$_1$1)	=SUM($A_2$1:I$_2$1)	=SUM($A_3$1:I$_3$1)	=SUM($A_4$1:I$_4$1)	=SUM($A_5$1:I$_5$1)	=SUM($A_6$1:I$_6$1)	=SUM($A_7$1:I$_7$1)	=SUM($A_8$1:I$_8$1)	=SUM($A_9$1:I$_9$1)	=SUM(A_{10}1:I$_{10}$1)	=SUM(A_{11}1:I$_{11}$1)	=SUM(A_{-11}1:I$_{-11}$1)
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-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
n	=SUM(A_1n:I$_1$n)	=SUM(A_2n:I$_2$n)	=SUM(A_3n:I$_3$n)	=SUM(A_4n:I$_4$n)	=SUM(A_5n:I$_5$n)	=SUM(A_6n:I$_6$n)	=SUM(A_7n:I$_7$n)	=SUM(A_8n:I$_8$n)	=SUM(A_9n:I$_9$n)	=SUM(A_{10}n:I$_{10}$n)	=SUM(A_{11}n:I$_{11}$n)	=SUM(A_{-11}n:I$_{-11}$n)
Total	**=SUM(A1:I1)**	**=SUM(A2:I2)**	**=SUM(A3:I3)**	**=SUM(A4:I4)**	**=SUM(A5:I5)**	**=SUM(A6:I6)**	**=SUM(A7:I7)**	**=SUM(A8:I8)**	**=SUM(A9:I9)**	**=SUM(A10:I10)**	**=SUM(A11:I11)**	**=SUM(A-I)**

7.6. A, B, and C-methods for the compilation of regional GFCF

The industry by type of asset approach, described in par. 7.5.1, can be classified as an **A-method** if an investment survey or administrative data based on the owner principle underpin the estimates.

Where the regional allocation of national GFCF in Table 1 cannot be based on an investment survey or administrative data, the allocation of the types of asset based on related regional indicators would be a **B-method**. For instance, the investment in:

— Dwellings, non-residential buildings and civil engineering works might be based on appropriate indicators, such as building permits and professional journals.

— Means of transport might be based on registrations (passenger cars) and professional journals (ships, aircraft), or activity indicators, such as the number of passengers arrived and departed.

— Machinery and equipment might be based on professional journals.

— It might be expected that the replacement rate of computers is high (about every four to five years). One might therefore assume that investment in computers is related to the number of employed persons.

The industry by sectors approach, described in par. 7.5.2, can be classified as an **A-method** if an investment survey or administrative data based on the owner principle underpin the estimates.

Where the regional allocation of national GFCF in Table 4 cannot be based on administrative data or an investment survey, the allocation of GFCF by industries and sectors based on appropriate regional indicators would be a **B-method**. For instance, the investment by transport companies may be based on the regional distribution of jobs. It is assumed that the size of the workforce is related to the capital stock and that more or less stable replacement rates apply.

A **C-method** is any method which does not satisfy the requirements of the A or B-methods noted above.

Applying the principles for the regional allocation of GFCF by particular industries

8

8.1. Introduction

This chapter discusses regional GFCF estimates for the industries where statisticians have encountered specific difficulties with principles, methods and data. It illustrates the practical application of the concepts of ESA and the general principles of chapters 2 and 3. All the principles of these chapters apply to these industries and are referred to rather than reiterated in this chapter.

Regional tables of GFCF by industry are based on NACE Rev. 2 sections. Therefore GFCF by industry should be evaluated according to this standard classification.

The following industries, which correspond to sections of NACE Rev. 2, need further consideration:

B   Mining and quarrying

D   Electricity, gas, steam and air conditioning supply

E   Water supply; sewerage, waste management and remediation activities

F   Construction

H   Transportation and storage

J   Information and communication

The main issues specific to these industries are as follows:

— Mining and quarrying activity is usually located in the regional territory of a country. However, some countries do have an element of production in the extra-regio territory.

— Activities D, E and J are all affected by cross-border activities using a network of cables, pipelines or wireless networks.

— Construction may take place in a region different from the fixed establishment of the producer and mobile equipment might be leased. The mobile equipment might also be used by several local units.

— Transportation includes an element of networks and mobile equipment.

These industries will be discussed in more detail in the following paragraphs.

8.2. Mining and quarrying (Section B), Electricity, gas, steam and air conditioning supply (Section D), and Water supply; sewerage, waste management and remediation activities (Section E)

Specific to these industries is that, besides GFCF in fixed assets such as buildings, they also invest in networks of pipelines, cables and antennas, mainly in regions, but sometimes in the extra-regio territory. The main rule (see par. 7.2) is that GFCF in networks has to be allocated to the local units responsible for their operation.

8.2.1. Mining and quarrying (Section B)

— GFCF in the distribution network should be separated from other GFCF. If the data for this do not exist for all enterprises, the missing data should be estimated using data for similar enterprises. This would be a **B-method**.

— GFCF by an owner in a pipeline has to be allocated to the local units that operate the pipeline (**A-method**). If the pipeline crosses regional borders, and if several local units of the same enterprise in different regions are responsible for operating the pipeline, one can use a physical indicator, such as the length of the pipeline for which a local unit is responsible, to allocate GFCF to regions. This would be an **A-method**.

— GFCF by an owner in an offshore oil platform at the continental shelf under the country's sovereignty should be allocated to the extra-regio territory. This would be an **A-method**.

— Any other method would be classified as a **C-method**.

8.2.2. Electricity, gas, steam and air conditioning supply (Section D) and Water supply; sewerage, waste management and remediation activities (Section E)

— The treatment of GFCF by enterprises in Sections D and E is the same as for Section B.

8.3. Construction (Section F)

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 principles adopted in chapters 2 and 3 require that GFCF owned by the enterprise is allocated to the region where the local unit using it is situated and that the leased (operational leasing) equipment is allocated to the region where the local unit owning it resides.

The main problem for the construction industry is that mobile equipment will generally be used at the building site on a temporary basis, and buildings or construction workshops on a fixed basis for more than one year. Moreover, mobile equipment might be owned by the main contractor or by subcontractors. Some of the mobile equipment will be used for a year or more and some for less than a year. Because of this, it is generally difficult to get information that suits the need for a regional allocation of GFCF by the construction industry according to the ESA guidelines.

A practical solution for all cases other than operational leasing would be to allocate GFCF to the region of residence of the local unit responsible for the management of the equipment. This could be the residence of the headquarters or an ancillary unit of a multiregional building company, or the residence of a uniregional building company or sub-contractor. This would be an **A-method** if empirical regional data are available and a **B-method** if no empirical regional data are available and GFCF is allocated to the residence of the headquarters.

8.4. Transportation and storage (Section H) and Information and communication (Section J)

8.4.1. Transport (excluding rail and air transport)

GFCF should be allocated to the production units that use the assets. For instance, investment in ships should be allocated to the land base of the enterprise.

8.4.2. Rail and air transport

Data for local units should be used if available and a pseudo-bottom-up approach is recommended according to the residence principle.

However for the following assets it is proposed:

a. Rolling-stock and aircraft can be allocated using an activity indicator, such as passenger arrival and departure numbers. This would be a **B-method**.

b. Infrastructure, such as railway tracks and signal boxes, should be allocated to the local units that support it. If there are no data on local units, the strict territorial criterion can be applied to allocate infrastructure to regions. In the latter case it is assumed that local units operate this infrastructure. The differences between one method and the other are likely to be negligible. This would also be a **B-method**.

No extra-regio allocation is envisaged.

8.4.3. Telecommunications

The user and residence principles must be respected. This means that GFCF in the entire telecommunications infrastructure, in particular the (mobile) telephone network, must be allocated to the local units that manage it. This would be an **A-method**.

The use of regional indicators related to GFCF in telecommunications, for instance the number of employees in local units responsible for operating the network, would be classified as a **B-method**.

Any other methods would be classified as C-methods.

General principles for regional labour data by industry

9

9.1. Introduction

In recent decades the statistical observation of the labour market regarding persons, the administrations of enterprises and central registrations has been expanded regularly. ([26]) Outside the Convergence Regions, the Regional Competitiveness and Employment objective aims to strengthen competitiveness and attractiveness, as well as employment. Besides that, labour is important for regional accounts compilation, because employment (number of employees or hours worked) or compensation of employees are often used as regional indicators for the allocation of GVA to regions. Because there are many definitions of employment and compensation of employees, we explain in more detail the different concepts that may be used, and especially the information necessary for national and regional accounts.

9.1.1. Labour Force Survey (LFS)

The EU Labour Force Survey (LFS) is a large household sample survey providing quarterly results on labour participation of people aged 15 and over, as well as on persons outside the labour force. All definitions apply to persons aged 15 years and over living in private households. Persons carrying out obligatory military or community service and persons in institutions/collective households are not included in the target group of the survey. This survey provides compulsory data at NUTS 2 level on employment (jobs and hours worked), unemployment and economic inactivity.

In the LFS employed persons are:

— Aged 15 years and over (16 and over in Spain, United Kingdom and Sweden (1995–2001); 15–74 years in Denmark, Estonia, Hungary, Latvia, Finland and Sweden (from 2001 onwards).

— Persons who performed work during the reference week, even for just one hour a week, for pay, profit or family gain.

— Persons who were not at work but had a job or business from which they were temporarily absent because of e.g. illness, holidays, industrial dispute or education and training.

The variables **full-time/part-time** in the LFS refer to the main job. The distinction between full-time and part-time work is based on a spontaneous response by the respondent except in the Netherlands, where part-time is defined as where the usual hours are fewer than 35 hours and full-time where the usual hours are 35 hours or more, and in Sweden where this criterion is applied to the self-employed. It is not possible to establish a more precise distinction between

full-time and part-time employment, since working hours differ between Member States and between branches of activity.

Usual hours worked are the modal value of the actual hours worked per week over a long reference period, excluding weeks when an absence from work occurs (e.g. holidays, leave and strikes).

Actual hours worked in the reference week are the hours the person spent in work activities during the reference week. Work activities should include production activities, ancillary activities, short pauses, and education and training necessary for successfully carrying out either the production or ancillary activities. Actual hours worked should exclude travel time between the home and the place of work, the main meal breaks, absences from work within the working period for personal reasons, and education and training hours which are not necessary for carrying out the production or ancillary activities.

9.1.2. Structural Business Statistics (SBS)

SBS cover industry, trade and services. They describe the behaviour (structure, conduct and performance) of businesses across the European Union (EU); data are available for the EU-27 and for the Member States. The main indicators within SBS are generally collected and presented as monetary values, or as counts (for example, numbers of enterprises or persons employed). SBS may be used to answer questions such as how much wealth and how many jobs are created in an activity. For regional purposes, compulsory data at NUTS 2 level are collected on an annual basis for wages and salaries and employed persons.
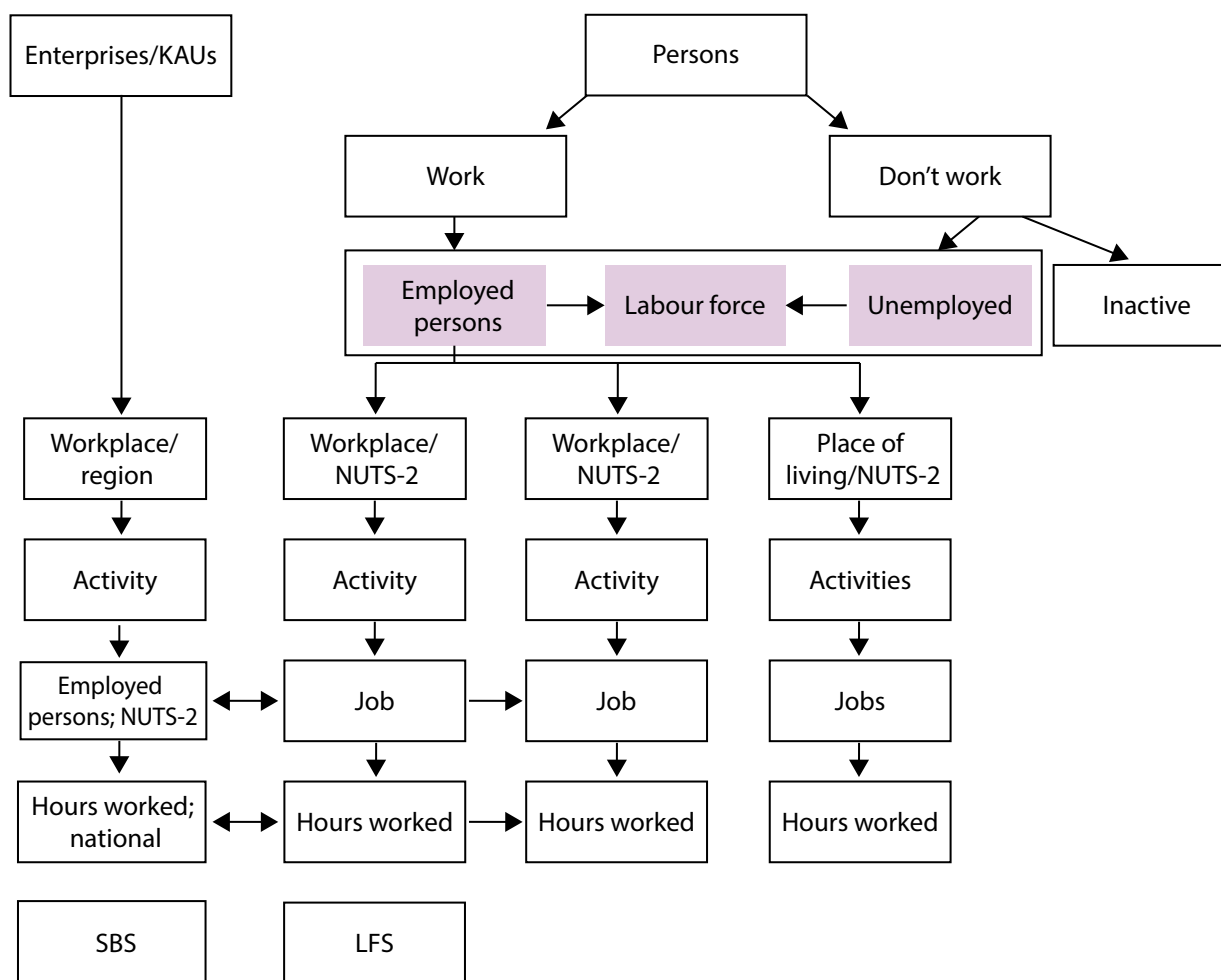
9.1.3. Administrative data

Statistical offices might complement survey data with administrative data. Tax administrations are an important source of information about the employment of employees, providing data about VAT, labour costs (wage declarations), employed persons, income tax etc. The main reason for using administrative data is to lower the response burden on enterprises.

Another advantage might be the availability of more comprehensive data. This might be highly relevant for regional accounts, because of a better coverage of small enterprises. However, there are disadvantages too:

1. For multiregional enterprises, information is generally collected at the head office without breaking down the data to the level of the local units.

2. The administrative concepts do not always match the national accounts concepts.

3. The administrative data generally underestimate the data (for example VAT-receipts) because of tax evasion.

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┌──────────────────┐                        ┌──────────────────┐
│ Enterprises/KAUs │                        │     Persons      │
└────────┬─────────┘                        └────────┬─────────┘
         │                          ┌─────────────────┴─────────────────┐
         │                          ▼                                   ▼
         │                  ┌──────────────┐                   ┌──────────────┐
         │                  │     Work     │                   │  Don't work  │
         │                  └──────┬───────┘                   └──────┬───────┘
         │                         │                    ┌──────────────┴────────┐
         │                         ▼                    ▼                       ▼
         │         ┌────────────────────────────────────────────────┐  ┌──────────────┐
         │         │  ┌──────────┐    ┌────────────┐   ┌──────────┐  │  │   Inactive   │
         │         │  │ Employed │──▶│ Labour force │◀──│Unemployed│  │  └──────────────┘
         │         │  │ persons  │    └────────────┘   └──────────┘  │
         │         │  └────┬─────┘                                   │
         │         └───────┼──────────────┬──────────────┬──────────┘
         ▼                 ▼              ▼              ▼
┌──────────────┐  ┌──────────────┐ ┌──────────────┐ ┌──────────────┐
│  Workplace/  │  │  Workplace/  │ │  Workplace/  │ │   Place of   │
│    region    │  │   NUTS-2     │ │   NUTS-2     │ │ living/NUTS-2 │
└──────┬───────┘  └──────┬───────┘ └──────┬───────┘ └──────┬───────┘
       ▼                 ▼                ▼                ▼
┌──────────────┐  ┌──────────────┐ ┌──────────────┐ ┌──────────────┐
│   Activity   │  │   Activity   │ │   Activity   │ │  Activities  │
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       ▼                 ▼                ▼                ▼
┌──────────────┐  ┌──────────────┐ ┌──────────────┐ ┌──────────────┐
│   Employed   │◀▶│     Job      │▶│     Job      │ │     Jobs     │
│persons;NUTS-2│  └──────┬───────┘ └──────┬───────┘ └──────┬───────┘
└──────┬───────┘         ▼                ▼                ▼
       ▼          ┌──────────────┐ ┌──────────────┐ ┌──────────────┐
┌──────────────┐  │ Hours worked │▶│ Hours worked │ │ Hours worked │
│ Hours worked;│◀▶└──────────────┘ └──────────────┘ └──────────────┘
│   national   │
└──────────────┘
┌──────────────┐  ┌──────────────┐
│     SBS      │  │     LFS      │
└──────────────┘  └──────────────┘
```

4. Politicians may change laws which impact upon the availability or comparability of the data. This can be difficult to resolve.

A social statistical database in which surveys and administrative data are combined and reconciled might provide the necessary consistency of the labour data (27). To conclude, administrative data is potentially a very important source when combined and reconciled with other sources for both national and regional accounts.

An overview of the different labour concepts is shown in the employment diagram.

9.2. Employment

For a better understanding it is necessary to discuss briefly the relevant definitions as used in the national and regional accounts:

Employed persons

Employed persons are all individuals who work for a business unit or private household for a remuneration and reside in a region or in the extra-regio territory of the country.

Annual average of employed persons

ESA 2010, par. 11.04, states: 'The aggregates to which the figures for population and labour inputs are related are often annual totals. In this case, average population and labour inputs during the year have to be used. When surveys are conducted at several times during the course of the year, the figure taken is the average of the results obtained on these various dates. When a survey is carried out over a period within the year, the period used is to be representative; the last available information on variations throughout the year is to be used in estimating data for the year as a whole. For example, when estimating average employment, allowance has to be made for the fact that certain people do not work throughout the whole year, for example casual workers and seasonal workers.' (See also par. 4.5)

(27) Veen, G. van der (2007), *Integration of microdata from business surveys and the social statistics database*. Paper DGINS September 2007 Budapest, Voorburg/Heerlen..

Employed persons may either be employees or self-employed

Employees are persons who, during a reference period, performed some work for wage or salary, in cash or in kind, by agreement with an employer. Self-employed persons are those who earn their income by performing labour on their own account (company, profession) or who operate jointly with others in the business of their family.

Jobs

A job is a work opportunity occupied by an employed person for a defined period or until further notice. Because employed persons may hold more than one job, the number of jobs will therefore equal or exceed the number of employed persons.

Full-time and part-time jobs

A full-time job concerns a contractually agreed normal full day or week task. All other jobs are part-time jobs.

Hours of work

The labour input of employees is the total hours of work in the reference period. There are several concepts of working hours:

— **Contractual hours**
Contractual hours are agreed in the contract between employer and employee. Agreed paid annual leave and paid public holidays are not included in the contractual hours.

— **Paid overtime**
Time worked in addition to normal hours of work for which a premium rate is paid. Overtime that has been given back and time spent travelling or waiting are not considered paid overtime.

— **Hours paid**
Hours paid is the sum of contractual hours and paid overtime. Time spent on sick leave or bad weather leave belong to hours paid. Contrary to the legal terms, paid annual leave and public holidays are not considered part of hours paid.

— **Hours actually worked**
Hours actually worked are hours paid plus unpaid overtime and less the hours paid but not worked, e.g. sickness absence, pregnancy leave, maternity leave, strikes, parental leave, short-term absence, and additional free time for older people. In the regional accounts by industry there is a focus on employed persons and employees, thus implicitly on self-employed persons.

9.3. Compensation of employees

Labour costs reflect the employers' expenses directly related to employees in the production process. The labour costs concept contains two main components: wages and salaries, and employers' social contributions.

Wages and salaries

The most important form of wages is **wages in cash** (including withheld taxes on wages and contributions). Wages in cash includes regular gross wages, standard extra allowances (for instance for hazardous work), bonuses, overtime pay, tips and compensation for costs related to employment (for instance refunds of fares to and from work). Bonuses include holiday pay, cash or staff bonuses, gratuities, profit shares and a thirteenth or fourteenth month. Wages in kind occur if an employee benefits from his or her job besides being paid wages. Examples of **payment in kind** are: the private use of a company car, free housing, free food, lower interest rates on mortgages, free or cheap use of the company's products or services, and day nursery provision supplied or subsidised by the company.

Employers' social contributions consist of legally or contractually required payments to social security, such as pension premiums. As set out by ESA 2010, par. 4.07, pay over periods in which no work is done due to illness or bad weather is also regarded as a social contribution.

9.4. Labour productivity

Economic growth in regional accounts terms is the volume growth of regional GDP, and this can be broken down into components including changes in labour productivity, the productivity per unit of labour, and changes in the volume of labour. The same breakdown can be made for the volume change of regional value added by industry.

This simple approach provides a framework for monitoring and analysing regional economic growth by industry. More homogeneous figures on labour inputs, obtained by using the number of employed along with hours worked and distinguishing between various levels of educational and vocational qualifications of the labour force, will result in more detailed labour productivity figures (see ESA 2010, par. 22.100).

A main problem for regional accounts estimates of labour productivity may occur when employment data only are used to measure regional GVA. In principle there will then be no differences in regional labour productivity per detailed industry.

9.5. Choice of methods

The following conditions have to be fulfilled:

1. The regional distribution of employment, number of employees, self-employed persons, full-time equivalents, hours worked, and compensation of employees should be based on the local units. This condition is significant for the available data sources:

    a. For multiregional enterprises in SBS, information might only be available for the number of employees and wages and salaries.

    b. SBS are not obliged to provide data at the NUTS 3 level ([28]).

    c. Wage declarations of multiregional enterprises intended for tax authorities, are often prepared by the head office without splitting the data between the local units.

    d. If dependent on sources such as LFS, corrections are needed to provide data for the local production units instead of the place of residence of the respondents.

2. The observations made in par. 3.9.1 also apply for the regional labour data by industry. However, an exception will be made for the industrial detail at which **hours worked** is to be compiled. Because most sources do not provide a detailed industrial breakdown of hours worked, the industrial detail may be less than the A*38 level of NACE Rev. 2. The minimum requirement for **hours worked** is that it should be compiled at least at the A*10 level of NACE Rev. 2.

3. Empirical data should be made available at the **NUTS 3** level for the **number of employees and self-employed:**

    a. The number of employees can be based on administrative data at NUTS 3 level and SBS for NUTS 2 level, or a combination of these sources.

    b. The number of self-employed persons might be based on a variety of sources, e.g. agricultural census, business register, SBS, LFS, population census, administrative data (tax registration) etc.

    c. The definitive data must refer to the correct period of observation.

    d. The regional data must closely match the corresponding national accounts totals.

    e. If the definitive regional data are empirically based, refer to the correct period of observation, and are correctly allocated to the local production or ancillary units, the method might be classified as an **A-method.**

    f. If the provisional data are based on the regional distribution of the definitive regional data according to the A-method, the method might be classified as a **B-method**, provided that this approach has been applied at least at the level of industries of NACE Rev. 2 division, A*38. If this is not the case, this method will be classified as a **C-method**.

    g. If any of the conditions of c, d or e are not fulfilled, the method will be classified as a **C-method**.

4. Empirical data should be available at the **NUTS 2** level for the **hours worked by employees and self-employed:**

    a. SBS partly collect data on hours worked, but only at enterprise level and not for local units.

    b. The number of hours worked by employees and self-employed (often) need to be based on the LFS or administrative data, or on a combination of both sources. Adjustments may be required for the correct allocation to industry or local unit (e.g. because of commuting).

    c. The definitive data must refer to the correct period of observation.

    d. The aggregated regional data have to closely match the corresponding national accounts totals.

    e. If the definitive regional data are empirically based, refer to the correct period of observation, and are correctly allocated to the local production or ancillary units, the method might be classified as an **A-method.**

    f. If the provisional data are based on the regional distribution of the definitive regional data according to the A-method, this approach might be classified as a **B-method**, provided that the method has been applied at least at the level of industries of NACE Rev. 2 division, A*10. If this is not the case, this method will be classified as a **C-method**.

    g. Regional GVA per hour worked at the industry level of at least NACE Rev. 2 division, A*10 and at NUTS 2 must show plausible results. Large variations in regional GVA per hour worked have to be clarified. There might be problems with GVA or hours worked or both.

    h. If any of the conditions of c, d, e or g are not fulfilled, the method will be classified as a **C-method**.

5. Empirical data should be made available at the NUTS 3 level for the **compensation of employees:**

    a. Compensation of employees at NUTS 3 level might be mainly based on administrative data.

    b. The definitive data must refer to the correct period of observation.

([28]) Council Regulation (EC, Euratom) No 58/97 of 20 December 1996 concerning structural business statistics, Annex 1, section 7, article 3.

c. The regional data must closely match the corresponding national accounts totals.

d. If the definitive regional data are empirically based, refer to the correct period of observation, and are correctly allocated to the local production or ancillary units, the method might be classified as an **A-method**.

e. If compensation of employees at NUTS 3 level is based on the regional distribution of the number of employees within NUTS 2 and is done top-down at the industry level of NACE Rev. 2 division, A*38, this method might be classified as a **B-method**.

f. If the provisional data are based on the regional distribution of the definitive regional data according to the A-method, this approach might be classified as a **B-method**, provided that the method has been applied at least at the level of industries of NACE Rev. 2 division, A*38. If this is not the case, this method will be classified as a **C-method**.

g. The **share of compensation in regional GVA** at the industry level of at least NACE Rev. 2 division, A*38 and NUTS 3 must show **plausible results**. Large variations in this share have to be clarified.

h. If any of the conditions of c, d, e or g are not fulfilled, the method will be classified as a **C-method**.

General principles for allocating income transactions and aggregates of households to regions

10

10.1. General overview of the household accounts

ESA 2010, par. 13.51, states: 'The regional household accounts are based on the households that are resident in a regional territory. The numbers of persons that are members of the resident households add up to the total resident population of the region.' (²⁹) The accounts are restricted to the distribution and use of income accounts. According to ESA 2010 (chapter 8 'Sequence of accounts') these accounts can be subdivided into the 'Allocation of primary income account (II.1.2)', the 'Secondary distribution of income account (II.2)', the 'Redistribution of income in kind account (II.3)', the 'Use of disposable income account (II.4.1)', and the 'Use of adjusted disposable income account (II.4.2)'. These accounts are briefly discussed in paragraph 10.2.

The balancing items primary and (adjusted) disposable income can be gross or net. Consumption of fixed capital (P.51c) is the difference. It depends on the available sources whether the balancing items will be gross or net. Paragraph 10.5 is devoted to consumption of fixed capital.

10.2. Clarification of the accounts

10.2.1. Allocation of primary income account (Table 24.6 Full sequence of accounts for households, account II.1.2 in ESA 2010)

This account is used to determine the primary income of households resident in the regional territory. 'Net balance of primary incomes (B.5n)' is the compensation of employees received (D.1) plus net operating surplus (B.2n) from their own-account production of housing services, plus net mixed income (B.3n), plus property income (D.4) received by resident households minus property income (D.4) payable by resident households.

The net balance of primary incomes (B.5n) is an indicator of the capacity of households resident in a region to generate an income as entrepreneurs, employees or recipients of property income, in the region of their residence, in other regions or abroad.

In general, the primary income of households is the most important of the primary incomes of the various sectors. If the primary income of resident households per capita is lower in one region than in others, this might lead to income transfers from central government or from supra-national institutions such as the European Union to the poorer regions. A relatively low primary income of resident households might be an indicator of the dependency of that region on the support of national and supra-national institutions.

A relatively low primary income of households might also lead to structural measures to improve the earning capacity of the region concerned. Creating economic activity (and thus employment) is one of the most important remedies.

For purposes of regional policy, it is important to break down the primary income of households into its components: net operating surplus (B.2n), net mixed income (B.3n), property income (D.4), and compensation of employees (D.1).

It is important to note that economic developments might have different effects on the various parts of primary income of households. For example, increasing competition in the agricultural markets directly affects the mixed income of farmers, while it is highly probable that this is not the case for employees. Thus, if there are substantial differences in the composition of the primary income of resident households between regions, economic policy might produce substantially different effects on the levels of primary income between regions.

10.2.2. Secondary distribution of income account of households (Table 24.6 Full sequence of accounts for households, account II.2 in ESA 2010)

The secondary distribution of income account of households records transactions which, for households resident in the regional territory, constitute a redistribution of income in cash. These transactions comprise social benefits and contributions (D.6), current taxes on income, wealth etc. (D.5) and other current transfers (D.7), such as net premiums (D.71), accident insurance claims (D.72), current international cooperation (D.74), and miscellaneous current transfers (D.75), such as current transfers between households (D.752).

When these transactions are added to or subtracted from net primary income, the result is the net disposable income of households (B.6n). This income does not include social transfers in kind (D.63) coming from public administrations or non-profit institutions serving households (NPISH).

Thus, net disposable income (B.6n) is the result of all preceding transactions, i.e. production, distribution and redistribution of income. For many countries, the redistribution of income incorporates substantial inter-regional transactions.

Net disposable income (B.6n) is a concept which reflects to some extent the 'material welfare' of households. Welfare as such is a concept which cannot be measured statistically. Relatively low regional disposable income of households is basically a topic for EU policy-making, although it is not referred to as such in the regulations. However, there is no doubt that the regional disposable income of households per capita is a very important regional indicator.

(²⁹) The extra-regio territory is not taken into account, because it is assumed that there is no population (see also par. 4.5: Regional GDP per capita and regional population).

10.2.3. Redistribution of income in kind account of households (Table 24.6 Full sequence of accounts for households, account II.3 in ESA 2010)

The redistribution of income in kind account 'has the specific purpose of showing social transfers in kind as an imputed transfer from government to the household sector, so that household income can rise by the value of individual government services. In the next account, use of adjusted disposable income account, the household use of disposable income is increased by the same amount, as if the household sector was buying the individual services provided by government. These two imputations cancel out, so that the balancing item is saving, identical to saving in the main sequence of accounts' (ESA 2010, par. 1.124).

Social transfers in kind (D.63) are in fact the counterpart of individual consumption of the services of general government and NPISH. The *Classification of the Functions of Government* (COFOG) will generally be used for a distinction between individual and collective consumption of general government services.[30]

There are two main transactions in this account: social transfers in kind – non-market production (D.631), and social transfers in kind – purchased market production (D.632). These transactions refer to: housing such as individual rent allowances (equivalent to COFOG group 10.6), health such as exceptional medical health care (equivalent to COFOG groups 7.1 to 7.4), recreation and culture (equivalent to COFOG groups 8.1 and 8.2), education (equivalent to COFOG groups 9.1 to 9.6), and social protection (equivalent to COFOG groups 10.1 to 10.5 and group 10.7). See Annex 1f and also Annex 1e for an overview of individual consumption expenditure by NPISH and general government.

These are produced by general government or non-profit institutions and feed into the disposable income of households resident in the regional territory, resulting in net adjusted disposable income of households (B.7n).

Compared with disposable income, the regional adjusted disposable income of households (B.7n) can be regarded as a closer approximation to the concept of 'material welfare'. Thus, if information on social transfers in kind can be obtained, it is strongly recommended that this balancing item and actual final consumption (P.4, see par. 10.2.4) are also compiled.

10.2.4. Use of (adjusted) disposable income account of households (Table 24.6 Full sequence of accounts for households, account II.4.1 and II.4.2 in ESA 2010)

The use of (adjusted) income account describes how the net disposable income of households resident in the regional territory is divided between final consumption and net saving. It includes two variants, one based on net disposable income (B.6n) and the other on net adjusted disposable income (B.7n).

Both accounts (II.4.1 and II.4.2) contain an adjustment for the change in pension entitlements (D.8). This is necessary so that any changes to pension entitlements on which households have a definite claim will appear in the savings of households. This pension entitlement change arises from premiums and contributions recorded in the secondary distribution of income account as social contributions (see ESA 2010, par. 4.141).

The first variant of the use of disposable income of households, 'Individual consumption expenditure, P.31', which is equal to 'Final consumption expenditure (P.3)', corresponds largely to purchases by households of goods and services. The second variant, 'Actual individual consumption, P.41', which is equal to 'Actual final consumption (P.4)', includes both individual consumption expenditure (P.31) and the social transfers in kind (D.63) which households receive. See also Annex 1e, *Classification of Individual Consumption According to Purpose* (COICOP), for an overview of the classification of individual consumption expenditure (P.31).

Thus the difference between net adjusted disposable income (B.7n) and net disposable income (B.6n) is exactly the same amount as the difference between actual individual consumption (P.41) and individual consumption expenditure (P.31). Consequently, net saving (B.8n) is the same whichever variant is used.

The balancing item 'net saving of resident households' in a region, gives an indication of the long-term endurance capacity of those households.

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[30] See United Nations Statistics Division: Statistical Papers Series M No. 84 and *Manual on sources and methods for the compilation of COFOG statistics, Classification of the Functions of Government*, Eurostat, 2011 edition.

10.3. Sources

Income distribution statistics provide the income distribution of individuals as well as of households. In principle, they provide the best opportunity for the regionalisation of most of the components of income, because the relevant administrations have a complete dataset of all individuals and households that pay tax. Regarding this source one should be aware of the problems of timeliness and tax evasion, for which estimates have to be made. Some important differences from national accounts concepts, such as population and certain transactions as mentioned in par. 3.7.3, should be noted.

In addition to consumption, **family budget surveys** usually also contain data on household income components. However, they do not generally achieve the level of detail and accuracy provided by information on income distribution statistics. The survey samples are usually far smaller than those used for income distribution statistics, leading in most countries to less reliable regional income and consumption expenditure data in family budget surveys. For this reason, most of the regional data on final consumption expenditure are taken from statistical sources other than family budget surveys.

Examples of possible sources for consumption expenditure data might be:

— Daily expenditure on food and beverages: family budget surveys.

— Expenditure on tobacco: retail trade statistics. Note that these data are based on the place where the sale occurs, which does not necessarily correspond to the region of residence of the household, especially in the case of supermarkets and such units. They are certainly not a good source in areas subject to a high level of tourism.

— Expenditure on durable consumer goods: retail trade statistics and miscellaneous sources.

— Expenditure on rents by households: housing surveys.

— Expenditure on other services: miscellaneous sources, such as surveys about holidays etc.

See Annex 2 for a detailed overview of the transactions and possible sources. The national totals of the tables correspond to the tables for corresponding national accounts totals in ESA 2010.

10.4. The choice of sources and indicators

Any regionalisation procedure must give priority to statistical sources and indicators based on the households' place of residence (see par. 2.3.2.3 and ESA 2010, par. 13.15 and

13.51). The regional aggregates should add up to the corresponding aggregates at the national level ([31]).

It is likely that a combination of sources has to be used for the compilation of the household accounts. The sources have to cover all types of households, if possible separately (see par. 2.3.2.2). It will be an **A-method** if all types of households are treated separately and covered sufficiently. If a separate regionalisation of the types of households is not possible, because no separate estimate has been produced at the national level, it will also be an **A-method** when all types of households are covered sufficiently. It will become a **B-method** if for instance students, studying for a year or more in another region or abroad, are not covered. It will become a **C-method** if important types of household, such as old persons living permanently in retirement homes, are not adequately covered.

The sources must at least allow a compilation of the accounts according to the residence principle at the NUTS 2 level. This would be an **A-method**. It will become a **B-method** if the compilation has been done at the NUTS 1 level and suitable indicators have been used to allocate the NUTS 1 data to the NUTS 2 level. It will become a **C-method** if the sources allow only a compilation at NUTS 1 or national level and unsuitable regional indicators, such as population, have been used, or the residence of households has not been taken into account.

The compilation of the aforementioned household accounts (see par. 10.2) should be done at least at a detailed level of distributive transactions as provided in Annex 2. This level of detail will be classified as an A-method when, if necessary, corrections for the non-observed economy, consumption of non-residents ([32]) in the region, consumption of residents in other regions (at NUTS 2 level) or in foreign countries have been included, and an acceptable estimate has been made for the operating surplus of owner-occupiers of dwellings. The method will become a B-method if the compilation is based on a higher level of aggregation of distributive transactions than that provided in Annex 2, and implicit corrections by grossing up have been made for the non-observed economy. It will become a C-method if the aforementioned interregional corrections, if necessary, are not sufficiently taken into account.

Estimates of individual consumption expenditure (P.31) should be based on sufficient detail (see Annex 1e), allowing the use of different sources, such as family expenditure surveys (food), retail trade statistics (durables, services), housing surveys (rent), administrative data (for instance gas, water and electricity), health statistics (healthcare), holiday

([31]) This implies that income and consumption expenditure of households in the extra-regio territory need to be allocated to the regional territories, preferably in proportion to the regional distribution of income and consumption expenditure of households in the regional territory respectively. If a top-down method is applied, this will be done automatically.
([32]) The non-residents could be inhabitants of other regions or other countries.

surveys etc. It is important that the indicators are related to the residence of the households. If necessary, corrections have to be made (see above). The compilation of P.31 should be done at least at the NUTS 2 level. It is likely that this information will not be available separately for different types of households, so the compilation should be done for the total of households as defined in par. 2.3.2. This method is an A-method when the sources provide sufficiently reliable regional indicators for the regional allocation of P.31, and corrections as mentioned before have been made. It will become a B-method when less suitable indicators have been used, and a C-method when the residence of households has not been used or the aforementioned corrections have not been made.

Estimates of social transfers in kind (D.63) should be based on the detail of the relevant transactions of the COFOG classification, as mentioned in par. 10.2.3 and Annex 1e. The allocation of social transfers in kind should be based on appropriate regional indicators using a top-down method. This is an A-method. This approach will become a B-method when the regional allocation of the transactions has been done at a more aggregated level of transactions of the COFOG classification, or when the regional indicators are less appropriate. The method will become a C-method when unsuitable regional indicators have been used.

10.5. The allocation of consumption of fixed capital (P.51c)

Consumption of fixed capital (P.51c) is the decline in value of fixed assets owned, as a result of normal wear and tear and obsolescence. The estimate of the decline in value includes a provision for the loss of fixed assets as a result of accidental damage which can be insured against. Consumption of fixed capital covers anticipated terminal costs, such as the decommissioning costs of nuclear power stations or oil rigs or the restoration costs of landfill sites. Such terminal costs are recorded as consumption of fixed capital at the end of the service life, when the terminal costs are recorded as GFCF (ESA 2010, par. 3.139).

Consumption of fixed capital is different from the depreciation allowed for tax purposes or the depreciation shown in business accounts. It is estimated on the basis of the stock of fixed assets and the expected average economic life of the different categories of those goods. For the calculation of the stock of fixed assets, the Perpetual Inventory Method (PIM) will be applied at the national level whenever direct information on the stock of fixed assets is missing (see also par. 3.2.2). The stock of fixed assets is valued at the purchasers' prices of the current period (ESA 2010, par. 3.141).

Consumption of fixed capital consists of consumption of fixed capital on gross operating surplus (P.51c1) and consumption of fixed capital on gross mixed income (P.51c2). There are generally no survey data available about the consumption of fixed capital. In the national accounts this problem is solved by applying the PIM. However, the data necessary for the application of the PIM are currently not available for the regional accounts. If they were available, this would be an **A-method**. The non-availability suggests the application of top-down methods for the component parts of P.51c.

In the accounts of households P.51c1 is linked to the dwellings owned by households. Thus the regional distribution of (the market value of) owner-occupied and rented dwellings might be an indicator for the regional allocation of P.51c1, and this would be a **B-method**. The regional distribution of P.51c2 is not straightforward. Mixed income can be generated in many industries, though the core is in agriculture, construction, the wholesale and retail trades, and hotels and restaurants. It is probable that no data are available on P.51c2, and in that case it might be recommended by convention to allocate P.51c2 to regions based upon the aggregated GVA of these industries as shown in the regional accounts by industry. This would be a **B-method**.

If P.51c cannot be divided into P.51c1 and P51c2, any distribution based on a general key would become a **C-method**.

10.6. Links between certain transactions

Employers' actual social contributions (D.611) correspond to flow D.121 (ESA 4.92).

Employers' actual social contributions are paid by employers to social security schemes and other employment-related social insurance schemes to secure social benefits for their employees. As these contributions are made for the benefit of the employees, their value is recorded as a component of compensation of employees, together with wages and salaries in cash and in kind. The social contributions are then recorded as being paid by the employees as current transfers to the social security schemes and other employment-related social insurance schemes.

This heading is split into two categories:

a. Employers' actual pension contributions (D.6111), corresponding to flow D.1211.

b. Employers' actual non-pension contributions (D.6112), corresponding to flow D.1212.

Households' social contribution supplements (D.614) are included in property income payable by the administrators of pension funds to households in the allocation of primary income account (investment income payable on pension entitlements (D.442), and investment income attributable to collective investment fund shareholders (D.443) (ESA 4.101).

In practice, this income is retained by the administrators of pension funds. It is therefore treated in the secondary

distribution of income account as being paid back by households to pension funds in the form of households' social contributions supplements.

10.7. Summary variables, definitions and possible sources

Annex 2 provides an overview of the distributive transactions and transactions in products in the regional sector accounts of households as discussed in par. 10.2, and also provides definitions of the variables and indicates some possible data sources.

Annex 3 provides a numerical example of regional household accounts, based on the figures in the accounts for households (Table 24.6) in chapter 24 of ESA 2010 [33].

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[33] Some of the aggregates in the tables are slightly different from the sum of the details due to rounding.

Annexes

Annex 1: Classifications

Annex 1a: Coding of industries (NACE Rev. 2: A*10, A*38 and A*64)

NACE Rev. 2 section	Seq. No. A*10	Seq. No. A*38	Seq. No. A*64	NACE Rev. 2 division	Description
A	1	1	1	01	Crop and animal production, hunting and related service activities
			2	02	Forestry and logging
			3	03	Fishing and aquaculture
B	2	2	4	05-09	Mining and quarrying
C (= 2a of A*10)		3	5	10-12	Manufacture of food products, beverages and tobacco products
		4	6	13-15	Manufacture of textiles, wearing apparel, leather and related products
		5	7	16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
			8	17	Manufacture of paper and paper products
			9	18	Printing and reproduction of recorded media
		6	10	19	Manufacture of coke and refined petroleum products
		7	11	20	Manufacture of chemicals and chemical products
		8	12	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
		9	13	22	Manufacture of rubber and plastic products
			14	23	Manufacture of other non-metallic mineral products
		10	15	24	Manufacture of basic metals
			16	25	Manufacture of fabricated metal products, except machinery and equipment
		11	17	26	Manufacture of computer, electronic and optical products
		12	18	27	Manufacture of electrical equipment
		13	19	28	Manufacture of machinery and equipment n.e.c.
		14	20	29	Manufacture of motor vehicles, trailers and semi-trailers
			21	30	Manufacture of other transport equipment
		15	22	31-32	Manufacture of furniture; other manufacturing
			23	33	Repair and installation of machinery and equipment
D		16	24	35	Electricity, gas, steam and air conditioning supply
E		17	25	36	Water collection, treatment and supply
			26	37-39	Sewerage, waste management and remediation activities
F	3	18	27	41-43	Construction
G	4	19	28	45	Wholesale and retail trade and repair of motor vehicles and motorcycles
			29	46	Wholesale trade, except of motor vehicles and motorcycles
			30	47	Retail trade, except of motor vehicles and motorcycles
H		20	31	49	Land transport and transport via pipelines
			32	50	Water transport
			33	51	Air transport
			34	52	Warehousing and support activities for transportation
			35	53	Postal and courier activities
I		21	36	55-56	Accommodation and food service activities

NACE Rev. 2 section	Seq. No. A*10	Seq. No. A*38	Seq. No. A*64	NACE Rev. 2 division	Description
J	5	22	37	58	Publishing activities
			38	59-60	Motion picture, video and television programme production, sound recording and music publishing activities; programming and broadcasting activities
		23	39	61	Telecommunications
		24	40	62-63	Computer programming, consultancy and related activities; information service activities
K	6	25	41	64	Financial service activities, except insurance and pension funding
			42	65	Insurance, reinsurance and pension funding, except compulsory social security
			43	66	Activities auxiliary to financial services and insurance activities
L	7	26	44	68	Real estate activities
		26a	44a of which:	68	Of which: Imputed rent of owner-occupied dwellings
M	8	27	45	69-70	Legal and accounting activities; activities of head offices; management consultancy activities
			46	71	Architectural and engineering activities; technical testing and analysis
		28	47	72	Scientific research and development
		29	48	73	Advertising and market research
			49	74-75	Other professional, scientific and technical activities; veterinary activities
N		30	50	77	Rental and leasing activities
			51	78	Employment activities
			52	79	Travel agency, tour operator and other reservation service and related activities
			53	80-82	Security and investigation activities; services to buildings and landscape activities; office administrative, office support and other business support activities
O	9	31	54	84	Public administration and defence; compulsory social security
P		32	55	85	Education
Q		33	56	86	Human health activities
		34	57	87-88	Social work activities
R	10	35	58	90-92	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities
			59	93	Sports activities and amusement and recreation activities
S		36	60	94	Activities of membership organisations
			61	95	Repair of computers and personal and household goods
			62	96	Other personal service activities
T		37	63	97-98	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U		38	64	99	Activities of extraterritorial organisations and bodies

Annex 1b: Classifications of transactions in products (P)

P.1	**Output**	
P.11	Market output	
P.119	Financial intermediation services indirectly measured (FISIM)	
P.12	Output for own final use	
P.13	Non-market output	
P.2	**Intermediate consumption**	
P.3	**Final consumption expenditure**	
P.31	Individual consumption expenditure	
P.32	Collective consumption expenditure	
P.4	**Actual final consumption**	
P.41	Actual individual consumption	
P.42	Actual collective consumption	
P.5	**Gross capital formation/P.5n Net capital formation**	
P.51g	**Gross fixed capital formation**	
P.511	Acquisitions less disposals of fixed assets	
P.5111	Acquisitions of new fixed assets	
P.5112	Acquisitions of existing fixed assets	
P.5113	Disposals of existing fixed assets	
P.512	Costs of ownership transfer on non-produced assets	
P.51c	**Consumption of fixed capital (-)**	
P.51c1	Consumption of fixed capital on gross operating surplus (-)	
P.51c2	Consumption of fixed capital on gross mixed income (-)	
P.51n	**Net fixed capital formation**	
P.52	**Changes in inventories**	
P.53	**Acquisitions less disposals of valuables**	
P.6	**Exports of goods and services**	
P.61	Exports of goods	
P.62	Exports of services	
P.7	Imports of goods and services	
P.71	Imports of goods	
P.72	Imports of services	

Annex 1c: Classification of institutional sectors (S)

S.1	**Total economy**
S.11	**Non-financial corporations**
S.12	**Financial corporations**
S.13	**General government**
S.1311	Central government (excluding social security)
S.1312	State government (excluding social security)
S.1313	Local government (excluding social security)
S.1314	Social security funds
S.14	**Households**
S.141	Employers
S.142	Own-account workers
S.143	Employees
S.144	Recipients of property and transfer income
S.15	**Non-profit institutions serving households**

Annex 1d: Distributive transactions (D)

D.1	**Compensation of employees**
D.11	Wages and salaries
D.12	Employers' social contributions
D.121	Employers' actual social contributions
D.1211	Employers' actual pension contributions
D.1212	Employers' actual non-pension contributions
D.122	Employers' imputed social contributions
D.1221	Employers' imputed pension contributions
D.1222	Employers' imputed non-pension contributions
D.2	**Taxes on production and imports**
D.21	Taxes on products
D.211	Value added type taxes (VAT)
D.212	Taxes and duties on imports excluding VAT
D.2121	Import duties
D.2122	Taxes on imports excluding VAT and duties
D.214	Taxes on products except VAT and import taxes
D.29	Other taxes on production
D.3	**Subsidies**
D.31	Subsidies on products
D.311	Import subsidies
D.319	Other subsidies on products
D.39	Other subsidies on production
D.4	**Property income**
D.41	Interest
D.42	Distributed income of corporations
D.421	Dividends
D.422	Withdrawals from income of quasi-corporations
D.43	Reinvested earnings on foreign direct investment
D.44	Other investment income
D.441	Investment income attributable to insurance policy holders
D.442	Investment income payable on pension entitlements
D.443	Investment income attributable to collective investment fund shareholders
D.4431	Dividends attributable to collective investment fund shareholders

D.4432	Retained earnings attributable to collective investment fund shareholders	
D.45	Rent	

D.5 **Current taxes on income, wealth etc.**

D.51	Taxes on income
D.59	Other current taxes

D.6 **Social contributions and benefits**

D.61	Net social contributions
D.611	Employers' actual social contributions
D.6111	Employers' actual pension contributions
D.6112	Employers' actual non-pension contributions
D.612	Employers' imputed social contributions
D.6121	Employers' imputed pension contributions
D.6122	Employers' imputed non-pension contributions
D.613	Households' actual social contributions
D.6131	Households' actual pension contributions
D.6132	Households' actual non-pension contributions
D.614	Households' social contribution supplements
D.6141	Households' pension contribution supplements
D.6142	Households' non-pension contribution supplements
D.61SC	Social insurance scheme service charges (-) ([34])
D.62	Social benefits other than social transfers in kind
D.621	Social security benefits in cash
D.6211	Social security pension benefits in cash
D.6212	Social security non-pension benefits in cash
D.622	Other social insurance benefits
D.6221	Other social insurance pension benefits
D.6222	Other social insurance non-pension benefits
D.623	Social assistance benefits in cash
D.63	Social transfers in kind
D.631	Social transfers in kind — non-market production
D.632	Social transfers in kind — purchased market production

([34]) Employers' contributions appear in both the generation of income account and allocation of primary income account as payable by employers and receivable by employees. In the secondary distribution of income account, these amounts are payable by households and receivable by those administering social insurance schemes. In order to show exactly the same value in each case, the deduction of the charge that represents part of the output of the schemes and final consumption of the beneficiary households is also shown in the secondary distribution of income account as a separate item. The item social insurance scheme service charges (D.61SC) is thus an adjustment item only and not a distributive transaction in itself.

D.7	**Other current transfers**
D.71	Net non-life insurance premiums
D.711	Net non-life direct insurance premiums
D.712	Net non-life reinsurance premiums
D.72	Non-life insurance claims
D.721	Non-life direct insurance claims
D.722	Non-life reinsurance claims
D.73	Current transfers within general government
D.74	Current international cooperation
D.75	Miscellaneous current transfers
D.751	Current transfers to NPISH
D.752	Current transfers between households
D.759	Other miscellaneous current transfers
D.76	VAT and GNI – based EU own resources

D.8	**Adjustment for the change in pension entitlements**

D.9	**Capital transfers**
D.9r	Capital transfers, receivable
D.91r	Capital taxes, receivable
D.92r	Investment grants, receivable
D.99r	Other capital transfers, receivable
D.9p	Capital transfers, payable
D.91p	Capital taxes, payable
D.92p	Investment grants, payable
D.99p	Other capital transfers, payable

Annex 1e: Classification of Individual Consumption According to Purpose (COICOP)

01-12 Individual consumption expenditure of households (P.31)

01   Food and non-alcoholic beverages

01.1   Food

01.2   Non-alcoholic beverages

02   Alcoholic beverages, tobacco and narcotics

02.1   Alcoholic beverages

02.2   Tobacco

02.3   Narcotics

03   Clothing and footwear

03.1   Clothing

03.2   Footwear

04   Housing, water, electricity, gas and other fuels

04.1   Actual rentals for housing

04.2   Imputed rentals for housing

04.3   Maintenance and repair of the dwelling

04.4   Water supply and miscellaneous services relating to the dwelling

04.5   Electricity, gas and other fuels

05   Furnishings, household equipment and routine household maintenance

05.1   Furniture and furnishings, carpets and other floor coverings

05.2   Household textiles

05.3   Household appliances

05.4   Glassware, tableware and household utensils

05.5   Tools and equipment for house and garden

05.6   Goods and services for routine household maintenance

06   Health

06.1   Medical products, appliances and equipment

06.2   Outpatient services

06.3   Hospital services

07   Transport

07.1   Purchase of vehicles

07.2   Operation of personal transport equipment

07.3   Transport services

08   Communication

08.1   Postal services

08.2   Telephone and telefax equipment

08.3   Telephone and telefax services

09   Recreation and culture

09.1   Audio-visual, photographic and information processing equipment

09.2   Other major durables for recreation and culture

09.3   Other recreational items and equipment, gardens and pets

09.4   Recreational and cultural services

09.5   Newspapers, books and stationery

09.6   Package holidays

10   Education

10.1   Pre-primary and primary education

10.2   Secondary education

10.3   Post-secondary non-tertiary education

10.4   Tertiary education

10.5   Education not definable by level

11   Restaurants and hotels

11.1   Catering services

11.2   Accommodation services

12   Miscellaneous goods and services

12.1   Personal care

12.2   Prostitution

12.3   Personal effects n.e.c.

12.4   Social protection

12.5   Insurance

12.6   Financial services n.e.c.

12.7   Other services n.e.c.

13   Individual consumption expenditure of non profit institutions serving households (NPISH)

13.1   Housing

13.2   Health

13.3   Recreation and culture

13.4   Education

13.5   Social protection

13.6   Other services

14   Individual consumption expenditure of general government

14.1   Housing

14.2   Health

14.3   Recreation and culture

14.4   Education

14.5   Social protection

Annex 1f: Classification of the Functions of Government (COFOG 1999)

01	**General public services**
01.1	Executive and legislative organs, financial and fiscal affairs, external affairs
01.2	Foreign economic aid
01.3	General services
01.4	Basic research
01.5	R&D General public services
01.6	General public services n.e.c.
01.7	Public debt transactions
01.8	Transfers of a general character between different levels of government

02	**Defence**
02.1	Military defence
02.2	Civil defence
02.3	Foreign military aid
02.4	R&D Defence
02.5	Defence n.e.c.

03	**Public order and safety**
03.1	Police services
03.2	Fire-protection services
03.3	Law courts
03.4	Prisons
03.5	R&D Public order and safety
03.6	Public order and safety n.e.c.

04	**Economic affairs**
04.1	General economic, commercial and labour affairs
04.2	Agriculture, forestry, fishing and hunting
04.3	Fuel and energy
04.4	Mining, manufacturing and construction
04.5	Transport
04.6	Communication
04.7	Other industries
04.8	R&D Economic affairs
04.9	Economic affairs n.e.c.

05	**Environmental protection**
05.1	Waste management
05.2	Waste water management
05.3	Pollution abatement
05.4	Protection of biodiversity and landscape
05.5	R&D Environmental protection
05.6	Environmental protection n.e.c.
06	**Housing and community amenities**
06.1	Housing development
06.2	Community development
06.3	Water supply
06.4	Street lighting
06.5	R&D Housing and community amenities
06.6	Housing and community amenities n.e.c.
07	**Health**
07.1	Medical products, appliances and equipment
07.2	Outpatient services
07.3	Hospital services
07.4	Public health services
07.5	R&D Health
07.6	Health n.e.c.
08	**Recreation, culture and religion**
08.1	Recreational and sporting services
08.2	Cultural services
08.3	Broadcasting and publishing services
08.4	Religious and other community services
08.5	R&D Recreation, culture and religion
08.6	Recreation, culture and religion n.e.c.
09	**Education**
09.1	Pre-primary and primary education
09.2	Secondary education
09.3	Post-secondary non-tertiary education
09.4	Tertiary education
09.5	Education not definable by level
09.6	Subsidiary services to education

Annex 2: Summary variables, definitions and possible sources of household accounts

Allocation of primary income account

Code	Variable	Definition according to ESA 2010	Possible sources
Resources			
B.2n	Net operating surplus	In the case of own account production of housing services by owner-occupier households and those leasing dwellings (SNA 2008, par. 7.9), the balancing item of the generation of income account is operating surplus (and not mixed income) (ESA 8.20).	— Housing surveys. — See also par. 2.3.2 for transactions of households' notional units.
B.3n	Net mixed income	In the case of unincorporated enterprises in the household sector, the balancing item of the generation of income account implicitly contains an element corresponding to remuneration for work carried out by the owner or members of the family. This income from self-employment has characteristics of wages and salaries, and characteristics of profit due to work carried out as an entrepreneur. This income, neither strictly wages nor profits alone, is referred to as 'mixed income' (ESA 8.19).	— Regional accounts for agriculture. — Regional accounts of industries. — Fiscal sources. — Housing surveys. — See also par. 2.3.2 for transactions of households' notional units.
D.11	Wages and salaries	Wages and salaries in cash include social contributions, income taxes, and other payments payable by the employee, including those withheld by the employer and paid directly to social insurance schemes, tax authorities etc. on behalf of the employee. Wages and salaries in kind consist of goods and services, or other non-cash benefits, provided free of charge or at reduced prices by employers, which can be used by employees in their own time and at their own discretion, for the satisfaction of their own needs or wants or those of other members of their households (ESA 4.03 - 4.05).	— Administrative sources: • Annual wage and salary returns. • Statistics of wages and salaries of public servants. • Fiscal sources. • Numbers of wage- and salary-earners in the region. • Number of residents in the regions employed abroad. • Housing surveys.
D.121	Employers' actual social contributions	Employers' actual social contributions (D.121) consist of the payments made by employers for the benefit of their employees to insurers (social security and other employment-related social insurance schemes). These payments cover statutory, conventional, contractual and voluntary contributions in respect of insurance against social risks or needs. Employers' actual social contribution is comprised of two categories: contributions related to pensions and contributions for other benefits (ESA 4.09).	— Administrative sources: • Regional statistics of social security institutions. • Private social insurance schemes. — Numbers of wage and salary earners in the region. — D.121 corresponds with D.611.

Code	Variable	Definition according to ESA 2010	Possible sources
D.122	Employers' imputed social contributions	Employers' imputed social contributions (D.122) represent the counterpart to other social insurance benefits (less eventual employees' social contributions) paid directly by employers to their employees or former employees and other eligible persons, without involving an insurance enterprise or autonomous pension fund, and without creating a special fund or segregated reserve for the purpose. As the cost of these benefits forms part of employers' labour costs, they are also included in the compensation of employees (ESA 4.10).	— Administrative sources: • Regional statistics of social security institutions. • Private social insurance schemes. — Numbers of wage and salary earners in the region. — D.122 corresponds with D.612.
D.41	Interest received	Interest (D.41) is property income receivable by the owners of the following financial assets: (a) Deposits (AF.2). (b) Debt securities (AF.3). (c) Loans (AF.4). (d) Other accounts receivable (AF.8). Interest is received for putting the financial asset at the disposal of another institutional unit (ESA 4.42).	— Administrative sources: • Fiscal sources. • Regional distribution of deposits of households (information from banks).
D.421	Dividends	Dividends (D.421) are a form of property income to which owners of shares (AF.5) become entitled as a result of, for example, placing funds at the disposal of corporations (ESA 4.53).	— Administrative sources: • Fiscal sources.
D.422	Withdrawals from income of quasi corporations	Withdrawals from the income of quasi-corporations (D.422) are the amounts which entrepreneurs withdraw for their own use from the profits earned by the quasi-corporations which belong to them (ESA 4.58).	— Administrative sources: • Fiscal sources.
D.43	Reinvested earnings on foreign direct investment	Reinvested earnings on foreign direct investment (D.43) are equal to the operating surplus of the foreign direct investment enterprise, plus any property incomes or current transfers receivable, minus any property incomes or current transfers payable, including actual remittances to foreign direct investors and any current taxes payable on the income, wealth, etc., of the foreign direct investment enterprise (ESA 4.64).	— Administrative sources: • Fiscal sources.
D.441	Investment income attributable to insurance policy holders	Investment income attributable to insurance policy holders (D.441) corresponds to total primary incomes received from the investment of insurance technical reserves. These reserves are those where the insurance corporation recognises a corresponding liability to the policyholders (ESA 4.68).	— Sources used for the regionalisation of premiums (related to D.71).
D.442	Investment income payable on pension entitlements	The investment income payable on defined contribution entitlements (D.442) is equal to the investment income on the funds plus any income earned by renting land or buildings owned by the fund. The value of the entitlements existing at the start of the year increases because the date when the entitlements become payable has become one year nearer. This increase is regarded as investment income attributed to the pension holders in the case of a defined benefit scheme (ESA 4.69).	— Demographic sources. — Sources used for the regionalisation of social contributions. — D.442 corresponds to D.6141.

Code	Variable	Definition according to ESA 2010	Possible sources
D.443	Investment income attributable to collective investment fund shareholders	Investment income attributable to collective investment fund shareholders (D.443), including mutual funds and unit trusts, is composed of two separate items: — Dividends attributable to collective investment fund shareholders (D.4431). — Retained earnings attributable to collective investment fund shareholders (D.4432) (ESA 4.70).	— Administrative sources. — Demographic data. — D.443 corresponds to D.6142.
D.45	Rent received	Rent (D.45) is the income receivable by the owner of a natural resource for putting the natural resource at the disposal of another institutional unit (ESA 4.72).	— Regional accounts for agriculture. — Data on sub-soil deposits. — Administrative sources.
Uses			

D.41	Interest paid	See above	— Administrative sources:
			  • Regional data on housing.
			  • Consumer loans outstanding.

D.45	Rent paid	See above.	— Regional accounts for agriculture. — Data on sub-soil assets. — Administrative sources.

Secondary distribution of income account

Code	Variable	Definition according to ESA 2010	Possible sources
Resources			
D.621	Social security benefits in cash	Social security benefits in cash (D.621) are social insurance benefits payable in cash to households by social security funds. These benefits are provided under social security schemes and may be split between: — Social security pension benefits in cash (D.6211). — Social security non-pension benefits in cash (D.6212) (ESA 4.103). Reimbursements are excluded and treated as social transfers in kind (D.632).	— Administrative sources: • Regional statistics of social insurance institutions.
D.622	Other social insurance benefits	Other social insurance benefits (D.622) correspond to benefits payable by employers in the context of other employment-related social insurance schemes. Other employment-related social insurance benefits are social benefits (in cash or in kind) payable by social insurance schemes (other than social security) to contributors to the schemes, their dependants or survivors. They typically include: a) The continued payment of normal, or reduced, wages during periods of absence from work as a result of ill health, accident, maternity etc. b) The payment of family, education or other allowances in respect of dependants. c) The payment of retirement or survivors' pensions to ex-employees or their survivors, and the payment of severance allowances to workers or their survivors in the event of redundancy, incapacity, accidental death etc. (if linked to collective agreements). d) General medical services not related to the employee's work. e) Hospital/nursing and retirement homes (ESA 4.104).	— Private insurance schemes.

Code	Variable	Definition according to ESA 2010	Possible sources
D.623	Social assistance benefits in cash	Social assistance benefits in cash (D.623) are current transfers payable to households by government units or NPISH to meet the same needs as social insurance benefits, but which are not made under a social insurance scheme requiring participation, usually by means of social contributions (ESA 4.105).	— Administrative sources: • Regional statistics of social assistance institutions.
D.72	Non-life direct insurance claims	Non-life insurance claims (D.72) are the claims that arise under contracts in respect of non-life insurance, i.e. the amounts which insurance enterprises are obliged to pay in settlement of injuries or damage suffered by persons or goods (including fixed capital goods) (ESA 4.114).	— Regional indicators for each risk in respect of which a claim is paid: • Regional population patterns. • Regional housing stock patterns. • Numbers of accidents etc.
D.75	Miscellaneous current transfers received	Current transfers between households (D.752) consist of all current transfers in cash or in kind made, or received, by resident households to, or from, other resident or non-resident households (ESA 4.129).	— Administrative sources: • General government accounts. • Accounts of non-profit institutions. — Demographic data. — Socio-economic data.
Uses			
D.51	Taxes on income	Taxes on income (D.51) consist of taxes on incomes, profits and capital gains. They are assessed on the actual or presumed incomes of individuals, households, corporations or NPISH. They include taxes assessed on holdings of property, land or real estate where these holdings are used as a basis for estimating the income of their owners (ESA 4.78).	— Administrative sources: • Fiscal sources
D.59	Other current taxes	Other current taxes (D.59) include: a) Current taxes on capital, which consist of taxes payable on the ownership or use of land or buildings by owners, and current taxes on net wealth and on other assets, for example jewellery. b) Poll taxes, levied per adult or per household, independently of income or wealth. c) Expenditure taxes, payable on the total expenditures of persons or households. d) Payments by households for licences to own or use (for non-business purposes) vehicles, boats or aircraft, or for licences for recreational hunting, shooting or fishing etc. (ESA 4.79).	— Administrative sources: • Fiscal sources. — Demographic data. — Distribution of the vehicles used for non-business purposes.
D.611	Employers' actual social contributions	Employers' actual social contributions (D.611) are paid by employers to social security schemes and other employment-related social insurance schemes to secure social benefits for their employees (ESA 4.92).	— Employers' actual social contributions (D.611) correspond to flow D.121. • See D.121.
D.612	Employers' imputed social contributions	Employers' imputed social contributions (D.612) represent the counterpart to social benefits (less eventual employees' social contributions) paid directly by employers (i.e. not linked to employers' actual contributions) to their employees or former employees and other eligible persons (ESA 4.97).	— Employers' imputed social contributions (D.612) correspond to flow D.122. • See D.122.
D.613	Households' actual social contributions	Households' actual social contributions (D.613) are contributions payable on their own behalf by employees, self-employed or non-employed persons into social insurance schemes (ESA 4.100).	— Regional distribution of employment.
D.614	Households' social contribution supplements	Households' social contribution supplements (D.614) consist of the property income earned during the accounting period on the stock of pension and non-pension entitlements (ESA 4.101).	— See D.442 and D.443.

Code	Variable	Definition according to ESA 2010	Possible sources
D.71	Net non-life insurance premiums	Net non-life insurance premiums (D.71) provide cover against various events or accidents resulting in: a) Damage to goods or property, or harm to persons, as a result of natural or human causes, examples being fires, floods, crashes, collisions, theft, violence, accidents, sickness etc. b) Financial losses resulting from events such as sickness, unemployment, accidents etc. (ESA 4.112).	— Regional indicators for each risk in respect of which a premium is paid. • Regional population patterns. • Regional housing patterns. • Numbers of accidents etc.
D.751	Miscellaneous current transfers paid to NPISH	Current transfers to NPISH (D.751) include all voluntary contributions (other than legacies), membership subscriptions and financial assistance which NPISH receive from households (including non-resident households) and, to a lesser extent, from other units (ESA 4.125).	— Administrative data from trade unions and other NPISH.
D.752	Current transfers between households	Current transfers between households (D.752) consist of all current transfers in cash or in kind (made or received) between resident households and other resident or non-resident households. In particular, these comprise remittances by emigrants or workers permanently settled abroad (or working abroad for a period of a year or longer) to members of their family living in their country of origin, or by parents to children in another location (ESA 4.129).	— Administrative data from the Central Bank. — Regional distribution of students. — Demographic data.
D.759	Other miscellaneous current transfers	Fines and penalties imposed on institutional units by courts of law or quasi-judicial bodies are treated as compulsory current transfers (ESA 4.132).	— Administrative data, for example from the Ministry of Justice.

Redistribution of income in kind account

Code	Variable	Definition according to ESA 2010	Possible sources
Resources			
D.63	Social transfers in kind	Social transfers in kind (D.63) consist of individual goods and services provided free or at prices that are not economically significant. They are provided for individual households, by government units and NPISH, whether purchased on the market or produced as non-market output by government units or NPISH. They are financed out of taxation, other government income or social security contributions, or out of donations and property income in the case of NPISH (ESA 4.108).	— Regional statistics of social security institutions. — Demographic data (allowances in kind granted by non-profit institutions). — The regional breakdown of individualised non-market services could be based on existing sources but will probably require specific work, in particular for the regionalisation of services provided by central government.

Use of disposable income account

Code	Variable	Definition according to ESA 2010	Possible sources
Resources			
D.8	Adjustment for the change in pension entitlements	The adjustment for the change in pension entitlements (D.8) is required to reflect in the saving of households the change in the pension entitlements on which households have a definite claim. The pension entitlement change comes from premiums and contributions recorded in the secondary distribution of income account as social contributions (ESA 4.141).	— Basically, the adjustment for the change in net equity of households on the basis of its component parts.

Code	Variable	Definition according to ESA 2010	Possible sources
Uses			
P.3	Final consumption expenditure	Final consumption expenditure (P.3) consists of expenditure incurred by resident institutional units on goods or services that are used for the direct satisfaction of individual needs or the collective needs of members of the community (ESA 3.94). Household final consumption expenditure includes the following examples: a) Services of owner-occupied dwellings. b) Income in kind, such as: 1) Goods or services received as income in kind by employees. 2) Goods or services produced as outputs of unincorporated enterprises owned by households that are retained for consumption by members of the household. Examples are food and other agricultural goods, housing services by owner-occupiers and household services produced by employing paid staff (servants, cooks, gardeners, chauffeurs etc). c) Items not treated as intermediate consumption, such as: 1) Materials for small repairs and interior decoration of dwellings carried out by tenants as well as owners. 2) Materials for repairs and maintenance to consumer durables, including vehicles. d) Items not treated as capital formation, in particular consumer durables, that continue to perform their function in several accounting periods; this includes the transfer of ownership of some durables from an enterprise to a household. e) Financial services directly charged and the part of FISIM used for final consumption purposes by households. f) Insurance services by the amount of the implicit service charge. g) Pension funding services by the amount of the implicit service charge. h) Payments by households for licences, permits etc., which are regarded as purchases of services. i) The purchase of output at economically insignificant prices, e.g. entrance fees for a museum. All household final consumption expenditure is individual (ESA 3.103).	— Household expenditure survey. — Retail trade statistics. — Housing surveys. — Administrative data from utility companies — Mobility surveys. — Holiday surveys. — Health surveys. — Census and/or Labour Force Survey for the composition of households in combination with data from the Household Expenditure Survey.

Use of adjusted disposable income account

Code	Variable	Definition according to ESA 2010	Possible sources
Uses			
P.4	Actual final consumption	Actual final consumption (P.4) consists of the goods or services acquired by resident institutional units for the direct satisfaction of human needs, whether individual or collective (ESA 3.100).	— Individual consumption expenditure (P.31) + Social transfers in kind (D.63).

Annex 3: Numerical example of regional household accounts

Table 1: Allocation of primary income account of households
(Table 24.6 Full sequence of accounts for households, Account II.1.2 in ESA 2010) (¹)

R/U	Code	Transaction/Balancing item	Regions				Extra-regio	Total economy
			a	b	c	d		
R	B.2n	**Net operating surplus**	**6.9**	**24.2**	**17.3**	**20.7**	**-**	**69.0**
	B.3n	**Net mixed income**	**21.2**	**5.3**	**18.6**	**8.0**	**-**	**53.0**
	D.1	**Compensation of employees**	**113.3**	**405.1**	**288.3**	**347.3**	**-**	**1 154.0**
	D.11	Wages and salaries	95.4	333.9	238.5	286.2	-	954.0
	D.12	Employer's social contributions	17.9	71.2	49.8	61.1	-	200.0
	D.121	Employer's actual social contributions	16.3	64.3	45.3	55.2	-	181.0
	D.1211	Employer's actual pension contributions	15.1	59.6	42.0	51.2	-	168.0
	D.1212	Employer's actual non-pension contributions	1.2	4.6	3.3	4.0	-	13.0
	D.122	Employer's imputed social contributions	1.6	7.0	4.5	5.9	-	19.0
	D.1221	Employer's imputed pension contributions	1.6	6.4	4.5	5.5	-	18.0
	D.1222	Employer's imputed non-pension contributions		0.6		0.4	-	1.0
	D4	**Property income**	**16.3**	**48.8**	**27.1**	**31.0**	**-**	**123.0**
	D.41	Interest	7.4	19.6	9.8	12.3	-	49.0
	D.42	Distributed income of corporations	4.0	7.0	5.0	4.0	-	20.0
	D.421	Dividends	2.6	4.6	3.3	2.6	-	13.0
	D.422	Withdrawals from Income of quasi corporations	1.4	2.5	1.8	1.4	-	7.0
	D.43	Reinvestment earnings on foreign direct investment		3.0			-	3.0
	D.44	Other investment income	2.8	11.8	7.0	8.4	-	30.0
	D.441	Investment income attributable to insurance policy holders	2.0	7.0	5.0	6.0	-	20.0
	D.442	Investment income payable on pension entitlements	0.8	2.8	2.0	2.4	-	8.0
	D.443	Investment income attributable to collective investment fund shareholders	0.0	2.0	0.0	0.0	-	2.0
	D.4431	Dividends attributable to collective investment fund shareholders		2.0			-	2.0
	D.4432	Retained earnings attributable to collective investment fund shareholders					-	0.0
	D.45	Rent	2.1	7.4	5.3	6.3	-	21.0
U	D.4	**Property income**	**4.8**	**13.7**	**10.3**	**12.3**	**-**	**41**
	D.41	Interest	0.7	5.6	3.5	4.2	-	14
	D.45	Rent	4.1	8.1	6.8	8.1	-	27
	B.5n	**Net balance of primary incomes**	**152.9**	**469.6**	**340.9**	**394.6**	**-**	**1 358**

(¹) Some aggregates are slightly different from the sum of the details due to rounding off.

Table 2: Secondary distribution of income account
(Table 24.6 Full sequence of accounts for households, Account II.2 in ESA 2010)

R/U	Code	Transaction/Balancing item	Regions				Extra-regio	Total economy
			a	b	c	d		
R	B.5n	Net balance of primary incomes	152.9	469.6	340.9	394.6	.	1 358.0
		Current transfers	49.8	140.2	94.9	135.2	.	420.0
	D.61	Net social contributions					.	0.0
	D.62	Social benefits other than soial transfers in kind	46.3	126.9	86.2	124.7	.	384.0
	D.621	Social security benefits in cash	10.6	13.7	15.9	12.9	.	53.0
	D.6211	social security pension benefits in cash	9.0	11.3	13.5	11.3	.	45.0
	D.6212	social security non-pension benefits in cash	1.6	2.4	2.4	1.6	.	8.0
	D.622	Other social insurance benefits	37.9	97.7	57.3	96.2	.	279.0
	D.6221	Other social insurance pension benefits	24.0	87.5	50.0	87.5	.	250.0
	D.6222	Other social insurance non-pension benefits	2.9	10.2	7.3	8.7	.	29.0
	D.623	Social assistance benefits in cash	7.8	15.6	13.0	15.6	.	52.0
	D7	Other current transfers	3.5	13.3	8.8	10.5	.	36.0
	D.72	Non-life insurance claims	3.5	12.3	8.8	10.5	.	35.0
	D.721	Non-life direct insurance claims	3.5	12.3	8.8	10.5	.	35.0
	D.75	Miscellaneous current transfers	0.0	1.0	0.0	0.0	.	1.0
	D.751	Current transfers to NPISHs					.	0.0
	D.752	Current transfers between households		1.0			.	1.0
	D.759	Other miscellaneous current transfers					.	0.0
U		Current transfers	56.1	206.2	144.8	175.0	.	582.0
	D.5	Current taxes on income, wealth, etc.	17.8	62.3	44.5	53.4	.	178.0
	D.51	Taxes on income	17.6	61.6	44.0	52.8	.	176.0
	D.59	Other current taxes	0.2	0.7	0.5	0.6	.	2.0
	D.61	Net social contributions	31.2	119.0	82.5	100.3	.	333.0
	D.611	Employers' actual social contributions	16.3	64.3	45.3	55.2	.	181.0
	D.6111	Employers' actual pension contributions	15.1	59.6	42.0	51.2	.	168.0
	D.6112	Employers' actual non-pension contributions	1.2	4.6	3.3	4.0	.	13.0
	D.612	Employers' imputed social contributions	1.8	6.9	4.5	5.8	.	19.0
	D.6121	Employers' imputed pension contributions	1.8	6.3	4.5	5.4	.	18.0
	D.6122	Employers' imputed non-pension contributions		0.6		0.4	.	1.0
	D.613	Households' actual social contributions	12.9	45.2	32.3	38.7	.	129.0
	D.6131	Households' actual pension contributions	11.5	40.3	28.8	34.5	.	115.0
	D.6132	Households' actual non-pension contributions	1.4	4.9	3.5	4.2	.	14.0
	D.614	Households' social contributions supplements	0.8	4.8	2.0	2.4	.	10.0
	D.6141	Households' pension contributions supplements	0.8	2.8	2.0	2.4	.	8.0
	D.6142	Households' non-pension contributions supplements	0.0	2.0	0.0	0.0	.	2.0
	D.61SC	Social insurance scheme service charges	-0.6	-2.1	-1.5	-1.8	.	-6.0
	D.62	Social benefits other than social transfers in kind					.	0.0
	D.7	Other current transfers	7.1	24.9	17.8	21.3	.	71.0
	D.71	Net non-life insurance premiums	3.1	10.9	7.8	9.3	.	31.0
	D.711	Net non-life direct insurance premiums	3.1	10.9	7.8	9.3	.	31.0
	D.75	Miscellaneous current transfers	4.0	14.0	10.0	12.0	.	40.0
	D.751	Current transfers to NPISHs	2.9	10.2	7.3	8.7	.	29.0
	D.752	Current transfers between households	0.7	2.5	1.8	2.1	.	7.0
	D.759	Other miscellaneous current transfers	0.4	1.4	1.0	1.2	.	4.0
	B.6n	Net disposable income	146.6	403.6	291.0	354.7	.	1 196.0

Table 3: Redistribution of income in kind account and use of (adjusted) disposable income account

R/U	Code	Transaction/Balancing item	Regions				Extra-regio	Total economy
			a	b	c	d		
Redistribution of income in kind account **(Table 24.6 Full sequence of accounts for households, Account II.3 in ESA 2010)**								
R	**B.6n**	**Net disposable income**	**146.6**	**403.6**	**291**	**354.7**	-	**1 196**
	D.63	**Social transfers in kind**	**42.6**	**75.3**	**32.7**	**64.5**	-	**215**
	D.631	Social transfers in kind-non-market production	42.2	73.9	31.7	63.3	-	211
	D.632	Social transfers in kind- purchased market production	0.4	1.4	1	1.2	-	4
U	**B.7n**	**Net adjusted disposable income**	**189.2**	**478.9**	**323.7**	**419.2**	-	**1 411**
Use of disposable income account **(Table 24.6 Full sequence of accounts for households, Account II.4.1 in ESA 2010)**								
R	**B.6n**	**Net disposable income**	**146.6**	**403.6**	**291**	**354.7**	-	**1 196**
	D.8	**Adjustment for the change in pension enti-tlements**	**1.1**	**3.9**	**2.8**	**3.3**	-	**11**
U	**P3**	**Final consumption expenditure**	**121.8**	**335**	**274.1**	**284.2**	-	**1 015**
	P.31	Individual consumption expenditure	121.8	335	274.1	284.2	-	1 015
	B.8n	**Net saving**	**25.9**	**72.5**	**19.7**	**73.8**	-	**192**
Use of adjusted disposable income account **(Table 24.6 Full sequence of accounts for households, Account II.4.2 in ESA 2010)**								
R	**B.7n**	**Net adjusted disposable income**	**189.2**	**478.9**	**323.7**	**419.2**	-	**1 411**
	D.8	**Adjustment for the change in pension enti-tlements**	**1.1**	**3.9**	**2.8**	**3.3**	-	**11**
U	**P4**	**Actual final consumption**	**1 64.4**	**410.2**	**306.7**	**348.7**	-	**1 230**
	P.41	Actual individual consumption	1 64.4	410.2	306.7	348.7	-	1 230
	B.8n	**Net saving**	**25.9**	**72.5**	**19.7**	**73.8**	-	**192**
		Average population	9.75	22.75	13	19.5	-	65
		Primary income per capita	15.7	20.6	26.2	20.2	-	20.9
		Net disposable income per capita	15	17.7	22.4	18.2	-	18.4
		Net adjusted disposable income per capita	19.4	21.1	24.9	21.5	-	21.7

Annex 4: Differences between ESA 1995 and ESA 2010, relevant for regional accounts purposes

Some notable differences between ESA 1995 and ESA 2010 are mentioned here:

1. Local KAUs: ESA 13.21, sections b) and c) provide new texts about respectively 'production units without significant labour input' and 'production activity without a fixed location'.

2. ESA 13.40 provides another concept for the allocation of FISIM to user industries.[35]

3. ESA 13.44 is a new item about per inhabitant data and the fact that these data are not calculated for the extra-regio territory.

4. ESA 13.46-13.48 regard a new item for regional accounts: the compilation of volume growth rates of regional GVA.

5. ESA 13.55 regards an extension of the regional household accounts with the use of income accounts.

6. ESA 13.55 regards a new item for the regional accounts: social transfers in kind.

7. Though not mentioned explicitly in chapter 13 of ESA 2010, attention should be drawn to conceptual changes for GFCF (see ESA 2010, par. 3.124 — 3.129):

    a. Weapons systems.

    b. Research and development.

    c. Databases.

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[35] The concept to allocate FISIM to user industries has been applied by the Member States from 2005 on.

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