

**INVENTORY OF  
METHODS**

FOR

**PRICE AND VOLUME MEASURES  
IN THE AUSTRIAN NATIONAL  
ACCOUNTS**

OCTOBER 2007



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## List of abbreviations

BZ (95)	non-agricultural business statistics (1995)
CFC	consumption of fixed capital
COICOP	Classification of Individual Consumption by Purpose
DRG	diagnosis related groups
ESA	European System of Accounts
FISIM	financial intermediation services indirectly measured
f.o.b.	free on board
FKA	hospitals, financed by special funds ("Fondskrankenanstalten")
GDP	gross domestic product
HBS	household budget survey
(H)CPI	(harmonised) consumer price index
ISCED	International Standard Classification of Education
NFKA	hospitals, not financed by special funds ("Nicht-Fondskrankenanstalten")
NOVA	standard consumption tax
ÖCPA	Austrian version of the CPA
OeNB	Austrian National Bank
ÖNACE	Austrian version of NACE
PI	price index
PIM	perpetual inventory method
PPI	producer price index
PRODCOM	statistics on the production of manufactured goods
SBS	structural business statistics
SNA	UN System of National Accounts
SPPI	producer price index for business services
ST.AT	Statistics Austria
STS	short-term statistics
VAT	value added tax
WIFO	Austrian Institute for Economic Research

# Chapter 1

## 1. General principles

### 1.1. Introduction

The concept of **price and volume measures** has two meanings with quite different aims and methods (ESA 95 10.06, 10.07):

1. **Volume growth**: the aim is to measure the growth of the economy in terms of volume. Volume by this definition means quantity and quality (ESA 95 10.13, 10.15).
2. **Purchasing power in real terms**: the aim is to measure the purchasing power of income flows adjusted for inflation.

In this **inventory of methods**, only **volume growth** is dealt with.

Over the past few years, measuring volume has assumed increasing importance in the EU. The focus of national accounts was initially on calculations at current prices. It was only when the stability and growth pact was agreed upon in July 1997 that harmonisation of price and volume measures moved up the agenda. Under the terms of the pact, whose key aim is stability of the euro, the Member States agreed, inter alia, that their public annual deficit should not be more than 3% of GDP. Only in the event of a severe recession, which is defined as a decline in annual GDP at constant prices of at least 2%, are exceptions possible. "GDP at constant prices" refers to volume growth of GDP, even though this is not stated explicitly. For the first time, growth data were required for administrative purposes and, since neither ESA 95 nor SNA 93 made sufficient provision for price and volume measures, Eurostat launched a working programme extending over several years to prepare standard principles for price and volume measurement. One of the main outcomes of the programme was Commission Decision 98/715/EC, which laid down the basic framework for price and volume measures. For areas for which no principles could be established, task forces were set up to carry out studies. The main bases for volume measurement are currently:

- **ESA 95** (legal basis)
- **Commission Decision of 30 November 1998 (98/715/EC)** (legal basis)
- **Commission Decision of 17 December 2002 (2002/990/EC)** (legal basis)
- Reports prepared by the individual **task forces** (recommendations)
- **Handbook on Price and Volume Measures in National Accounts**

## 1.2. Conceptual background

The **ESA 95** is mainly concerned with calculating GDP at current prices; there is only a short chapter (Chapter 10) which deals with the principles of price and volume measures. The main **principles** are as follows:

1. Price and volume measures should be made within an integrated system of price and volume indices (10.02). Changes in value can be broken down into price and volume components only for transactions in goods and services and production accounts (the income approach is not suitable for measuring volume because the operating surplus, one of its components, is determined as a residual and can therefore not be measured directly at constant prices<sup>1</sup>. The volume of balancing items, such as value added, can be measured only indirectly via transactions at constant prices (double deflation). An integrated system of volume measures (10.08) must meet three requirements:
  - The goods and services account must be balanced for two successive years both in current and constant prices.
  - Each flow at the level of the total economy must be equal to the sum of the corresponding flow or the various industries.
  - Every change in value of a transaction must be associated with a change in price or a change in volume or a combination of the two.
  
2. The value of a homogeneous product is defined by (10.12f):  
$$v \equiv p \times q$$

v... Value  
p... Price  
q... Quantity unit
  
3. “**Quantity unit**” comprises **quantitative and qualitative characteristics**. The concept “volume” became the more usual term because it was more precise. **Volume** refers specifically to<sup>2</sup>:
  - quantity
  - quality
  - composition of the product mix
  
4. Wherever possible, volume should be determined by **deflation using the price index** since this method is the best way of recording changes in quality. Quantity indicators are regarded as the second best method and input methods, where the components on the costs side (intermediate consumption, employee compensation, other taxes on production less other subsidies, consumption of fixed capital formation) are deflated, are regarded as the third best methods (ESA 10.32ff).

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<sup>1</sup> Eurostat: Handbook on Price and Volume Measures in National Accounts, p. 7, Luxembourg, 2001.

<sup>2</sup> Eurostat: Handbook on Price and Volume Measures in National Accounts, p. 4, Luxembourg, 2001.

5. The annual volume change should ideally be measured with **Fisher chain indices**. Chain indices with **Laspeyres** volume measurements and **Paasche** price measurements are acceptable alternatives. The disadvantage of chain indices is that they are not additive<sup>3</sup>. This should be explained to data users.

In **Commission Decisions 98/715/EC** and **2002/990/EC**, the principles of price and volume measurement are clarified. The key principle is that volume should be measured in an **integrated system**. There are three sets of principles:

1. **General principles** which must always be complied with
2. Principles for measuring volume in line with the **production approach**.
3. Principles for measuring volume in line with the **expenditure approach**.

The **general principles** are:

1. **An elementary aggregation level which is as detailed as possible** is to be used for price and volume measures. The minimum level of detail is P60 level of the ESA 95.  
This is because price and volume changes of non-homogeneous goods must generally be weighted together in statistical practice. At national accounts level, only a single consistent weighting method may be used (the weighting method is described by the three general principles). The aggregation level is defined by the assumption that the indices used are elementary indices, i.e. indices (and/or indicators) which have not been aggregated by the national accounts weighting method. This assumption is most plausible when the level of breakdown is very detailed.
2. For aggregating elementary indices, the following rules apply: volume indices are to be aggregated using the **Laspeyres formula** and price indices using the **Paasche formula**. The **Fisher formula** may also be used. Data below the level of the elementary aggregation level need not to be aggregated in accordance with this principle.
3. The base year is the respective previous year. The individual figures are chained by reference to a single year (reference year) for the purposes of presenting them in a time series.

As regards the principles for measuring volume in accordance with the output and/or expenditure approach, the methods described are classified as **A, B and C methods**. A methods are the most suitable methods, B methods are to be used if an A method cannot be used and C methods should not be used. As a rule, the following principles apply when distinguishing between A, B and C methods:

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<sup>3</sup> For an explanation of non-additivity, see: Commission Decision 98/715/EC, p. L340/39.



**A-method:** for the purposes of the **production approach**, the A method basically comprises the use of producer price indices.

For the **expenditure approach**, the A method may be a consumer price index (for consumption), an **investment goods price index** (for gross fixed capital formation), etc<sup>4</sup>. For both the production and expenditure approaches the indicators must meet the following criteria:

- Full and/or representative coverage of the goods and services (groups)
- Recording of changes in quality and new products
- Valuation at basic prices for the production approach and purchaser's prices for the expenditure approach
- Consistency with national accounts concepts.

**B-methods** meet the A criteria only in part, such as when a producer price index is used without quality adjustment. **C-methods** deviate even more from the A criteria than B methods (using, for example, input methods for market production).

The various regulations and recommendations are summarised in the **Handbook on Price and Volume Measures in National Accounts**. The Handbook is based on: ESA 95, Commission Decision 98/715/EC, Task Force recommendations, recommendations of the National Accounts Working Group and other considerations.

### 1.3. Price and volume measures in the Austrian national accounts

In Austria, the production approach represents the point of departure for calculating GDP.<sup>5</sup>

The expenditure approach is the second means of calculating gross domestic product. There is a connection between the two methods of calculation in as far as the same data sources are used for many variables for both the production and expenditure approaches and/or calculations from the production approach are used directly in the expenditure approach after corresponding conceptual adjustments.

However, the production approach is traditionally seen as the more reliable way to determine the level of the gross domestic product due to data availability and the methods used. Statistical differences on the expenditure side – occurring in preliminary accounting results - are, as long as they do not exceed certain limits, accepted and are indicated as such.

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<sup>4</sup> For detailed list see: Commission Decision 98/715/EC p. L340/47f.

<sup>5</sup> For a detailed description see: Statistik Austria "Methodeninventar zu den Volkswirtschaftlichen Gesamtrechnungen in Österreich", Vienna 2007, ([http://www.statistik.at/web\\_de/statistiken/volkswirtschaftliche\\_gesamtrechnungen/bruttoinlandsprodukt\\_und\\_hauptaggregate/jahresdaten/index.html](http://www.statistik.at/web_de/statistiken/volkswirtschaftliche_gesamtrechnungen/bruttoinlandsprodukt_und_hauptaggregate/jahresdaten/index.html))

The income approach does not play any significant part in determining the level of gross domestic product in Austria.

Volume measures in Austria are, to put it in simplified form, based on activities (in accordance with ÖNACE) on the production side and goods and services (groups) (in accordance with CPA, COICOP, etc.) on the expenditure side. The volume of individual activities is measured at the lowest necessary or possible level by goods and services (groups). The values on the production and expenditure sides are balanced largely by careful plausibility tests by the competent experts.

Developing an integrated system has been a priority aim over the last few years. Balancing procedures are being carried out to coordinate data from the production and expenditure approaches at detailed level in the course of producing annual supply/use tables. From the reference year 2000 onwards the results of the supply/use tables at current prices are integrated into the annual accounts.

Preparations are currently under way for producing supply/use tables at constant prices with work being carried out on the conceptual design and on setting up a price data base, in connection with the necessary rules for filling all cells of the system adequately. A preliminary 2003 version is expected for the end of this year.

#### **1.4. General calculation methods**

The economic unit best suited to depict the production process is the "local kind of activity unit", which is generally called a "Betrieb" (establishment) in Austria. Kind of activity units are classified according to their economic activity and are grouped to form industries. The classification used - ÖNACE 2003 - is a slightly more detailed version of NACE Rev 1.1. All production accounts are produced on the basis of ÖNACE either at division level (2-digit code) or a more detailed level which is chosen so that useful forms of aggregates can be produced for making calculations at constant prices and for preparing supply/use tables.

Within industries, kind of activity units are distinguished according to their sector classification, i.e. the ESA 95 distinction between market producers, producers for own final use and other non-market producers is strictly complied with. Thereby a kind of cross-classification of activities and sectors is used, covering sectors S.11 (non-financial corporations) including S.14 (households), S.12 (financial corporations), S.13 (general government) and S.15 (non-profit institutions serving households). The internal working classification comprises a split into about 200 branches, which form the basis for setting up production accounts at current as well as constant prices.

For the year 1995, the non-agricultural business statistics (BZ) was available to provide original data for calculations at current prices. These are full surveys of all areas of the market economy except

agriculture and forestry and non-market producers (civil service and NPISH). The freelancers (lawyers, auditors, etc.) were covered for the first time in 1995 by business statistics (with the exception of freelance artists). This survey provides detailed information on production revenues and costs, gross capital formation, stocks, employee numbers, expenditure on personnel and consumption of fixed capital.

Since 1997, there have been yearly censuses with a questionnaire similar to the one for the BZ. This is called the structural business statistics (SBS) and is a sample survey covering ÖNACE sections C to K with no primary data being surveyed for ÖNACE 66 (insurance), as the insurance association's full survey data are used. The SBS, like the BZ, provides information on production revenues and costs, numbers of employees, etc. The survey units are enterprises, their establishments (kind of activity units) and places of work (local units).

Using all the available basic statistics and other information, detailed production accounts for all industries are produced after checks for exhaustiveness and conceptual adjustments. All market production is valued at basic prices with output initially being calculated at market prices. The transition to valuation at basic prices is carried out in the next stage.

All production accounts contain output and intermediate consumption broken down by so-called codes which provide information on the structure of goods. Entries do not, of course, exist for all individual items. Where they do, they are calculated both at current and constant prices. This means that the gross value added of the national economy is determined at constant prices using the **double deflation method**.

The production accounts provide the values on which the goods and services accounts are based. The transition to goods and services is made using the monthly available very detailed short-term statistics (using PRODCOM classification) and the raw and input material statistics. Where this information is not available, the structures of the most recently available supply/use and/or input/output tables are used.

For all industries, output is broken down by the following structure (clearly, not all of the various positions are relevant for each economic activity):

<b>Structure – Output</b>
Revenues from manufacturing
Revenues from in-house supplies and services
Revenues from supply and transmission of energy
Revenues from own account production of fixed capital
Revenues from construction and ancillary construction work
Revenues from product support services
Revenues from intermediate trading activities and consignment business (commissions)
Revenues from rent
Revenues from accommodation
Revenues from sales and supply of food and beverages
Revenues from repairs, assembly and installation work
Revenues from commission processing
Revenues from other services
Wholesale revenues
Retail revenues
Revenues from transport services and communications
( - )Purchase of goods for resale in unchanged condition
(+) Change in inventories of goods for resale
(+) Change in inventories of unfinished and finished products
<b>Output</b>

**Output** comprises production for market sales, production for own use (mainly own account formation of fixed capital, including software) and other non-market production. Market production – in its simplest form net sales plus changes in the output inventories – is invariably valued at basic prices. Other non-market production is production by general government and NPISH not sold at economically significant prices. This is valued in terms of cost and output is the sum of intermediate consumption, consumption of fixed capital, compensation of employees and other taxes on

production. Other non-market production has been decreasing steadily over the last years (see table 1 below)

For each single code, the respective goods structures form the basis for the construction of a price index. In most cases, a price index itself is compiled by using other representative indices, weighted together according to the respective goods structures. For example, the price indices for raw and input materials are the result of a combination of more than 2.100 entries in the price data base, weighted together adequately. The goods structures are taken from the latest version of the supply/use tables (e.g. for the 2007 release of the annual accounts, the 2003 supply/use results provided the detailed weighting structures for the accounting years 2003 to 2006).

Table 1

## Share of non-market output\*

	2000	2001	2002	2003	2004	2005	2006
<b>ÖNACE</b>	<b>% of activity</b>						
01 Agriculture, hunting	3,1	3,0	3,1	3,2	3,1	3,6	3,6
15 Manufacture of food products, beverages and tobacco	0,1	0,1	0,0	0,0	0,0	0,0	0,0
55 Hotels and restaurants	0,1	0,1	0,1	0,1	0,1	0,1	0,1
63 Supporting and auxiliary transport activities, activities of travel agencies	0,4	0,3	0,3	1,1	1,5	1,2	1,2
70 Real estate activities	0,1	0,0	0,0	0,0	-	-	-
71 Renting of machinery and equipment without operator and of personal and household goods	2,5	2,5	2,5	2,3	2,2	2,1	2,1
73 Research and development	9,1	7,1	8,4	11,1	11,0	10,9	14,2
74 Other business activities	0,3	0,3	0,3	0,5	0,5	0,5	0,5
75 Public administration and defence; compulsory social security	100,0	100,0	100,0	100,0	100,0	100,0	100,0
80 Education	92,4	92,3	92,1	92,0	92,3	92,9	93,0
85 Health and social work	21,5	18,2	18,2	18,1	18,6	18,5	18,7
85.11 Hospital services	0,0	0,0	0,0	0,0	0,0	0,0	0,0
85.12 Medical practice services	0,2	0,2	0,2	0,2	0,2	0,2	0,2
85.13 Dental practice services	0,0	0,0	0,0	0,0	0,0	0,0	0,0
85.14 Other human health services	0,3	0,3	0,3	0,3	0,3	0,3	0,2
85.2 Veterinary services	0,1	0,2	0,1	0,1	0,1	0,1	0,1
85.3 Social work services	20,8	17,5	17,6	17,6	18,1	18,0	18,2
90 Sewage and refuse disposal, sanitation and similar activities	7,0	6,7	6,3	6,6	6,2	6,8	6,5
91 Activities of membership organizations n.e.c.	91,9	91,8	91,8	91,5	91,6	91,6	91,6
92 Recreational, cultural and sporting activities	18,8	19,4	20,3	20,7	21,2	20,2	20,6
<b>Total non-market output, all activities</b>	<b>9,9</b>	<b>9,6</b>	<b>9,6</b>	<b>9,5</b>	<b>9,3</b>	<b>9,2</b>	<b>9,0</b>
<b>Total non-market output, all activities excluding ÖNACE 75</b>	<b>5,2</b>	<b>5,0</b>	<b>5,1</b>	<b>5,0</b>	<b>5,0</b>	<b>4,9</b>	<b>4,8</b>

\* Percentage of non-market output to total output of activities at basic prices, as of July 2007

The same procedures are applied for the processing of intermediate consumption.

Intermediate consumption measures the value of goods and services consumed, processed or transformed in the production process. For all industries intermediate consumption is broken down by the following structure (clearly, not all of the various positions are relevant for every economic activity):

<b>Structure - Intermediate consumption</b>
Purchases of fuels, electrical energy and district heat
Purchase of materials for handling and processing
Expenditure on repairs and maintenance
Expenditure on contracted work
Expenditure on sub-contracts
Expenditure on rent (of buildings, machinery and means of transport)
Expenditure on operating leasing
Expenditure on agency workers
Expenditure on non-company workers (including commissions for self-employed representatives)
Expenditure on outward freight
Expenditure on services for resale in unchanged condition
Other operating expenses
Expenditure on internal supplies and services
Expenditure on small tools
(-) Change in inventories of fuels and inventories of raw and input products
<b>Intermediate consumption</b>

### 1.5. Data publication

According to the European legislation<sup>6</sup>, price and volume measurement in Austria is carried out on the **basis of previous year's prices** since 2004, for the annual and the quarterly accounts as well.

In the annual publications, data are published not only at current prices but almost all constant price data are presented by using **volume indices**. Growth rates are shown additionally. At present, the time series (starting with the reporting year 1976 for the annual main aggregates) are referenced to

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<sup>6</sup> Commission Decision on 30 November 1998 (98/715/EC) clarifying Annex A to Council Regulation (EC) No 2223/96 on the European system of national regional accounts in the Community as it concerns the principles for measuring prices and volumes.

the year 2000. Besides, constant price data at previous year's prices are available on demand in order to satisfy qualified users' needs.

## **1.6. Changes in quality**

Changes in quality or new products are mainly recorded as follows:

- The activities and/or goods and services (groups) are broken down in as great a detail as possible.
- The volume is measured by deflation as far as possible.

There are various methods known in price statistics for the treatment of changes in quality. For example, if a product is replaced without a change in quality, the possible difference in price between product A and product B is regarded as purely a change in price and there is no correction of the base. Price B is used instead of price A.

In principle, implicit and explicit methods can be distinguished. Implicit methods can be the overlapping method, the bridged overlap method and the automatic linking method (in order to show no price change).

As explicit methods are known: the option cost method (including a 50% rule), the production cost method, hedonic methods and, last but not least, expert guesses, incorporating the producer's know how of the product.



## Chapter 2

### 2. The main sources for price and volume measures

#### 2.1. Price index for capital expenditure on machinery and equipment

Price surveys for machinery and other equipment were launched in the middle of the 70s when Austria took part in the international comparison project. On the basis of this price information, a method for calculating a current price index was developed.

The price index for capital expenditure on machinery and equipment in its present form is a **Laspeyres chaining price index**. Calculations of annual changes in prices for goods which are defined as machinery, equipment or vehicles for the purposes of calculating supply in national accounts form the basis for the price index for capital expenditure on machinery and equipment.

This index is based on the net investor price. This is the value that an entrepreneur must use for an investment plan (purchase of machinery, plant, etc.) after making deductions to reflect any favourable conditions normally offered in the branch and adding any costs which might arise for transportation to the place of use, installation, etc., i.e. the "actual purchasing price" (purchaser's price less value added tax).

In order to portray as accurately as possible the constant changes which occur at increasingly shorter intervals in this important sector of the market, the Laspeyres chaining calculation method was used for weighting. This is based on the expenditure data from the previous year and makes it much easier to select representative goods for the price survey and for adjustment to the current market situation. For the particularly difficult question of assessing changes in quality in this area, a new approach was adopted for Austria and – wherever possible – the MCR (Monthly Chaining and Resampling) method was used.

The weighting formula for the price index is based on national accounts calculations using the commodity flow method broken down to three-digit codes under the ÖCPA (Austrian product classification system) which, in simplified terms, reflects domestic production minus exports plus imports, with a systematic distinction being made between domestic and imported investment goods. At the most detailed breakdown level, company's figures are further weighted in accordance with market share (production sold domestically according to production statistics, turnover according to turnover tax statistics, statistics on the registration of new vehicles or information from companies). The weightings are adjusted annually (Laspeyres chain index).

Some 450 companies supply the product and price information used to calculate the index for an average of around 500 product groups on an exclusively voluntary basis. The number of companies

surveyed is kept to a representative minimum to lessen the burden on the respondents as far as possible but also due to workload considerations. The arrangements for reporting (e.g. e-mail, telephone, post, etc.) are flexible and mainly depend on the resources and wishes of the companies offering their cooperation. The annual changes in prices may occur at very different times and intervals in the various branches and this is factored into current survey intervals in order to ensure that the most recent data are used.

The indices are calculated on the basis of the monthly chaining and resampling (MCR method). This takes account of changes in quality when products are compared over time.

In the MCR method, the procedure is as follows: first of all, representative product groups are selected. These product groups include all the variants, arranged in order of their importance in the market and their life cycle (product cycle). If a product acquires a significant foothold in the market, it is included for as long as it retains it. The data pool of product variants is checked every month and any changes are taken into account.

Chaining is done by comparing all identical products over a period of two months on condition, however, that the number of products in the groups is above a given threshold. Changes in quality are recorded as far as possible by the MCR method. Explicit adjustments due to changes in quality are then necessary only in exceptional cases. The arithmetic mean is formed from the monthly figures in order to determine the annual figures.

According to the Commission Decision guidelines on price and volume calculations, the MCR method can be regarded as an A method since it produces results which are as accurate as those obtained using very time and resource-consuming hedonic calculation methods.

## **2.2. Construction price index**

Since 1971, a construction price index has been calculated in Austria. The construction PI is a Laspeyres price index with a fixed base year. The current base year is 2005. The index is broken down into the following subgroups:

- Construction price index for structural engineering
  - Dwellings
  - Other structural engineering
- Construction price index for civil engineering
  - Road construction
  - Bridge construction
  - Other civil engineering

For the purposes **of the construction PI**, prices are surveyed at master builders and professionals from all Federal states for a total of 91 individual services. The "standardised specification for structural engineering" recommended by the Federal Ministry for Economic Affairs is used as a standard description of the individual groups of services and representative individual services. The construction price index is weighted in three stages:

1. Regional weighting by Federal state
2. Distribution of the entire sum of contracts amongst the groups of services with standardisation of technical and material changes
3. Examination of the weightings of individual services within groups and/or an entire project.

The prices which are accepted on both sides when the contract is awarded are used (contractual prices without value added tax).

For all three indices for civil engineering, the contractual prices are also recorded. Any discount which may be agreed upon during the negotiations is taken into account in the valuation. Prices are forwarded to Statistics Austria by means of price reports from the regional building directorate and special companies which award contracts for road and bridge construction and water supply and disposal projects.

The price surveys are carried out on a quarterly basis. Output for construction from the 1995 construction statistics<sup>7</sup> is used to weight the index groups (construction: houses and housing estates, other construction; civil engineering: road construction, bridge construction, other civil engineering). The individual price figures are aggregated with the weighted arithmetic mean. New products are recorded by regularly changing the base year.

### **2.3. Wholesale price index**

Since 1914, a wholesale price index has been calculated in Austria and an uninterrupted series since 1947 is available at total index level. In the year 2005, the wholesale price index was revised to take account of structural changes which had occurred in wholesale and changes in the range of goods.

The wholesale price index 2005 is – like the indices in 2000, 1996, 1986 and 1976 – based on an **institutionally defined wholesale trade**, i.e. only goods were considered in the basket which are

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<sup>7</sup> In accordance with the regulation on Short-Term Statistics 1165/98, indices must, in general, be rebased every five years. The base years are those years ending with a 0 or a 5. The weighting system needs to be adjusted only when this is necessary.

actually sold via the institutional wholesale trade. The wholesale price index 2005 covers ÖCPA<sup>8</sup> division 51 "Intermediary trading and wholesale services" which was adapted for the purposes of the wholesale price index.

The final version of the shopping basket contains **387 products** (wholesale price index 1996: 373 products).

For the purposes of weighting the **61 ÖCPA - classes/categories/subcategories**, the results of the turnover profiles of wholesale companies obtained in the structural business statistics 2003 were used. These provide a distribution of the wholesale turnovers of the wholesale companies in the year 2003 at four-digit or six-digit code level in the 2002 ÖCPA which was adapted to match the breakdown for the wholesale price index. This enabled the group weighting in the wholesale price index to be based on the results of a turnover distribution broken down in keeping with the product classification system, instead of the activity classifications used previously.

The **product weighting** in the ÖCPA index groups is done according to a variety of information from other statistical domains. On the contrary to former versions of the wholesale PI, the weights for fruits and vegetables remain fixed for all months of the year.

**220 wholesale companies report 1400 prices** for the purposes of compiling the wholesale price index 2005 = 100. When companies were selected, the main consideration, apart from their economic importance, was their willingness to cooperate on a voluntary basis. Despite intensive efforts on the part of Statistics Austria and support by the Austrian Chamber of Industry in attempting to recruit new reporting companies, it has proved impossible to halt the decline in the number of respondents over the last few years, as a result of closures, bankruptcies and mergers and in the willingness to report (Wholesale Price Index 1986, 385 reporting companies, Wholesale Price Index 1996, 318 companies, Wholesale Price Index 2000, 270 companies).

The wholesale prices are surveyed on the 15th of every month at the selected wholesale companies using lists which go back and forth and are sent by mail or e-mail. The prices to be reported are the wholesale prices not including value added tax as they apply for retailers and industrial consumers. The prices recorded should not be list prices but "actual prices" in accordance with the customary terms of supply of the companies, i.e. after deduction of any discounts which might be granted. It is important for the companies to stick to the arrangements which applied when they first reported their prices or, if any major changes are made, to announce this when the corresponding report for the month is made (such as special offers or temporary rises or falls in price).

The fact that the companies themselves select the products on which they are reporting, within the scope of the definition they are given, ensures that the prices reported for individual products are as representative as possible. It has also been found that the variations in the range of goods which was

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<sup>8</sup> ÖCPA 2002 – the Austrian version of the Classification of Products by Activities, the statistical classification of products in connection with industries in the European Community, in accordance with the Council Regulation 204/2002.

created as a price basis for the index reflects the development in prices much more accurately than an index which is restricted to a shopping basket with products which are defined precisely by sort, brand or type.

The calculations for the Laspeyres index are geared to an unchanged shopping basket with constant price-determining characteristics, mainly the quality of the articles. However, no matter how much care goes into selecting the shopping basket, this cannot prevent some products from being replaced. Sometimes a product is changed when companies go out of business and a new price reporter needs to be selected and sometimes articles are no longer available or there has been a change in their quality as a result of constant technical development. However, under no circumstances may unjustified changes in prices be fed into the price index. A new product must be integrated in the index irrespective of its price, so that a change in price only occurs when the price of the product has changed from one month to another.

When the prices of products in the shopping basket change, checks are to be made – in agreement with the reporting company - to determine whether the product has become more or less expensive or whether the change in price is totally, or, partially attributable to a difference in quality and/or a change in sales conditions (discounts, freight charges, etc.). Any change in quality or any other change in the sales conditions and/or the part of the difference between the price in the previous month and the reporting month these account for must be factored out of the equation. In addition to actual increases and decreases in price, any changes in price which are caused by replacement of a product for which a change in value can be ascertained are incorporated in full in the index. This is a "change of type" which is mainly attributable to minor changes in design or presentation.

The main breakdown for the wholesale price index is based on the **ÖCPA 2002**. As the ÖCPA 2002 is compatible with CPA<sup>9</sup> at 6-digit level, the index is comparable with other industrial statistics at national and even international level.

For the purposes of compiling the wholesale price index, ÖCPA division 51 "intermediary trading and wholesale services (excluding trading services for vehicles)" was adjusted by, for example, extending it to vehicles, motorcycles and accessories (from ÖCPA groups 50.1 to 50.3) and excluding the group "51.1 intermediary trading" and classification units which do not refer to specific groups of products or are not significant in the Austrian wholesale trade (such as food and other consumer goods, household articles, raw tobacco, textile fibres). For the sectors "clothing" and "house-hold articles", several ÖCPA groups were merged due to the small number of representative products and/or reports of prices.

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<sup>9</sup> Classification of Products by Activities in the European Communities in accordance with the Council Regulation 204/2002 of 19. December 2001; L 36.

The **breakdown scheme** of the wholesale price index 2005 = 100 covers 61 ÖCPA classes (4-digit), categories (5 digit) and subcategories (6 digits).

Further breakdown variants are indicated either by category of products, type of use or seasonality.

For the purposes of national accounts in particular, there is also a breakdown into classes of origin, in which the goods included in the wholesale price index are classified in accordance with their characteristic origin (by classes (4-digits) of ÖNACE 2003).

The wholesale price index 2003 is, like the indices for 1964, 1976, 1986, 1996 and 2000, calculated using the formula for Laspeyres indices. This type of calculation, which is based on an unchanged shopping basket during the period in which the index is valid, offers the advantage of comparability of all index figures, but has the drawback that changes which arise over time in the composition of the total range of products are not reflected. After a certain period of time, the index therefore has to be revised in order to ensure the Laspeyres index is meaningful, i.e. in particular to adjust the shopping basket to reflect what products are actually available.

The wholesale price index is calculated by the **indicator method**, i. e. each individual price for a product is represented by an indicator relating to the corresponding basic price and these are used to calculate an unweighted mean indicator for each product. The average figures are aggregated in accordance with the product weights and produce indices for the individual breakdown items and the total index.

#### **2.4. Agricultural price statistics**

Agricultural price statistics comprise the statistics of absolute agricultural prices and agricultural price indices.

Since January 1972, Statistik Austria has produced a standardised set of agricultural producer price statistics for the entire country which covers 216 agricultural and forestry products at present. Except in the case of a few products, a price for each Federal state and a national mean are indicated.

The prices, which are sometimes recorded weekly, are based on an agreement between Statistik Austria, the Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW), Agrarmarkt Austria (AMA), the Austria Chamber of Agriculture and the market experts of the regional Agricultural Chambers. The latter take care of the regional survey system, collecting the weekly price reports and forwarding these to Statistik Austria on a monthly basis for calculating average producer prices.

Prices must refer to a precisely defined product and a geographical area. They should be average prices, i.e. not affected by extraordinary market situations, which the farmers actually receive (without value added tax) for their products.

The price reports are first checked for exhaustiveness. Prices must be indicated for all the products in the basket of goods concerned which are available on the market. Even if prices remain unchanged, it is important for reports to be filed. If a price is not available the previous price may be used for up to three months.

Each price is compared with the previous month and/or the month of the previous year. The price differences must then be analysed. If there are any price differences which appear implausible, they must be investigated unless they are small enough to be disregarded.

The price survey is mainly based on a system of voluntary cooperation by farmers and foresters, market experts, officials of cooperatives, chamber employees, horticulturists, winegrowers, livestock traders, butchers, members of warehouse and vintners cooperatives, fruit and vegetable processing cooperatives, producer organisations and other companies with high turnovers in the respective sectors. At present, seven questionnaires are used (productive livestock, other livestock for slaughtering (horses, sheep, lambs), game, field crops, vegetables, fruit, wine and timber).

Once the monthly prices for a calendar year are available they are weighted taking into account the monthly movements of sales volumes in seasonal and/or regional terms to form an annual average price. Seasonal weighting schemes (total annual sales in percent, market output data) are used for plant products. Both sales and slaughtering figures are used for the livestock sector.

Agricultural Price Indices are compiled by the Statistical Department of the *LBG Wirtschaftstreuhand- und Beratungsgesellschaft m.b.H.* (Economic Trust and Consulting Company). National and EU indices are calculated. Both are **Laspeyres price indices** with a fixed base year.

The national indices differ from the EU Agricultural Price Indices in respect of their field of observation and their base. The national calculation comprises indices of producer prices of agricultural and forestry products, subsidies and indices of purchase prices of the means of agricultural production (including wages and wage costs). The current base year of the national indices is 1995. The group weights of the national price indices for revenues and expenditure were derived from results of the national Farm accountancy data network (FADN) for the "Green Report" from the years 1995, 1996 and 1997. The individual weights were calculated from official statistics on the turnover of plant and animal products and also special evaluations of the documentation supplied by agricultural and forestry holdings of the FADN. The national indices are published in the Agrarischer Paritätsspiegel.

The EU Agricultural Price Indices comprise the index of producer prices of agricultural products and the index of purchase prices of the means of agricultural production. Their current base year is 2000. The weighting scheme of the EU indices 2000=100 is based on the results of the Economic Accounts for Agriculture for the years 1999 to 2001. The individual weightings for the means of agricultural production (goods and services for current consumption in agriculture and investment goods) were calculated from statistics on production, foreign trade statistics and data from the National Accounts. Indices are calculated on a quarterly and annual basis for a number of individual products/inputs, for groups of products/inputs and for all products/inputs. The prices for agricultural products are taken from the above mentioned Statistics of agricultural and forestry producer prices of Statistik Austria. Purchase prices for the means of agricultural production are either taken from official market reports or recorded at major producers or trading companies.

## **2.5. Index of agreed minimum wages**

The index of agreed minimum wages is a **Laspeyres price index** with a fixed base year. The current base year is 1986. The index is based on the **minimum gross earnings** determined by law or collective wage agreements for dependent employees and employees in the liberal professions. Gross earnings include wages and salaries before deduction of PAYE and social security contributions. The index is calculated from a total of 1 507 items.

The structure of the index of agreed minimum wages is based on that of collective agreements for employees in the industrial economy, agriculture and forestry and the liberal professions and of public remuneration for employees of the civil service. The wage sum proportions are used for weighting. Individual price indicators are aggregated using the weighted arithmetic mean. Changes in quality and/or new employment conditions have not been recorded since 1986.

As a rule, only the basic wage (time rate) is used for calculating the index of agreed minimum wages. Payments in excess of the time rate, piece rates, bonus rates and specific allowances for overtime, night work, work on a public holiday and special bonus payments (13th and 14th salary and any remuneration in excess of these) and statutory and voluntary social security contributions are not included in the index. Only in the civil service sector are allowances payable to all staff, such as the administrative service allowance, also taken into account.

The index of agreed minimum wages 1986 has four structural levels:

- general index (all individual items together)
- 4 main series of indices (workers, salaried employers, civil servants, transport officials)
- 14 sub-indices (agriculture and forestry: wage earners, salaried employers. Crafts and trades: wage earners, salaried employers. Industry: wage earners, salaried employers. Trade: wage



earners, salaried employers. Transport: wage earners, salaried employers. Tourism: wage earners, salaried employers. Financial intermediation and insurance: salaried employers. Liberal professions: salaried employees).

- indicators for each of the 1507 index items.

Revision work is almost finished for the new index of agreed minimum wages based on 2006 weights. The index will be published from 2008 onwards and will then replace the former one. For year 2007 indices on 1986 and 2006 bases will be prepared in parallel.

## **2.6. (Harmonised) Consumer price index**

A consumer price index has been calculated in Austria, with some interruptions, since the First World War. The index, which had been calculated and published since 1958 in the current form, was revised for the seventh time at the beginning of 2006. The former consumer price index 2000 was replaced by the 2005 = 100 based index; the new series is therefore called the "consumer price index 2005" (CPI 2005) and is linked with the old index series by corresponding chaining factors. In addition, the harmonised consumer price index (HICP) has been calculated and published since January 1997. As laid down in EU Regulation (EC) 1708/05 the reference period was rebased to 2005 = 100.

In terms of the way it measures prices, the CPI 2005 is a "pure" price index because it measures only the changes in price in a shopping basket occurring over a period of time and disregards all other changes (composition, replacement effects) (Laspeyres price index).

The CPI 2005 is a fixed base index which uses the weighting of the base period (2005 = 100) and maintains this for as long as the index is valid. During the revision in the year 2005, the aim was - available resources permitting - to design a shopping basket which reflects current consumer behaviour. EU Regulation (EC) No 1687/98 on the HICP, which establishes that goods which account for at least 0.1% of total consumer expenditure in Austria are to be included in the shopping basket, was used as a guideline.

The basis for the new weightings of the CPI 2005 was the 2004/2005 household budget survey (HBS), which was carried out by Statistics Austria in 8 400 households (detailed records of expenditure in "household accounts"<sup>10</sup> between September 2004 and September 2005). The household budget survey reflects the current structure of consumption of private households

Index items are hence the most detailed level of expenditure breakdown (mostly COICOP 5-digit codes), below which there appears to be no need for further weighting of expenditure. In practice

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<sup>10</sup> Mini-household accounts containing expenditure outside the house, primarily by young people and owners of second homes, which is not financed by the normal household budget.

however, an additional level (weighting) is carried out by regions (and possibly type of business). The level below this is the price item (survey item) level, specifying the goods and services for which prices were surveyed in the respective outlets in the individual regions. At this level the data is exclusively price-based.

For the **overall weighting**, which reflects the interaction between the 106 COICOP 3-digit codes, private consumption expenditure taken from national accounts are used as well as the HBS. In order to determine the HICP weightings, consumption of foreigners from national accounts were added to the expenditure of the households recorded in the HBS. In addition, expenditure of the "mini-household accounts" was added on a pro rata basis.

In the CPI every additional price is, in principle (there are some exceptions), compared with the corresponding base price and the relative change is calculated. The geometric mean of the relative changes produces the regional indicator for this product (indicator method).

The Austrian CPI 2005 covers 770 index items, some of which do not feature in the HICP, which only covers 759 items. Of the total of 770 items, approximately half are accounted for by the three main groups: food and non-alcoholic beverages, transport and leisure, and entertainment and culture.

The basis for the CPI is the purchasing price including VAT. In calculations for national accounts the individual CPI indices are used either including or excluding VAT, depending on their use.

<b>Number of index items in the CPI 2005</b>		
	<b>Goods and services in accordance with COICO</b>	<b>CPI 2005</b>
0	Individual consumer expenditure of private households	770
1	Food and non-alcoholic beverages	129
2	Alcoholic beverages and tobacco	10
3	Clothing and footwear	66
4	Housing, water, electricity, gas and other fuels	49
5	Furnishing and household equipment	75
6	Health	33
7	Transport	141
8	Communications	12
9	Leisure, entertainment and culture	117
10	Education	13
11	Hotels, cafes and restaurants	47
12	Miscellaneous goods and services	78

The individual price indicators are aggregated using the geometric mean. New products are recorded by regularly changing the base year – since 1996 the index has been rebased every five years. Adjustments in quality are made during the current index period.

The concept "domestic consumption by nationals" applies for the purposes of the Austrian CPI. Accordingly the index is weighted and prices are observed in Austria in accordance with the consumption behaviour of the resident population of Austria. Expenditure by Austrians abroad is not included.

## **2.7. Producer price index – Manufacturing**

Since July 2001, a hybrid industrial producer price index has been calculated and published for ÖNACE divisions C to E on the basis of average values and wholesale price information with the base 2000 = 100. Short-term statistics in the production sector are used as a source of data for calculating the average values.

The hybrid index was a temporary measure until a producer price index which is based solely on real price information could be produced.

To calculate the producer price index with the base 2000 = 100, average values of sales taken from monthly production statistics were used. Price information from the wholesale price index and the price index for formation of fixed capital in equipment was included with the current producer price index remaining a hybrid index. The proportion of real prices has, however, been increased considerably with the result that real price information was available for approximately half of all 2-digit codes and average prices in the form of price replacement figures were available for the other half.

The unit values were used as price replacement figures in the absence of real price information but it is only the fact that Austria has a very detailed monthly product data base (10-digit ÖPRODCOM) that enabled calculated average values to be used to make a realistic approximation of producer prices.

To calculate the average values, the data from the monthly short-term statistics in the production sector processed by product (PRODCOM system) were used. The unit value was derived by dividing the value of sales of a given product item (= 10-ÖPRODCOM) by the quantity of these products.

Another important step was to filter the mass of data. By eliminating certain PRODCOM items (such as generic categories) and filtering out the most important product groups and their leading producers in the market, the approach adopted bore some resemblance to a primary price survey, since only the prices of the leading producers were surveyed here too. A sufficient number of PRODCOM establishment combinations were selected so that some of their outputs accounted for at least 70% of

the output of the next NACE three-digit code above. By introducing threshold values it was also possible to exclude fluctuations of average values which arose purely as a result of changes in quality and the composition of the aggregate from the index calculation.

For base year 2000, part of the price information of the price index for fixed capital formation in equipment was included in the calculation schedule for the producer price index. This meant that real prices could be used for ten more NACE two-digit codes than in the old 1996 base.

The unit values were determined for each PRODCOM item and establishment from the value of sales and the associated volumes. Using the monthly average values from 2000 determined for each PRODCOM item, the annual average for 2000 was calculated, providing the basis for computing the reference value for the monthly indicator calculation.

For NACE two-digit codes 16, 20, 23, 24 and 26, real prices were based on the annual average of wholesale prices surveyed in 2000 for each product and, for NACE two-digit codes 25, 28 to 36, on the annual average of the indicator calculated per product group in 2000 on the basis of price information for formation of fixed capital in equipment.

The monthly index values were calculated from unit values used as replacement prices by comparing the establishment's average value for each PRODCOM item with the values for the previous month. The resulting rates of change for the establishments were weighted in order to reflect the fact that larger producers have more impact on the development of prices than small ones. Subsequently, the PRODCOM-related rate of change was calculated which was applied to the updated average value for each PRODCOM item.

In the same way, the rates of change of the price per product over two months was ascertained by factoring in the wholesale price information, the rates of change for the product were aggregated and the arithmetic mean was calculated. Price reports from the price index for formation of fixed capital in equipment were handled in a similar manner in that the established and weighted rates of change of the indicators at the level of product groups were aggregated over two months and the arithmetic mean was calculated.

The Laspeyres concept and the weighting method were also carried over in the rebasing process, so that the product items established in the base period 2000 were kept constant and the weighting structure established in the base year was applied to the indicators. The data from the monthly short-term statistics 2000 was used as a basis for calculating the weightings. For items taken from the wholesale price index, the weighting was made at product level, and for indicators taken from the index for formation of fixed capital in equipment, the weighting for each CPA three-digit code was used. The weightings from the wholesale price and the index for formation of fixed capital in

equipment were harmonised in several intermediate stages using the weighting system of the unit value index.

Starting with January 2006, the hybrid version was replaced by a genuine price index for manufacturing. The reference year is 2005. The weights are adapted each year (Laspeyre chain index). The current calculation method for the producer price index is based on approximately 1.000 items and 1 400 reporting units or about 7 000 pieces of price information. Results are available for the domestic market and for exports (EMU and non-EMU).

## **2.8. Producer price index – Business services**

During the last years considerable progress has been made in developing a PPI for the business services. Some time ago a pilot study for development of a price index for the service sector was launched. The initial aim was to assess the current situation and to work out the basic requirements and concepts for developing a producer price index for company services. The final goal was to prepare the ground thoroughly for producing high quality price indicators to measure changes in prices of business services in accordance with the requirements of Eurostat, the ECB and other users. A price index for business services would then constitute an important component of an integrated price statistics system which ultimately has to be devised.

It will still take several years to develop all producer price indices for business services, due to the complexity and scale of the task, and work is carried out in several phases.

The first phase (design phase) was devoted to analysing existing price indices with regard to their usability for company services, designing a survey infrastructure, determining a method for selecting the various services sectors and devising survey and calculation methods. In this first phase, work was also being started on those economic activities which could be tackled fairly easily with existing know-how because they were closely aligned with existing survey and/or index designs (such as telecommunication services).

In the subsequent phases, work is to be focused on 24 PPI for service activities, which are published from the beginning of 2007, and are transmitted to Eurostat quarterly. Transmission has started in June 2007 and comprised of the activities NACE 62.10, 64.11, 64.12, 64.20, 74.11 and 74.4. The base year is 2006 and the first reference period is 1st quarter 2007. The data are sent in a preliminary version, the final results will be sent with the data transmission of the following quarter. For the purpose of national accounts, the indices were available in advance and therefore could be used for the price and volume measurement earlier

Preparatory work is under way for PPI covering NACE 60.24, 72.1, 72.2, 72.3, 72.4, 72.6, 74.12 and 74.2. and will be completed hopefully by the end of 2007.

The PPI for the business services will be set up according to the Laspeyres method, with fixed weights from 2006, and afterwards periodical revisions every five years.

## **2.9. Unit value index for foreign trade statistics**

The basic data for the calculations are the individual sets of Austrian foreign trade statistics from the Extrastat and Intrastat surveys. Supplementary estimates for the Intrastat data surveyed (values beneath the thresholds, lack of response) are not included in the calculations.

Individual sets are the individual reporting items forwarded to Statistics Austria, which, depending on the reporting arrangements of the respondents, may constitute individual transactions or summations of the qualitative survey characteristics at the most detailed level of breakdown.

In order to make the calculated indices more meaningful, various methods are used to filter out non-homogeneous data. This is done by first producing an average value vector, sorted in descending order of proportion of total trade for each commodity flow direction, transactor and goods item, and analysing it using stratification and distribution parameters.

Due to storage constraints, a maximum of 1 000 items can be entered in this vector for each combination of direction/companies/nomenclature item; the loss of data through this screening process is, however, minimal (less than 1% of the total values). Within the vector, the ratio of the standard deviation to the mean value (variation coefficient) is calculated for which, after extensive test runs using different parameters as homogeneity criteria, a variation coefficient not greater than 0.40 was established for imports and not greater than 0.50 for exports.

If this criterion is not met in a given vector, further calculation steps are carried out to filter out goods information at the end of the vector, which is arranged in descending order, until either the criterion is fulfilled or the remaining proportion accounts for less than 60% of the vector sum. If no satisfactory variation coefficient is obtained when only 60% of the values remain in the vector, the entire vector is eliminated from the process of calculating the mean value.

The values are then aggregated for direction, transactor and nomenclature items, rates of change of the average values for the base year/current year are calculated and tests are run on the rates of change using the variation coefficients as described above. Goods items which display rates of  $< 0.10$  and  $> 10.0$  are defined as non-homogeneous and are eliminated.

Up to and including reporting year 2000, Paasche unit value indices and Laspeyres volume indices were compiled as official indices of foreign trade statistics, which were calculated as chain indices with a sliding computation base and chaining to the base year 1995.

As of 2001, the base year was changed to 2000 = 100 and, due to the results of comparative trial calculations, the calculation method was converted to the Fisher Ideal Index (geometric mean of Paasche and Laspeyres). The recent base year for the Fisher Ideal Index is 2005 = 100.

#### Hybrid index for national accounts

The average value index for the foreign trade statistics is adjusted from national accounts at Statistics Austria for the purposes of deflating exports and imports. Real price information from the investment goods price index and the wholesale price index and/or also producer price information from the agricultural statistics are used for selected CPA 3-digit code product groups and any rates of change in the average value index for foreign trade statistics which appear implausible are corrected in the detailed results and hence also in the total index.

Adjustments are mostly carried out in the product groups for rubber and plastic goods, metals and semi-finished products, metal products, machinery, electrical equipment and medical and measuring instruments. By incorporating this real price information and maintaining the weighting scheme of the foreign trade statistics, a hybrid foreign trade index is produced which displays elements of both the real price index and unit values.

Currently, preparations are under way for a quarterly import price index for the sections A – E (at CPA 3-digit code level, base period = 2007). First results will be available in 2008.

## Chapter 3

### 3. Price and volume measures in the production approach

#### 3.1. General remarks

This chapter refers to the price and volume measurement in the production approach. Production accounts are set up for all economic activities according to the ÖNACE classification by using a much more detailed internal breakdown. In this way, a split into more than 200 production accounts is carried out, which gives the opportunity to analyze business cycle movements as well as structural economic phenomena on a very detailed basis.

Output and intermediate consumption are deflated separately. Therefore value added at constant prices is derived by the **double deflation method**. For those activities which are not covered by annual structural business statistics or other comparable information, value added at constant prices is derived by applying constant net rates of the base year.

The following sections focus on the description of the deflation methods for market and non-market output, produced in the respective activities. For that reason, the relatively largest part of production is referred to as “characteristic output” or output in terms of CPA classification alternately.

#### 3.2. ÖNACE A + B – Agriculture, hunting and forestry, fishing

In agricultural and forestry accounts, output for the vast majority of products is determined using the "quantity x price" formula. Calculations at constant prices are made using the prices for the previous year of individual products from the agricultural and forestry producer price statistics. Constant price data for the production of agricultural services and inseparable non-agricultural secondary activities and intermediate consumption (for which extrapolated values from the national Farm accountancy data network are used) are calculated by deflation using price indices (CPI sub-indices and agricultural input price indices calculated by LBG Wirtschaftstreuhand- und Beratungsgesellschaft m.b.H.).

#### 3.3. ÖNACE C – Mining and quarrying

#### 3.4. ÖNACE D – Manufacturing

Both for ÖNACE C and ÖNACE D, all the production accounts both at current and constant prices are produced at ÖNACE 2-digit code level.



The corresponding producer price indices are used to deflate characteristic output. Since the reporting year 2006, a genuine producer price index for manufacturing is available.

### 3.5. ÖNACE 40 – Electricity, gas and water supply

The internal classification for ÖNACE 40 is as follows:

ÖNACE	Description
40.1	Electricity supply
40.2	Gas supply
40.3	District heat supply

For all three activities, the appropriate Producer Price Index (PPI) is used.

### 3.6. ÖNACE 41 – Collection, purification and distribution of water

For deflating characteristic output, the Producer Price Index (PPI) for ÖNACE 41 is used.

### 3.7. ÖNACE 45 – Construction

The internal classification for ÖNACE 45 is as follows:

ÖNACE	Description
45.1	Site preparation
45.2	Building of complete constructions or parts thereof; civil engineering
45.3	Building installation
45.4	Building completion
45.5	Renting of construction or demolition equipment with operator
45.6	Own account construction of housing
45.7	Interest groups for the purpose of construction activities

#### Characteristic output:

The characteristic output of the construction activities ÖNACE 45.1 and 45.2 is deflated by weighted sub-indices of the construction price index for structural and civil engineering.

For the activities ÖNACE 45.3 and 45.4, weighted construction price indices by group of construction services are used for deflation.

The activity ÖNACE 45.5 is deflated by the price index for capital expenditure on machinery and equipment (sub-group construction machinery).

For ÖNACE 45.6 - own-account construction -, the construction price index for houses and housing estates is used.

The value added of ÖNACE 45.7 is deflated by the wage index for civil services, the intermediate consumption by weighted wholesale price indices.

### **3.8. ÖNACE 50 – Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel**

The internal classification for ÖNACE 50 is as follows:

<b>ÖNACE</b>	<b>Description</b>
50.1	Trade in motor vehicles
50.2	Maintenance and repair of motor vehicles
50.3	Trade in motor vehicle parts and accessories
50.4	Trade in motor cycles, parts and accessories; maintenance and repair of motor cycles
50.5	Petrol stations

#### *Trade services with motor vehicles (trade margin)*

The trade margin is deflated using the corresponding price indices of goods for resale, separated into wholesale and retail trade from the short-term statistics for trade, based on wholesale and consumer price indices (C method)<sup>11</sup>.

#### *Maintenance and repair work on motor vehicles*

To deflate maintenance and repair work on motor vehicles the corresponding sub-index compiled from the consumer price index is used (B method). The applied price index (CPI 50.20: Maintenance and repair of motor vehicles) covers the following work:

- car washing
- motor vehicle body work, by hour
- motor vehicle mechanic, by hour
- replacing a headlight, hours worked
- replacing an exhaust system without a catalytic converter, hours worked
- replacing an exhaust system with a catalytic converter, hours worked
- realigning brakes on the front wheels, hours worked

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<sup>11</sup> see also: General remarks on trade margins, p. 36

- replacing a water pump, hours worked
- replacing a windscreen, hours worked

*Petrol station services (trade margin)*

According to the CPA definition, these services cover retail trade services involving fuel, lubricants, radiator fluids and similar products and care and cleaning agents for motor vehicles and are thus measured on the basis of the trade margins obtained. The corresponding price index of goods for resale from the short-term statistics for trade is used for deflation, based on consumer price indices (C method)<sup>12</sup>.

**3.9. ÖNACE 51 – Wholesale trade and commission trade, except of motor vehicles and motorcycles**

The internal classification for ÖNACE 51 is as follows:

ÖNACE	Description
51.1	Wholesale on a fee or contract basis
51.2	Wholesale of agricultural basic materials and livestock
51.3	Wholesale of food, beverages and tobacco
51.4	Wholesale of household goods
51.5	Wholesale of non-agricultural intermediate products, waste and scrap
51.6	Wholesale of machinery, equipment and supplies
51.7	Other wholesale

*Wholesale on a fee or contract basis*

Data are deflated using the corresponding price index compiled from the short-term statistics for trade, based on wholesale price indices (B method).

*Wholesale services (trade margin)*

The wholesale trade margin is deflated using the corresponding price indices of goods for resale from the short-term statistics for trade, based on wholesale price indices (C method)<sup>13</sup>.

**3.10. ÖNACE 52 – Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods**

The internal classification for ÖNACE 52 is as follows:

<sup>12</sup> see also: General remarks on trade margins, p. 36

<sup>13</sup> see also: General remarks on trade margins, p. 36

ÖNACE	Description
52.1	Retail sales in non-specialised stores
52.2	Retail of sale of food beverages and tobacco in specialised stores
52.3	Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles
52.4	Retail sale of new goods in specialized stores
52.5	Retail sale of antiques and second-hand goods (in stores)
52.6	Retail sale not in stores
52.7	Repair of personal and household goods

#### *Retail sale services (trade margin)*

The retail trade margin is deflated using the corresponding price indices of goods for resale from the short-term statistics for trade, based on consumer price indices (C method)<sup>14</sup>

#### *Repairs of personal and household goods*

To deflate the data on repairs of personal and household goods, the corresponding sub-index compiled from the consumer price index is used (A method). The applied price index (CPI 52.7: repair of personal and household goods) covers the following work:

- repair of footwear and leather goods (resoling)
- repair of electrical domestic appliances (washing machine service, television mechanic)
- repair of other personal and household goods (clothing alterations, repairs of skis)

#### **General remarks on trade margins**

Austria is currently working on substituting the C method for the deflation of trade margins (using the turnover price index) by a B method (constant margins of the previous year). Based on the information from the annual supply/use tables (SUT), constant margins of the previous year by commodity will be implemented as soon as the work on supply/use tables at constant prices will be completed.

Meanwhile, test calculations have been carried out for the years 1996 to 2005, using constant trade margins by activity (3-digit level of ÖNACE). The impact on total GDP at previous year's prices ranges from -0.3 to +0.6 percent. For some activities the changes of the implicit prices of trade margins are quite substantial and, thus, questionable. Hence, the application of mere constant margins by activity seems to be misleading, since the effects caused by changes in the product mix and by births, deaths and re-classifications of production units would be neglected.

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<sup>14</sup> see also: General remarks on trade margins, p. 36

Another test calculation was applied for the years 2002 and 2003. It was also based on constant previous year's margins by activity, but the production units within each activity (3-digit-level of ÖNACE) were separated into three groups:

1. units, which appeared in the same activity (3-digit level) for two subsequent years
2. units, which moved from one activity (3-digit level) to another in two subsequent years
3. units, which newly appeared in a particular year

For the latter, trade margins at previous year's prices had to be estimated by assumptions derived from the trade margins of units, which appear in two subsequent years. The impact on GDP at previous year's prices was 0.2 percent in 2002 and -0.04 percent for the year 2003 respectively. Due to a break in the methodology of structural business statistics in the year 2002, the comparability of units with those of the previous year was somewhat deficient. Since these calculations were carried out only for two years, a sound assessment of the results is not feasible.

Consequently, the most suitable method for trade margins at constant prices seems to be applying constant margins by commodity. The particular algorithm for reconciling margins by commodity (2-digit level of CPA) with margins by activity for the SUT at constant prices is still being tested and therefore not yet fully developed. The first SUT at constant prices, covering the year 2003, is scheduled to be published within the year 2007. First results show that strictly applying the method of constant margins by commodity results in implicit price changes for trade margins in some activities which are still questionable. Thus, in case a significant shift in the trade margin by commodity occurs, it can be assumed that the components and/or the quality of the particular commodity (2-digit level of CPA) might have substantially changed. Therefore it seems more appropriate to apply the trade margin at current prices also on the estimates at constant prices, assuming that this would have been the accurate margin for this particular commodity in the (previous) base year, too.

The current work and investigation is therefore focused on this particular problem.

### **3.11. ÖNACE 55 – Hotels and restaurants**

The internal classification for ÖNACE 55 is as follows:

<b>ÖNACE</b>	<b>Description</b>
55.1	Hotels, guesthouses and bed and breakfast hotels
55.2a	Other accommodation
55.2b	Private rooms, not on farms
55.3	Restaurants, guesthouses, snack bars, cafes and ice cream parlours
55.4	Bars
55.5	Canteens and caterers

#### *Accommodation services*

Accommodation services are deflated by using the corresponding sub-indices of the consumer price index. Sub-index 55.10 (hotels, guesthouses, and bed and breakfast hotels) covers bed and breakfast in a 4/5-star establishment and bed and breakfast in a 3-star establishment, and sub-index 55.20 (other accommodation) covers student hostels and private rooms. The data are deflated separately by type of accommodation (commercial or private rooms) and weighted by using the number of overnight stays by category (4 to 5 and/or 3-star) from the tourism statistics (A method)

#### *Restaurant and cafe services*

Restaurant and cafe services are deflated using the corresponding sub-indices of the consumer price index (55.30: restaurants, snack bars, cafes; 55.40: bars, discotheques and other restaurants; 55.51: canteens; 55.52: caterers; A method).

### **3.12. ÖNACE 60 – Land transport; transport via pipelines**

The internal split for ÖNACE 60 is as follows:

<b>ÖNACE</b>	<b>Description</b>
60.1	Railways
60.21-01	Trams, buses, underground and high-speed rail scheduled transport
60.21-02	Scheduled bus transport
60.21-03	Cableway, chair and drag lift transport
60.2a	Taxis and hire cars with driver, other land passenger transport
60.24	Freight transport by road
60.3	Transport via pipelines

## **Characteristic output:**

### **60.1 Railways**

In this activity three indices are calculated:

- index for passenger transport (B method)
- index for freight transport (B method)
- weighted index for deflating characteristic output

For deflating **passenger transport**, the harmonised consumer price index for railways (60.10) is used. For **freight transport**, a unit value index is compiled by contrasting tonne-kilometres with respective revenues (source: freight transport statistic of ST.AT and business reports of the Austrian Railway Company (ÖBB)).

These two indices are weighted according to their turnover share in the respective year to get an index for deflating characteristic output.

#### **60.21-01 Trams, buses, underground and high-speed rail scheduled transport**

HCPI 60.21-10 (passenger transport local traffic) is used (B method).

#### **60.21-02 Scheduled bus transport**

HCPI 60.21 (scheduled passenger transport on land) is used (B method).

#### **60.21-03 Cableway, chair and drag lift transport**

HCPI 60.21-51 (sub-index for cableways) is used (B method).

#### **60.2a Operation of taxis and hire cars with drivers and other passenger transport on land**

HCPI 60.22 (taxi services and hiring of cars with drivers) is used (B method).

#### **60.24 Freight transport by road**

For deflating freight transport by road, a unit value index is compiled by using tonne-kilometres and nominal receipts (sources: freight transport statistics, structural business statistics), (B method).

### **60.3 Transport via pipelines**

A unit value index is compiled by using tonne-kilometres and nominal receipts (B method).

## **3.13. ÖNACE 61 – Water Transport**

Because of the lack of importance of passenger water transport in Austria there are no passenger-kilometres surveyed.

From the freight transport statistics of ST.AT there is information about tonne-kilometres in freight water transport, which is used for calculating a unit value index by contrasting the tonne-kilometres with the respective revenues (source: structural business statistics), (B method).

### 3.14. ÖNACE 62 – Air Transport

In this activity, three indices are calculated:

- index for passenger transport (A method)
- index for freight transport (B method)
- weighted index of both for deflating characteristic output

Passenger transport is deflated by the Service Producer Price Index (SPPI) for scheduled passenger air transport.

For freight transport, a unit value index is calculated using nominal receipts and tonne-kilometres (source: business report of the Austrian Airlines Group).

Currently, Austria is working on a SPPI for scheduled air freight transport, which will be implemented soon.

These two indices are weighted according to their turnover shares in the respective year to get an index for deflating characteristic output

### 3.15. ÖNACE 63 – Supporting and auxiliary transport activities; activities of travel agencies

The internal classification for ÖNACE 63 is as follows:

ÖNACE	Description
63.1	Cargo handling and storage
63.21a	Car parks and garages and other auxiliary and ancillary activities for other land transport
63.21-02	Toll roads
63.22	Other auxiliary and ancillary activities for water transport
63.23	Other auxiliary and ancillary activities for air transport
63.3	Tour operators and travel agencies
63.4	Forwarding of freight and other transport arrangements



**Characteristic output:**

**63.1 Cargo handling and storage**

The wholesale price index in total is used (C method).

**63.21a Car parks and garages, other auxiliary and ancillary activities for transport on land**

The HCPI 63.21 (other auxiliary and ancillary activities for transport on land) is used (B method).

**63.21-02 Toll roads**

The HCPI sub-index for toll charges is used (B method).

**63.22 Other auxiliary and ancillary activities for water transport**

The wage index “water transport for workers and employees” (weighted 50/50) is used (B method).

**63.23 Other auxiliary and ancillary activities for air transport**

Two sub-indices are compiled:

- one for airports, which compares airport charges with the number of passengers to get an average charge per annum
- the other one for Austro Control (Austrian Civil Aviation Company) is weighted using air traffic control charges and charges for incoming and outgoing flights

The weighting of these two indices is based on the turnover of airports and Austro Control (B method).

**63.3 Travel agencies and tour operators**

The HCPI 63.30 (travel agencies and tour operators) is used (B method).

**63.4 Forwarding of freight, other transport arrangements**

Here an index is calculated by weighting (in equal shares):

- price index for freight transport by road
- wage index “forwarding agencies for workers and employees” (weighted 50/50)
- transport cost index (according to the forwarding agencies association)

This constitutes a B method.

**3.16. ÖNACE 64 – Post and telecommunications**

The internal classification for ÖNACE 64 is as follows:

ÖNACE	Description
64a	Post and courier activities, Telecommunications
64b	Cable TV and radio activities

**Characteristic output:**

**64a Post and Courier Services, Telecommunication Services**

In this activity, three indices are compiled:

- index for mobile phone service providers
- index for the Austrian Telekom (Landline)
- index for postal services

The sub-indices for mobile phone service providers and for the Austrian Telekom are calculated by using the appropriate HCPI on a six-digit level. Postal services are deflated by the HCPI for postal services (64.11).

The index for deflating 64a is calculated by weighting the three sub-indices according to their respective turnover (B method).

Currently, ST.AT is calculating quarterly SPPI for postal services, courier services and telecommunications services (base period = 2006). Presumably, they can be used soon.

**64b Cable TV and radio activities**

HCPI for television cable charges (64.20-22) is used (B method).

**3.17. ÖNACE 65 – Financial intermediation, except insurance and pension funding**

Revenues from financial intermediation services

Financial intermediation services cover financial intermediation by banks and other credit institutions and can be broken down into two groups:

- Financial intermediation services indirectly measured (FISIM)
- Financial intermediation services directly measured

**FISIM**

The calculation of FISIM at constant prices is defined by Council Regulation (EC) No 448/98 Annex III.

The difference between the reference rate and the effective rate of interest represents the margin earned by the financial intermediary, and thus can be considered to be the price paid for the service provided. FISIM at constant prices is derived as the quotient of the value of FISIM on loans and deposits held by S.122 and S.123 and this price. The stocks of loans and deposits are revalued to base period prices using a general price index (e.g. the implicit price deflator for domestic final demand).

$$\text{FISIM on the loans (deposits)} = \frac{\text{FISIM on the loans (deposits)}}{\text{Price index}} \times \frac{\text{base period margin}}{\text{effective margin}}$$

Base period margin on loans = effective interest rate on loans ± reference rate

Base period margin on deposits = reference rate ± effective interest rate on deposits

A transformation of this formula leads to:

$$\frac{\text{Loans (deposits) in the reporting year}}{\text{Price index}} \times \frac{\text{FISIM base year}}{\text{Loans (deposits) in base year}}$$

This formula<sup>15</sup> is used to deflate FISIM for each institutional sector. The total output of FISIM at constant prices consists of the sum of the values for all institutional sectors.

The implicit price index for domestic final use is used as the required price index.

The output of the OeNB (Austrian Central Bank) in real terms is calculated as the sum of costs, whereby an index is compiled for intermediate consumption, personnel costs and taxes on production. The wage index "financial intermediation and insurance services" is used for personnel costs and taxes on production (employers' contribution to the family allowance equalisation fund and municipal taxes).

### **Financial intermediation services for which there is an explicit price:**

#### **Commissions, expenses and charges received**

To create an index for "Other Financial Services" (non-FISIM part of output), the major components have been identified. For every component, the number of transactions is used to build a volume index. To create an appropriate total index, the components are weighted by their revenues. Thus, the total index results from the weighting of the sub-indices.

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<sup>15</sup> see German Federal Statistical Office: "FISIM report" – Germany, Wiesbaden, August 2000, p. 22

### 3.18. ÖNACE 66 – Insurance and pension funding, except compulsory social security

A volume index, based on the number of policies, is applied to deflate the service charge of non-life insurance. Therefore, the development of the number of policies of 36 different insurance products is used. A differentiation is also made between intermediate and final consumption. According to the Handbook on Price and Volume Measures, this is a B method.

For life insurance and pension funding, the change of provisions, deflated by using the GDP deflator is used. According to the manual this is also a B method.

### 3.19. ÖNACE 67 – Activities auxiliary to financial intermediation

Virtually, 90% of the output of ÖNACE 67 is accounted for by activities linked with insurance services.

#### ÖCPA 67.1 Services auxiliary to financial intermediation, except to insurance and pension funding

##### Revenues from intermediary trading

Unfortunately, there is no appropriate volume index for 67.1 available, and therefore the wage index for banks is still used (C method).

#### ÖCPA 67.2 Services auxiliary to insurance and pension funding

##### Revenues from intermediary trading

The output of ÖNACE 67.2 (approximately 96% of all revenues) mainly consists of commissions paid by insurers. Thus, the index consists of the change of the numbers of new insurance policies of the various insurance products, weighted by revenues (B method).

### 3.20. ÖNACE 70 – Real estate activities

The internal classification for ÖNACE 70 is as follows:

ÖNACE	Description
70.1a	Imputed rents
70.1b	Renting of dwellings
70.1c	Renting of business premises
70.20-01	Leasing of land and dwellings
70.31	Real estate agencies
70.32-01	Management of land and dwellings
70.32-02	Facility management and janitorial services

### **Characteristic Output:**

#### **70.1a and 70.1b Renting services**

Imputed rents and renting of dwellings are deflated by using the harmonised consumer price index for rents of dwellings (70.20), (A method).

#### **70.1c Renting of business premises**

For letting of non-residential buildings, an index is compiled by using detailed rents per m<sup>2</sup> office space and store space for each federal state. These data are provided by the Austrian Federal Economic Chamber in their annual published Real Estate Price Comparison List (Immobilienpreisspiegel). The weights of the nine federal states are given by the output of each state provided by the structural business statistics (SBS), (A method).

#### **70.20-11-1**

ÖCPA 70.20-11-1 (leasing services involving own residential property) is deflated by the weighted price index of 70.1a (imputed rents), 70.1b (renting of dwellings) and 70.1c (renting of business premises).

#### **70.31 Real estate agencies**

HCPI for intermediary activities (70.31) is used (B method).

#### **70.32-01 Management of land and dwellings**

This index is compiled by observing the prescribed standard rates for the management of rented dwellings, which provides the basis for calculating administrative costs (B method).

#### **70.32-02 Facility management and janitorial services**

The facility management services are deflated by using the sub-index for cleaning (B method).

### **3.21. ÖNACE 71 – Renting of machinery and equipment without operator and of personal and household goods**

The internal split to measure production ÖCPA 71 at constant prices is:

<b>ÖCPA</b>	<b>Description</b>
71.1	Renting services of automobiles
71.2a	Renting services of other transport equipment (71.2) Renting services of other machinery and equipment (71.3) Renting services of personal and household goods n.e.c. (71.4)

71.1 is deflated using the CPI 71.1 (B method).

71.2a is deflated by adequate price indices for capital expenditure on machinery and equipment, weighted by revenues (B method).

### 3.22. ÖNACE 72 – Computer and related activities

ÖCPA 72 is deflated using the sub-index for capital expenditure on machinery and equipment for data processing and data bases (B method).

### 3.23. ÖNACE 73 – Research and development

ÖCPA 73 is deflated using the CPI for services (C method).

### 3.24. ÖNACE 74 – Other business activities

The internal split to measure production ÖCPA 74 at constant prices is:

ÖCPA	Description
74.11	Legal services
74.12	Accounting, book-keeping and auditing services; tax consultancy services
74.13	Market research and public opinion polling services
74.14	Business and management consultancy services
74.15	Management holdings services
74.2	Architectural, engineering and related technical consultancy services
74.3	Technical testing and analysis services
74.4	Advertising services
74.5	Labour recruitment and provision of personnel services
74.6	Investigation and security services
74.7	Industrial cleaning services
74.8	Miscellaneous business services n.e.c.

Till 2000, ÖCPA 74 was deflated by the CPI for services, which constitutes a C method. Since that, in most ÖCPA groups improvements could be reached.

**74.11:** From 2001 to 2003 the CPI for 74.11, since 2004 the SPPI 74.11 is used (A method).

**74.12:** ÖCPA 74.12 is still deflated by the CPI for services, but a SPPI is already under construction.

**74.13:** ÖCPA 74.13 is still deflated by the CPI for services, but a SPPI will be developed.

**74.14:** From 2002 onwards, the price index for ÖCPA 74.11 is used (B method). For the future, a SPPI will be developed.

**74.15:** From 2002 onwards, the production at constant prices is estimated by an input-method (B method).

**74.2:** ÖCPA 74.2 is still deflated by the CPI for services, but a SPPI is already under construction.

**74.3:** ÖCPA 74.3 is still deflated by the CPI for services, but a SPPI will be developed.

**74.4:** From 2004 onwards, the SPPI for ÖCPA 74.40-02 is used (B method). For the future, there will be a SPPI also for ÖCPA 74.40-01 developed.

**74.5:** According to the results of the supply/use-statistics, good ÖCPA 74.5 was identified in the intermediate consumption of all ÖNACE activities. For calculating a price index, the wage indices of the main activities mentioned above were weighted by their share in the sum of intermediate consumption of ÖCPA 74.5 (B method). For the future, a SPPI will be developed.

**74.6:** ÖCPA 74.6 is still deflated by the CPI for services, but a SPPI will be developed.

**74.7:** From 2002 onwards, the CPI for 74.7 is used (B method). For the future, a SPPI will be developed.

**74.81** (photographic plates, film, other than cinematographic, exposed): From 2002 onwards, the CPI for 74.81 is used (B method).

**74.8 excl. 74.81:** ÖCPA 74.8 excl. 74.81 is still deflated by the CPI for services.

### **3.25. ÖNACE 75 – Public administration and defence; compulsory social security**

See chapter “Sector general government” below.

### **3.26. ÖNACE 80 – Education**

The internal split to measure production ÖCPA 80 (market output<sup>16</sup>) at constant prices is:

<b>ÖCPA</b>	<b>Description</b>
80.10-11	Preschool education services
80.41	Driving school services
80.42	Adult and other education services n.e.c.

80.10-11: CPI 80.10-11 for S.11 (A method)

80.41: CPI 80.41 (A method)

80.42: CPI 80.42 (A method)

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<sup>16</sup> For non-market output, see chapters „Sector general government“ and „NPISH“

### 3.27. ÖNACE 85 – Health and social work

The internal split to measure production ÖCPA 85 (market output<sup>17</sup>) at constant prices is:

ÖCPA	Description
85.11	Hospital services
85.12	Medical practice services
85.13	Dental practice services
85.14	Other human health services
85.2	Veterinary services
85.3	Social work services

#### ÖCPA 85.11:

To deflate ÖCPA 85.11, it is necessary to group the services in homogenous production groups, depending on the following characteristics:

1. Kind of Service

Is it an in-patient or an out-patient service?

2. Financier

Is the service financed by the social security funds, by a private insurance or by the patient him- or herself?

Additional to this distinction, it is necessary to treat the rehabilitation services within the production group “in-patient services” separately.

3. Provider

Is the service provided by “Fondskrankenanstalten (FKA)” or by “Nicht-Fondskrankenanstalten (NFKA)”?

FKA are hospitals, which are financed by social security funds by means of DRG since 1997 (see below). Losses are covered by the owner, by the region for whose population the hospital is intended and by the federal state.

The NFKA hospitals have their own contracts with social security funds. Since 2002, some of them are also financed by means of DRG, via a separate fund (“PRIKRAF”), which was created for this purpose.

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<sup>17</sup> For non-market output, see chapters „Sector general government“ and „NPISH“



Not for all production groups there are data available to measure production at constant prices in an adequate way. The most comprehensive data are available for production, which is in-patient, financed by social security funds and provided by FKA. Luckily, this production comprises the main proportion of ÖCPA 85.11.

Summarised, there are following homogenous production groups distinguished, with data availability as described in the overview:

Production Groups	FKA	NFKA
<b>In-Patient Services</b>		
Social security funds	Data available → <b>PI 1</b>	No data available → PI 1 is used
Privat insurance	Data available → <b>PI 2</b>	Data available → <b>PI 2</b>
Patient	No data available → PI 2 is used	No data available → PI 2 is used
Rehabilitation services	Not offered by FKA.	<b>Hospitals run by social security</b> Data available → <b>QI 3</b>
		<b>Other hospitals</b> No data available Production is distributed among all other production groups
<b>Out-Patient Services</b>		
Social security funds*)	Data available → <b>PI 4</b>	No data available → PI 4 is used

\*) Out-patient services are mainly financed by social security funds.

### Price index 1 (PI 1)

The basic components for this price index are the Diagnosis Related Groups (DRG). DRG were introduced in Austria in 1997 to assure a more performance-oriented financing by social security funds. For that, twenty representative hospitals were chosen to collect data on all performed treatments and their costs in 1993. By means of these data, DRG were formed which represent different treatment groups and their average costs, produced by all medical, paramedical (e.g. laboratory) and non-medical (e.g. food) services. The costs are denoted by a certain number of “points” – the higher the costs, the higher the number of points. The hospitals are now paid for their services by social security funds via these DRG-points.

As Statistics Austria was provided with the required data by the Ministry of Health, it was possible to calculate the average price per DRG-point (= revenues paid for DRG-points divided by the number of DRG-points) and to produce the following price index:

$$\text{Price index} = \frac{\text{average price per DRG – point}_{\text{currentyear}}}{\text{average price per DRG – point}_{\text{baseyear}}}$$

As the DRG are regularly checked, it is assured that changes in quality and new products are taken into account. Smaller adjustments are accomplished annually (for example, if a new medicament gets to be used regularly, the number of DRG is increased), larger ones in time intervals. Up to now, there was one big adjustment in 2002, where not only new DRG were implemented, but also the number of DRG-points was adapted. For that, data for the year 1999 were collected in 15 representative hospitals.

### **Price index 2 (PI 2)**

The private insurance pays (mainly additionally to social security funds) for non-medical services (accommodation, food) and medical fees.

The non-medical services can be deflated by their costs, provided by the Austrian Assurance Association.

$$\text{Price index} = \frac{\text{cost in public hospitals per day}^{\text{currentyear}}}{\text{cost in public hospitals per day}^{\text{baseyear}}}$$

For the medical fees, there are no data available, therefore, all services paid by private insurance are deflated by the price index for non-medical services.

### **Quantity indicator 3 (QI 3)**

For those rehabilitation hospitals, which are run by social security funds, there are data available to, firstly, identify production at current prices, and, secondly, measure production at constant prices by the number of occupant days. As a B method requires occupant days by level of care or at least that the different rehabilitation services are relatively homogenous, the rehabilitation hospitals are grouped by their main focus (e.g. cardiovascular diseases; supporting apparatus and locomotor system).

$$\text{Quantity indicator} = \frac{\text{occupant day}^{\text{currentyear}}}{\text{occupant day}^{\text{baseyear}}}$$

For all other rehabilitation hospitals, it is neither possible to identify production at current prices nor to get data to measure production at constant prices in an adequate way. The production of these hospitals is just divided up amongst all other production groups. However, as their share in production is insignificant, it is a problem of minor importance.

### **Price index 4 (PI 4)**

Out-patient services are paid by social security funds globally, DRG are only under way. For the price index, the annual average costs per out-patients per FKA are used. The data are calculated by the Ministry of Health, and weighted by the number of out-patients per FKA.

$$\text{Price index} = \frac{\text{average costs}_{\text{current year}}}{\text{average costs}_{\text{base year}}}$$

Price index ÖCPA 85.11 in total

To produce the entire price index for ÖCPA 85.11, the different price indices (Q1 3 is transformed into an implicit price index) are weighted by their share in production. Data used as weights are the revenues of FKA, provided by the Ministry of Health, and the payments by private insurances, provided by the Austrian Assurance Association.

Due to Commission Decision 2002/990/EC, a distinction has to be made between the following different types of hospital services to take account of the varying complexity of the different classes of services:

- a) Services to in-patients by general and specialised hospitals
- b) Hospital psychiatric services
- c) Rehabilitation services in rehabilitation centres/hospitals
- d) Nursing services (under medical supervision)

In Austria, a) and b) can be measured by means of DRG which meet the criteria for an A method.

As c) and d) are provided by NFKA, there are only few data available. Indeed, the only data available to measure production at constant prices are those for rehabilitation services, and here also only for those, which are provided by rehabilitation hospitals run by social security funds. The indicator produced by this data can be classed as a B method. Luckily, all other services account for only a small share in ÖCPA 85, so that this production is of little importance.

Generally speaking, as the main part of ÖCPA 85.11 at constant prices is measured by DRG, so the methods used meet the requirements for an A method to a large extent.

#### **85.12:**

The services of ÖCPA 85.12 are financed either by social security funds, by private insurance or by the patient him- or herself. The services paid for by social security funds constitute the main part of ÖCPA 85.12.

There are only data available for services financed by social security funds. In cooperation with the Association of Austrian Social Insurance Schemes Statistics Austria produced a price index, which meets the criteria for a B method. First of all, the physicians are divided in 18 homogenous groups (e.g. optometrists, paediatricians). For each of these groups, unit value indices are produced using the number of "cases" and the revenues of physicians paid for by social security funds. The "cases"

represent the number of treatments and, due to absence of data, are counted by health insurance certificates (“Krankenschein” formerly, replaced by the so-called “e-card”).

$$\text{Price index} = \frac{\text{revenue per case}^{\text{currentyear}}}{\text{revenue per case}^{\text{baseyear}}}$$

Due to the complexity and abundance of data (there are 12 different sets of arrangements for payment with different service items and fees), it is not possible to develop an A method.

**85.13:**

The services of ÖCPA 85.13 are financed either by social security funds, by private insurance or by the patient him- or herself. The services paid for by social security funds constitute the main part of ÖCPA 85.13.

The only data available are those for services financed by social security funds. As there are only 3 different sets of arrangements for payment with considerably less different service items and fees, Statistics Austria was able to develop a price index, which qualifies as an A method. The basic component is the fee for each service item paid for by the social security funds.

$$\text{Price index} = \frac{\text{fee per service item}^{\text{currentyear}}}{\text{fee per service item}^{\text{baseyear}}}$$

To produce the price index in total, the different price indices per service item are weighted by their proportion of revenue.

**85.14:**

CPI 85.14 is used (B method).

**85.2:**

CPI 85.2 is used (A method).

**85.3:**

CPI 85.3 is used (A method).

**3.28. ÖNACE 90 – Sewage and refuse disposal services, sanitation and similar activities**

ÖCPA 90 (market output) is deflated using the sub-index CPI 90 (B method).

### 3.29. ÖNACE 92 – Recreational, cultural and sporting activities

The internal split to measure production ÖCPA 92 (market output) at constant prices is:

ÖCPA	Description
92.11a	Motion picture and video production services (92.11) Motion picture or video tape distribution services (92.12)
92.13	Motion picture projection services
92.2	Radio and television services
92.3	Other entertainment services
92.4	News agency services
92.5	Library, archives, museums and other cultural services
92.6	Sporting services
92.71-10-1	Lottery and other betting services
92.71-10-2	Casino services
92.71-10-3	Gambling machines operation services
92.72	Other recreational services n.e.c.

**92.11a:** CPI for services (C method)

**92.13:** CPI 92.13 (A method)

**92.2:** Revenues in the activity ÖNACE 92.2 are mainly generated by fees and the selling of advertising time. From 2004 onwards, the fees are deflated by their development, and the selling of advertising time by the sub-indices SPPI 74.40-02 for TV and radio.

**92.3:** CPI 92.3 (A method)

**92.4:** CPI for services (C method)

**92.5:** CPI 92.5 (B method)

**92.6:** CPI 92.6 (A method)

**92.71-10-1:** CPI 92.71-01 (A method, since there is a constant ratio between stakes and winnings)

**92.71-10-2:** For casinos, information on the number of visitors is available to calculate a quantity index (B method).

**92.71-10-3:** Total CPI (C method)

**92.72:** CPI for services (C method)

The share of the remaining C methods for ÖCPA 92 is about 16%.

### 3.30. ÖNACE 93 – Other service activities

The internal split to measure production ÖCPA 93 at constant prices is:

ÖCPA	Description
93.01	Washing and dry cleaning services
93.02	Hairdressing and other beauty treatment services
93.03	Funeral and related services
93.04a	Physical well-being services (93.04 excluding services of spas 93.04.10-3)
93.04b	Services of spas" (93.04.10-3)

**93.01:** CPI 93.01 (B method)

**93.02:** CPI 93.02 (A method)

**93.03:** CPI 93.03 (A method).

**93.04a:** CPI 93.04 (A method)

**93.04b:** CPI for health resorts (B method)

### 3.31. ÖNACE 95 – Activities of households

Services of households as employers of domestic staff are deflated using the wage index for cleaning.

### 3.32. Sector general government

This section applies to general government non-market production only, the market production being deflated with the implicit price indices obtained from market output in the corresponding ÖNACE divisions. The following table gives an overview of the distribution of non-market output across the different ÖNACE divisions, and hence of the relative importance and distribution of non-market production within general government.

Table 2

Non-market output of general government sector 2003, current prices, EUR million

ÖNACE	Non-market production	Share of non- market production
01 Agriculture, hunting	189,5	0,6%
02 Forestry		0,0%
15 Manufacture of food products, beverages and tobacco	4,5	0,0%
41 Collection, purification and distribution of water		0,0%
55 Hotels and restaurants	12,5	0,0%
63 Supporting and auxiliary transport activities, activities of travel agencies	78,1	0,2%
70 Real estate activities	0,0	0,0%
71 Renting of machinery and equipment without operator and of personal and household goods	78,1	0,2%
72 Computer and related activities		0,0%
73 Research and development	74,8	0,2%
74 Other business activities	101,5	0,3%
75 Public administration and defence; compulsory social security	17.910,7	55,1%
80 Education	11.298,1	34,7%
85 Health and social work	502,6	1,5%
90 Sewage and refuse disposal, sanitation and similar activities	215,3	0,7%
91 Activities of membership organizations n.e.c.	1.132,5	3,5%
92 Recreational, cultural and sporting activities	926,3	2,8%
<b>Total</b>	<b>32.524,7</b>	<b>100,0%</b>

Non-market output at current prices is calculated as the sum of costs. This method is also used for constant price calculations, unless output indicators are available.

#### – Wages and salaries (D.11)

For the deflation of wages and salaries, 14 different wage indices for civil servants are used. The indices are relating to the institutional sub-division “civil servants in general, federal, state, local and Viennese government”. In particular, the following indices are applied: wage index for defence activities (ÖNACE 75.22); wage index for justice and judicial activities (ÖNACE 75.23); wage index for public security, law and order activities (ÖNACE 75.24); and finally, wage index for activities of business, employers’ and employees’ organization for wages and salaries (ÖNACE 91).

The wage index for social security activities is applied to D.11 of ÖNACE 75.30. For wages and salaries of ÖNACE 80, the wage indices for federal government, teachers, state teachers, Viennese teachers and university professors were chosen as deflators.

**– Employers’ actual and imputed social contributions (D.121, D.122)**

For the deflation of the actual and imputed social contributions, a base year average ratio between actual/imputed social contributions and wages and salaries for each wage index is used. The calculation is made according to the formula:

$$D.12_t^{ppy} = D.11_t^{ppy} \times \frac{D.12_{t-1}^{cup}}{D.11_{t-1}^{cup}}$$

ppy = previous year’s prices

cup = current prices

**– Other taxes on production (D.29)**

Other taxes on production are considered to develop in parallel to wages and salaries and, therefore, are deflated with the same index as wages and salaries of the respective activity or legal entity.

**– Consumption of fixed capital (K.1)**

CFC at constant prices is directly obtained from the PIM-model, used to estimate capital stock and capital consumption. The perpetual inventory method (PIM) typically produces estimates at both constant and current prices; on a detailed level, deflators for CFC are identical to those used to deflate gross fixed capital formation.

**– Intermediate consumption (P.2)**

The deflation of intermediate consumption is based on information out of the latest supply/use tables. All goods and services with a share of more than 1 % of total intermediate consumption of an ÖNACE division are being taken into account.

As deflators, 14 HCPIs (most of them on a four-digit level), 24 wholesale price indices, 2 construction PIs and 13 different specially created price indices are used. FISIM for the general government sector is compiled according to Commission Regulation No 1889/2002 (for further details see chapter on ÖNACE 65).

**– Output for own final use (P.12)**

Output for own final use is made up of self-produced software, therefore, the wage index “civil servants in general” is applied.



The computation is done following the input method. According to the handbook on price and volume measures, the input method qualifies as B method for ÖNACE 75.1 and 75.2, and as a C method for the other ÖNACE divisions.

For the implementation of output methods for education services, extensive preliminary work has been undertaken. The complete codification of government expenditure according to the ISCED classification was accomplished. Further, the research, data collection and compilation of volume indices on a ÖNACE six-digit level for ÖNACE 80 using pupil numbers as a proxy for number of lessons received was done. The implementation of volume indicators for the calculation of non-market output of education services produced by the government sector is scheduled for 2008.

### 3.33. Sector non-profit institutions serving households (NPISH)

The NPISH sector is broken down into the following activities:

ÖNACE	Description
80	Kindergartens, schools and evening schools
85	Health and social work
91	Political parties, trade unions, environmental protection organisations, churches, automobile clubs, development cooperation and other associations
92	Culture and sport

In Austria, two methods for the deflation of the other non-market production and, hence, consumption expenditure of the NPISH are applied. If output indicators are available, the volume measure method is used to deflate the non-market output. In cases of a lack of appropriate output information, the input components and market revenues are deflated separately in the accounts of the NPISH sector and the other non-market production is calculated as the balance of input and revenues.

#### Case 1: Output indicators are available

##### Non-market output

At present, appropriate output indicators are only available for kindergartens and schools, so only the non-market output of ÖNACE 80 is deflated by using the volume measure method. The number of children in kindergartens and the number of pupils (for each type of school on ISCED level separately) are used as a proxy for the recommended output indicator number of lessons.

### **Intermediate consumption**

Intermediate consumption is deflated by using a weighted intermediate consumption price index based on the respective input structure of the individual activity. The input structure is taken from the latest available supply/use tables. Individual sub-indices are made up of wholesale price sub-indices and consumer price sub-indices.

### **Case 2: Output indicators are not available**

If no appropriate output information is to hand, the other non-market output is calculated as the balance of input and revenues. The individual transactions of the production accounts are deflated using the following indices:

#### **Intermediate consumption**

Intermediate consumption is deflated by using a weighted intermediate consumption price index, based on the respective input structure of the individual activity. The input structure is taken from the latest available supply/use tables. The individual sub-indices are made up of the adequate wholesale and consumer price sub-indices.

#### **Compensation of employees**

Compensation of employees is deflated by using the respective wage indices.

#### **Other taxes on production**

Other taxes on production are deflated by using the wage indices. The reason for this is that the main taxes on production, i.e. municipal taxes and the employers' contributions to the family allowance equalisation fund, depend on the remuneration of workers.

#### **Consumption of fixed capital (CFC)**

CFC at constant prices is directly obtained from the PIM-model used to estimate capital stock and capital consumption. The perpetual inventory method (PIM) typically produces estimates at both constant and current prices; on a detailed level, deflators for CFC are identical to those used to deflate gross fixed capital formation.

#### **Market revenues and own consumption**

Market revenues are calculated in real terms using the appropriate consumer price sub-indices. Consumption expenditure of NPISH is calculated as the balance of input and revenues.

### **3.34. Intermediate consumption**

For all industries, intermediate consumption is broken down by the very detailed good structures according to the latest version of the supply/use tables.

As there are no intermediate consumption prices available, a variety of other prices has to be used. Due to the lack of genuine import price statistics, information on price developments for selected imported raw and input materials is derived by creating unit value indices by using the most detailed levels of foreign trade statistics.

## Chapter 4

### 4. Price and volume measurement in the expenditure approach

#### 4.1. Household final consumption expenditure

The standard method for deflating consumption of private households is to use consumer price indices, selecting the corresponding price representatives for consumer goods of private consumption at working classification level from the detailed set of sub-indices of the CPI and using these for deflation. In many cases, weighted price indices are used in order to reflect the commodity structure as accurately as possible. If this is not possible or if there is no matching price representative in the CPI, the implicit price deflator of the output of the production accounts of the corresponding ÖNACE divisions is used. This mainly applies to the services. The implicit price index for the production account "private households" for services rendered by domestic personnel is, for example, used in private consumption. For most consumer goods sold via retail trade, weighted price indices from the CPI, which are also used for the short-term statistics for trade, are applied. These are already weighted sub-indices of the CPI for those consumer goods normally sold in the specialist trade (of an ÖNACE class).

Own consumption of goods and services is not deflated separately because it only accounts for a small proportion of total consumption. For imputed rents the corresponding market rents are used. The price index for tourist imports from the rest of the world account (see calculations in real terms for the rest of the world account) is also used for deflating consumer goods and services, imported by residents. Goods and services, consumed by non-residents, are deflated by the same indices as resident private consumption.

#### 4.2. Final consumption expenditure by government

- **Social benefits in kind (D.631)**

Social benefits in kind are subdivided into other social security benefits in kind (D.6312) and social assistance benefits in kind (D.6313) for the deflation. As deflators 9 different HCPIs and 3 implicit price indices are used.

- **Other non-market production (P.131)**

For the deflation of other non-market production, 17 different HCPIs, 1 producer price index, 2 construction price indices and other specially created price indices (implicit price indices and unit value indices) are chosen according to the information regarding goods and services out of the supply/use tables.

### **4.3. Final consumption expenditure by NPISH**

As described in more detail above, the final consumption expenditure of NPISH at constant prices is either calculated as the balance of the deflated expenditures and revenues, or – if appropriate output indicators are available – by the use of the volume indicator method.

### **4.4. Gross capital formation**

#### **4.4.1. Gross fixed capital formation**

Gross fixed capital formation, just like private consumption expenditure, is principally compiled by the commodity flow method. Besides a matrix for gross fixed capital formation by industries and investment goods is set up, both at current and constant prices. The two approaches are used independently and reconciled in the annual supply/use tables.

Gross fixed capital formation for machinery, equipment and means of transport is deflated by using the price index for capital expenditure on machinery and equipment (see p. 17). The breakdown of the investment goods price index is maintained in accordance with ÖCPA. That ensures uniformity between the goods structure of national accounts and price statistics and therefore the investment price indices can be implemented directly into national accounts calculations at constant prices.

For gross fixed capital formation in dwellings and other buildings and structures, the construction price indices are available, broken down by type of construction service.

##### **4.4.1.1. Machinery and transport equipment**

The following breakdown of products by product classification ÖCPA is used for machinery and transport equipment.

<b>ÖCPA</b>	<b>Description</b>
17	Textiles
25	Rubber and plastic products
26	Other non-metallic mineral products
28	Fabricated metal products
29	Machinery and equipment
30	Office machinery and equipment
31	Electrical machinery and apparatus
32	Radio, television and electronic components
33	Medical precision and optical instruments, watches and clocks
34	Motor vehicles, trailers and semi-trailers
35	Other transport equipment
36	Furniture and other manufactured goods n.e.c.

#### **4.4.1.2. Construction**

The following deflators are used to deflate individual components of construction volume, in the same way as for calculations of the production accounts of construction:

- characteristic output, interest groups for the purpose of construction, own account construction work: as for production account ÖNACE 45
- non-characteristic output of other industries, relevant for construction investment: construction price indices
- supply of material: sub-indices of the wholesale price index and implicit price index for architectural and engineering services and related technical consultancy, technical testing and analysis services
- imports, exports: construction price index

For the deflation of gross capital formation of dwellings, the dwelling construction price index is used.

#### **4.4.1.3. Software**

For purchased software, the price index for capital expenditure on machinery and equipment of computer and related services is used for the purpose of deflation.

For self-produced software, the same index (domestically produced) is used.

#### **4.4.1.4. Entertainment, literary or artistic originals**

Entertainment, literary or artistic originals are relevant for ÖCPA 92.11a, 92.2 and 92.3 (see p.54).

These goods are deflated by the corresponding output price indices of the respective ÖCPA categories.

#### 4.4.1.5. Cultivated assets

Cultivated assets in real terms are compiled by means of unit areas of new cultivations of the current year, valued at the costs of new cultivations per ha of the previous year.

#### 4.4.2. Changes in inventories

In order to maintain consistency in the accounting system, the time of entry into the accounts and evaluation of changes in inventories must be coordinated with other goods transactions, namely with intermediate consumption (raw and input materials), output (unfinished products, finished products and tradable goods) and gross fixed capital formation (work in progress). Changes in inventories should be entered at the time at which goods enter or leave the store and the prices used should agree with the prices of other flows.<sup>18</sup> The ESA itself points out that conceptually correct evaluation of each individual transaction in and out of inventories consistent with the valuation of output, intermediate consumption and final uses is often not possible in practice and approximation methods have to be accepted (ESA 95, 3.124). It is proposed that volume changes in inventories are valued at average prices over the period of observation which comes very close to the theoretically best method if the stocks change fairly uniformly over time and/or prices remain largely constant when there are major fluctuations in the volume of inventories. It should be noted in particular that, as a rule, direct information is not available on output and input but is on revenues from sales of goods and services and/or purchase thereof and stocks.

In the framework of the non-agricultural business statistics 1995 (BZ 95), the book value inventories at the end of the reporting year and the end of the previous year were surveyed with the final inventories of the previous year being entered as the initial inventories of the reporting year. A distinction is made between five different types of inventories:

<b>Goods structure – Changes in inventories</b>
fuels – final stocks
raw and input materials – final stocks
unfinished products - final stocks
finished products (from own production) – final stocks
goods for resale – final stocks

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<sup>18</sup> For details see ESA 95, 3.120 to 3.123.

For ÖNACE divisions 65 (financial intermediation) and 66 (insurance), inventories were not a characteristic to be surveyed in BZ 95 so there is no information for these divisions or for divisions 75 (public administration, defence and compulsory social security) and 91 (activities of membership organisations, church and other religious associations and other associations excluding social work, culture and sport) which were not covered by the BZ.

From 1997 onwards, the main source of data has been the annual structural business statistics, the results of which are used to calculate changes in inventories. In addition, indicators of changes in inventories are also taken from the business reports of the major companies in some industries. For the year 1996, there was no structural information from the industrial statistics and estimates had to be used which were primarily based on inventory data from the years 1995 and 1997, backed up by plausibility checks. When the initial estimates of national accounts aggregates are made for the current reporting year, assumptions are, as a rule, made for inventories because, at that time, the structural business statistics have not delivered any results. Any information stemming from business reports is incorporated as it become available.

#### **Valuation:**

As described above, the book values entered for the final inventories of one reporting period and the previous period (which represents the initial inventories for the reporting period) can be found in the economic statistics surveys (BZ and SBS). Under accounting rules established by commercial and company law, the minimum value principle applies for the purposes of assessing working capital in the interests of commercial prudence and to protect creditors. This provides that either the purchasing or production costs or the current value, in any case, however, the lower of the two values, is to be used for assessment. Due to the difference between the purchase price (production cost) and replacement price, book values provide a distorted picture of changes in inventories in terms of goods transactions and use of goods categories, because they contain holding gains or losses from inventories which are not determined by output but price. These are to be eliminated in order to enable changes in inventories to be valued at annual average prices for the purposes of the approximation method proposed in ESA 95.

The method adopted is for the book value inventories for each category of inventory goods to be converted to a constant price basis first<sup>19</sup>. The real difference between initial and final inventories (= the change in volume) determined in this way is then valued at an annual average price. The calculation steps can be illustrated by the following formula:

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<sup>19</sup> In the absence of any genuine inventory prices, annual average prices are used for the purposes of approximation. There is also no information on the frequency of change in inventories within a year or the valuation methods used by the respondents.



$$\Delta L_{nom} = (L_t / P_t - L_{t-1} / P_{t-1}) P_t$$

Whereby

$\Delta L_{nom}$  is the change in inventories at current prices

$L_t$  the book value of the inventories at the end of the reporting period

$L_{t-1}$  the book value inventories at the end of the previous period (= initial inventories of the reporting period)

$P_t$  the average price index for the reporting period

$P_{t-1}$  the average price index for the previous period.

The difference between the book value changes and the changes at current prices are entered as holding gains and losses.

This adjustment process is carried out in the production accounts for output (revenues plus changes in output inventories and/or trade margin) and intermediate consumption (purchase of intermediate consumption goods less changes in input inventories) and is reflected directly in the production account and, hence, in the distribution of income account<sup>20</sup>.

#### **4.4.3 Acquisitions less disposals of valuables**

Valuables include the following goods:

- gold (coins and bars)
- jewellery
- pearl jewellery
- works of art

The individual gold items are deflated using the gold price index, jewellery and pearl jewellery using the HCPI for jewellery and related articles, and works of art using the HCPI for artistic and literary creation and interpretation services.

### **4.5. Exports and imports**

#### **4.5.1. Exports and imports of goods**

The foreign trade price index (unit value index) broken down in accordance with the CPA structure (produced in the directorate business statistics of Statistics Austria, responsible for foreign trade

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<sup>20</sup> Cf. Reinhold Schwarzl, On the problem of "Inflation Accounting". Holding gains and losses in inventories, in: Wirtschaftspolitische Blätter 2/1981.

statistics) is used to calculate, in real terms, exports and imports of goods f.o.b. as entered in national accounts, whereby any individual items which appear to be implausible are replaced by values from the investment goods price index and the wholesale price index. The weighting of the foreign trade price index is not, however, changed. Attention is also focused on the development of terms of trade.

Currently, preparations are under way for a quarterly import price index for the sections A – E (at CPA 3-digit code level, base period = 2007). First results will be available in 2008.

#### **4.5.2. Exports and imports of services**

Imports of tourism services are deflated by using a tourism price index (Laspeyres index, basket of goods and services by rough product (expenditure) groups, weighted with national price indices of the most important travel destinations). Exports of tourism services, that are goods and services, consumed by non-residents, are deflated by the same indices as resident private consumption (see p.62).

Concerning exports and imports of other goods, a principle change to measure prices and volumes was implemented in 2007. Due to the lack of genuine price indices, specific product group deflators or volume indices or implicit PIs for deflating intermediate consumption applied in the production approach are used. The following categories (weightings in accordance with the balance on current account) are differentiated:

##### **– Transport**

**Road transport:** For deflating freight transport by road, a unit value index is compiled by using tonne-kilometres and nominal receipts (source: freight transport statistics and structural business statistics). Currently, ST.AT is calculating a SPPI for road transport, which can be implemented soon.

**Railway transport:** For deflating imports and exports, the following indices are used: For passenger transport the harmonised consumer price index for railways is used. For freight transport a unit value index is compiled by contrasting tonne-kilometres with the respective revenues (source: freight transport statistics and business reports of ÖBB).

Pipeline transport: For deflating exports and imports, a unit value index was developed using nominal receipts and tonne-kilometers.

**Air transport:** For imports and exports, the following indices are used: Passenger transport is deflated by the Service Producer Price Index (SPPI) for scheduled passenger air transport. For freight transport, a unit value index is calculated using nominal receipts and tonne-kilometres (source: business report of the Austrian Airlines Group). Currently, Statistics Austria is working on a SPPI for scheduled air freight transport, which can be implemented soon.

– **Communication services:**

For deflating imports and exports of communication services, the index for deflating characteristic output of ÖNACE 64a (post and courier services, telecommunication services; see p. 41) is used.

– **Computer and information services:**

This category (imports and exports) is deflated by using mostly sub-indices of CPI for CPA 92 and a PI for computer software (a PI for domestic (exports) and a PI for imports).

Currently, ST.AT is calculating quarterly SPPIs for postal services (CPA 64.11), courier services (CPA 64.12), telecommunication services (CPA 64.2), computer and related services (CPA 72). These indices are compiled in accordance with international established methods (base period = 2006) and can be used soon.

– **Construction services:**

For deflating exports, a weighted construction PI for civil engineering and weighted construction price indices by group of services is used. For imports, a weighted construction PI for other construction is used.

– **Insurance services:**

Exports are deflated using the output index for CPA 66. For deflating imports, an index is used which is constructed with the same method as CPA 66 but only includes insurance services which are used for intermediate consumption (see p. 44).

– **Financial services:**

An index for “other financial services” (non-FISIM part, see ÖNACE 65, see p. 42) for deflating exports and imports of financial services is used.

– **FISIM:**

Exports and imports of FISIM are deflated according to the FISIM regulation.

– **Royalties and licence fees:**

This category comprises different product groups, identified by input output statistics. It is a very heterogeneous group. For deflation of these different product groups, the relevant output deflators and implicit PIs for deflating intermediate consumption are used.

– **Other business services**

**Merchanting:** The wholesale trade PI is used.

**Other trade-related services:** Exports and imports are deflated by using an output deflator for commission trade provided by short-term statistics for trade.

**Operational leasing:** The PI for CPA 71 (see p. 45) is used for deflating exports and imports.

**Miscellaneous business, professional and technical services:** For deflating exports, the following indices are used: the SPPI 74.11 for CPA 74.11, 74.12, 74.13, 74.14 and 74.15; the SPPI for CPA 74.40-02; the CPI for services for CPA 73 and 74.2; an implicit PI for ÖNACE 01; a weighted PI for CPA 74.5, 74.6, 74.7 and 74.8. For deflating imports, a weighted PI for CPA 74.11, 74.12, 74.13, 74.14 and 74.15; the SPPI for CPA 74.40-02; the CPI for services for CPA 73 and 74.2; the wholesale trade PI for CPA 01 and a weighted PI for CPA 74.6, 74.7 and 74.8 are used.

**– Personal, cultural and recreational services:**

This category comprises several product groups identified by input output statistics. For deflating exports and imports, the PI for CPA 92.2 and the various representative CPIs (for CPA 92.3, 92.5, 92.6 and 92.7) are used.

**– Government services, n.i.e.:**

A large number of CPA positions is allocated to this category. For deflating exports, the SPPI for CPA 22, the PI for CPA 64 and a volume index for CPA 65 (index for deflating financial services) are used. For deflating imports, a weighted PI using sub-indices of the wholesale trade PI, construction PI and CPI for services is used.

#### **4.5.3. Income and transfers**

The real value of cross-border primary income and transfers is calculated using the price index for the most recent domestic use of goods.

## Chapter 5

### 5. Taxes and subsidies on products

#### 5.1. Taxes on products

##### Value added tax

A price index is used to deflate VAT which is derived from calculations of private consumption and gross fixed capital formation by industries and by type of asset. The total amount of VAT is calculated from private consumption for individual products on the basis of the current tax rates. For the real values of the same products, the real supply is determined using the tax rates valid in the base year. Formation of fixed capital by investors not entitled to deduct input tax is treated in the same way to determine the real value of VAT on formation of fixed capital. The price index for VAT is derived implicitly from the nominal and real totals of both calculation methods.

##### Taxes on imports

The foreign trade price index (goods imports) compiled by the foreign trade division of Statistics Austria and adapted for national accounts, is used to deflate import taxes (exception: foreigners' share of the road traffic contribution).

##### Tax for using roads (abolished as of 31.12.2003).

The foreigners' proportion of the tax for using roads is part of import taxes.

Since the contribution is a volume tax, the import tax proportion is deflated in the same way as other volume taxes.

This tax is levied at daily, weekly, monthly and annual rates.

Tax rate changes occurred in 1996, 1997 and 2000.

#### 5.2. Other taxes on products

##### 5.2.1. Taxes related to quantities of products

The tax is surveyed as a fixed sum per volume unit of the taxed product. The taxation payment therefore depends on

- the quantity of the product
- the amount of tax per unit of the product (basic assessment figure)

Breaking down changes in value into price and volume components is no problem in this case.

- the volume component is determined by the change in volume of the product
- the price component is determined by the change in the basic assessment figure

Calculation in real terms: basic assessment figure for the base year x volume of the produced/imported product.

### **Beer tax**

This tax is levied per hectolitre of beer for each degree Plato (alcoholic content = tax class)

The tax rate was changed as of 1.6.2000.

### **Tax on sparkling wine** (abolished as of 1.4.2005).

This is levied on each hectolitre of sparkling wine made from grapes or fruit, or of (fruit) wine which resembles a sparkling wine.

Sparkling wine made from grapes and fruit: constant tax rate, the tax rate for intermediate products (mainly liqueur wines and aromatic wines) was changed as of 1.6.2000.

### **Alcohol tax**

Alcohol and alcoholic products are subject to alcohol tax which is levied per hectolitre. The tax rate was raised as of 1.6.2000.

### **Petroleum tax**

Petroleum tax is levied per litre of petroleum product consumed (various changes in the tax rate). Statistics Austria energy supply statistics identifies in detail the quantities of liquid fossil fuels for consumption which are subject to petroleum tax. A weighted price index can therefore be produced using the quantities of the respective base year.

### **Energy tax**

Since 1996, an energy tax has been levied per cubic metre gas and per kilowatt-hour electricity.

The tax rate for electricity and for natural gas was changed as of 1.6.2000 and 1.1.2004.

### **Compensatory amounts under the law regulating agricultural markets (MOG): Agrarmarkt Austria (AMA)**

The compensatory amounts are levied on animals for slaughtering and laying hens per head, milk and cereals per ton, vegetables, fruit, potatoes and horticultural products per hectare and wine per hectare and litre.

The tax rate and the assessment basis for vegetables, fruit and potatoes were changed as of 1.7.1996.

### **Contaminate site clean-up tax**

This tax is levied per ton of waste.

Tax rates were changed as of 1.7.1996, with increases in 1997 and additional increments between 1998 and 2001.

### **Civilian aviation safety tax**

This safety tax is payable for each person taking a flight from a domestic civilian airport.

The tax was raised as of 1.7.1996.

### **Tourist tax (excluding Vienna)**

The tourist tax is levied per person and number of overnight stays (except in Vienna). The number of overnight stays is used to deflate the data.

## **5.2.2. Taxes related to values of products**

This tax is levied as a percentage of the value of a product.

In this case the tax paid is determined by:

- the volume of the product
- the price of the product
- the tax rate

The amount of tax to be paid can therefore be broken down into

- **a volume component** which corresponds to the change in terms of volume of the tax product and
- **price component** which covers the price and taxation rate change

The calculation in real terms: tax rate of the base year x value of the produced/imported product in base year's prices.

### **Tax on beverages**

The basis for assessment is the sales price.

Judgment of the European Court of Justice of 9.3.2000: a beverage tax on alcoholic beverages (10%) is contrary to the rules of the common market; therefore it was abolished.

Before the taxation rate had been unchanged since 1.8.1992 (5% non-alcoholic, 10% alcoholic beverages)

Calculation in real terms: change in price using the CPI for other hotels and restaurants, no change in the taxation rate.

### **Capital transfer tax (= Company tax from 2001 onwards)**

**Company tax and stock exchange turnover tax** (abolished as of 1.10.2000, tax on securities was already abolished as of 1.1.1995).

Value of the compensation when company rights are acquired (1%); the price agreed upon, i.e. the stock exchange or market price when securities are purchased (0.04% to 2.5%).

Calculation in real terms: change in price using the implicit price index for the output of the corresponding ÖNACE division. No change in the taxation rate.

#### **Land acquisition tax**

Basis for assessment: sales price, from 1988 3.5% and a reduced rate of 2%.

Calculation in real terms: implicit price index for the output of ÖNACE 70.3 (real estate activities on a fee or contract basis). No change in the taxation rate.

#### **Entertainment and amusement tax**

Basis for assessment: tickets for performances, entertainment, exhibitions, competitions, etc.

Calculation in real terms: implicit price index for the output of ÖNACE 92.1 (motion picture and video activities).

**Taxes on winnings** (1% - 25%, for example for sports bets), **taxes on casinos** (35% - 80% of the annual gross gambling receipts of casino companies) and taxes on franchises (17,5% - 27,5% of the sum of betting stakes for the lottery, sports totalisator and bonus number within a calendar year).

Calculation in real terms: implicit price index for the output of ÖNACE 92.7 (other recreational activities).

#### **Insurance tax**

Tax rate according to type of insurance (life insurance 4%, health insurance, 1%, pension insurance 2,5% and social insurance 11%).

Calculation in real terms: implicit price index for the output of ÖNACE 66 (insurance and pension funding, except compulsory social security). There have been no changes in the tax rate since 1995 (for changes in the taxation rate calculations are made for different types of insurance, since there are different tax rates for each one).

#### **Fire protection tax**

Assessment basis: 8% of the insurance premium levied in addition to insurance tax.

Calculation in real terms: implicit price index for the output of ÖNACE 66 (Insurance and pension funding, except compulsory social security). There have been no changes in the tax rate.

**Advertising tax** (levied since 2000, 5% of payment for advertising) and press advertising tax (payment for publishing advertisements in newspapers, magazines, etc.).

Calculation in real terms: implicit price index for the output of ÖNACE 74.4 (advertising).

#### **Tourist tax for Vienna**

Basis of assessment: payment for accommodation.

Calculation in real terms: implicit price index for the output of ÖNACE 55 (hotels and restaurants).



The following taxes are subject to a **mixed tax rate** (based on **volume** and **value**):

### **Car registration tax (NOVA)**

This tax is **volume-based** (the tax rate depends on the ECE consumption of the vehicle concerned) and **value-based** (being also determined by the net sales price of newly registered vehicles).

In the expenditure approach, the registration statistics for new motor vehicles, broken down by badge, type, cubic capacity, price and NOVA rate of the vehicle are analysed and aggregated to form seven engine capacity classes, for each of which an average tax rate can be determined.

The price index for NOVA is calculated according to the formula  $\frac{\sum q_i p_{it} \cdot s_{it}}{\sum q_i p_{i0} \cdot s_{i0}}$ .

$q_i p_{it}$  value in the reporting year of newly registered motor vehicles in capacity class  $i$  at prices of the reporting year

$q_i p_{i0}$  value of newly registered motor vehicles in the reporting year in class  $i$  at prices of the base year

$s_{it}$  average taxation rate of class  $i$  in the reporting year

$s_{i0}$  nominal average taxation rate of class  $i$  in the base year

### **Tobacco tax**

For cigarettes, there is a mixed taxation rate (volume- and value-related) and for all other tobacco products there is a value-related taxation rate (no changes to the taxation rate have been made).

Cigarettes: value-related depending on the consumer price, volume-related per 1 000. Changes in the taxation rate: 1.6.1996, 1.1.1997, 1.6.2000, 1.1.2007.

Calculations in real terms: change in the taxation rate (= taxation rate/taxation rate base year) and changes in prices using CPI for tobacco.

### **Sugar tax**

There are various arrangements here: the taxation rate depends on the sugar content, quantity, price, etc., depending on the type of sugar. The data are deflated using the CPI for sugar.

### **Announcement tax** (abolished as of 31.05.2000)

There are two components: volume-related (area and period of time of the announcement) and value-related (payment for the announcement).

The tax is due for announcements in writing, images or light effects in public places. This tax is calculated in real terms using the implicit price index for output of ÖNACE 74.4 (advertising)

## **5.3. Subsidies on products**

The volume of subsidies on products is determined as for taxes on products, by:

- applying the subsidy assessment figure of the base year to the volume of the product (volume-related subsidies)
- or
- multiplying the value of the product in base year's prices by the rate of subsidy of the base year (value-related subsidies on products)

Since, however, there are different criteria for awarding subsidies than for levying taxes, there is no explicit basic assessment figure for individual types of subsidies.

Agricultural subsidies in real terms (as in nominal terms) come from economic agricultural accounts (EAA). All other kinds of subsidies are separately deflated by the implicit price indices for the output of the corresponding ÖNACE divisions.

Type of subsidy	Deflation	Comments
Agrarmarkt Austria (AMA) EU subsidies, Federal state budget	ÖNACE 01: according to EAA ÖNACE 15, 51: Implicit price index output ÖNACE 15	
Subsidy to railways not owned by the Federal State	Implicit price index output ÖNACE 60.1	
Transfer to ÖBB (Austrian national railways)	Implicit price index output ÖNACE 60.1	
Transport associations	Implicit price index output ÖNACE 60.1	
Transfer to the PTA (Austrian Post Office)	Implicit price index output ÖNACE 64	Only from 1996 onwards
Regional hospital funds	Implicit price index output ÖNACE 85	Only from 1997 onwards
Other subsidies on products, Federal States and municipalities	Implicit price index output for each ÖNACE-2-digit code	
Transfers to public utilities and transport operations (Vienna)	Implicit price index output ÖNACE 60	
Transfers to hospitals	Implicit price index output ÖNACE 85	
Other subsidies on products, Federal and regional chambers reserve	Implicit price index output for each ÖNACE-2-digit code	

## Chapter 6

### 6. Quarterly national accounts<sup>21</sup>

#### 6.1. General remarks

As the Austrian quarterly national accounts (QNA) system is based on benchmarking in principal, this goes also for prices used in the QNA framework. So, indicator series have to be found which are able to explain price developments of annual national accounts (ANA) in the past. For this, official index series are statistically checked for their appropriateness to do so. These series cover a wide area like retail and whole sale trade series, investment prices, deflators of wage series, export prices in other countries, etc. These Laspeyres type indices are taken to explain implicit price development of ANA.

Quarters at nominal values, at average prices of the current year and at average prices of the previous year are derived by this approach. Whereas the first both sum up to nominal annual figures of the ANA, the last sums up at previous year's price figures as published in the ANA. Using these three series, the one-quarter-overlap technique is applied in order to calculate growth rates. These growth rates compare the respective quarter with the fourth quarter of the previous year(s) and are chained accordingly in order to construct an index. This index is rebased using the year 2000 as a reference year in order to calculate absolute values.

Clearly, this implies a loss of additivity, possibly growing with the distance from the reference year. In the cross-section dimension, no procedures to force sub-aggregates to sum up to their higher aggregates are applied. Only in the time domain, quarters are adjusted to make them summing up to their chained totals.

#### 6.2. Price and volume measures in the production account

In those industries for which information is available on output or revenues (i.e. ÖNACE sections C to H and J) both an output and a value added deflator are calculated.

In order to derive volume estimates, in a first step price changes reflected in annual accounts are chain-linked for deriving index series. These annual index series are broken down to quarters by benchmarking techniques using indicator series available at sub-annual frequencies theoretically related to this, and which are statistically significant in explaining annual variations. After applying these quarterly index series, a further benchmarking procedure is necessary in order to assure time consistency of the resulting volume estimates.

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<sup>21</sup> The quarterly national accounts are currently prepared by the Austrian Institute for Economic Research on behalf of Statistics Austria; For further information on QNA see: Quarterly National Accounts Inventory of Austria, WIFO 2007, [http://www.statistik.at/web\\_de/wcmsprod/groups/v/documents/webobj/024047.pdf](http://www.statistik.at/web_de/wcmsprod/groups/v/documents/webobj/024047.pdf).

The procedure is somewhat different for all components of the production side, where value added is not directly derived but as the difference between output and intermediate consumption. In this case, output prices are benchmarked as described before with a consecutive transformation of their benchmarked values by a benchmarked net rates in order to derive volume estimates.

Gross value added at constant prices is then determined by using these net rates. In order to make the transition from gross value added at constant prices to nominal values, a deflator is generated using a regression approach whereby, however, exclusively output price data are also used as regressors. But since no intermediate consumption prices are entered, this approach is not actually correct. Nevertheless, it is necessary because the intermediate structure of companies is much less uniform than their output structure. Incorporating intermediate consumption prices would require a regression model with many different regressors (energy prices, office material, insurance expenditure, etc.) which would make it impossible to identify the factors in a statistically reliable manner because of the limited number of degrees of freedom in the estimation equation. The disadvantage in determining the gross value added deflators using output information alone is mitigated by the fact that, by applying this deflator only for the values of gross value added at constant prices, any possible distortions are reflected exclusively in nominal gross value added. Since, however, the real value added contributions in the quarterly account are certainly more important than the nominal ones, this is acceptable.

In the industries for which there is no information on turnover or output development, value added is determined directly. If there are data on a real indicator of value added (such as employment), the real value added of the industry is first calculated using econometric methods (with the Chow-Lin approach again being given priority). Next, a gross value added deflator is determined directly also using an econometric approach. Where quantitative information on components of nominal gross value added is available, this is estimated first. Here too, a net output deflator is determined directly afterwards and used for calculations in real terms.

For the remaining transactions for which there is no quarterly information on the price development or for which there is no adequate model to account for this<sup>22</sup>, the annual deflator needs to be put on a quarterly basis without an indicator series. For this purpose, the convention is to require as small as possible a variation of the deflator from one quarter to another. If this is combined with the additional requirement that the annual values must be complied with, the Boot-Fibes-Lisman method, which is designed to minimise the sum of the initial differences, is best suited to this process. The result of this purely mathematical method is rather similar to a quarterly division of the deflator using a spline function. The disadvantage lies in the fact that, for the extrapolation of the deflator series outside the time period for which annual values are available, an assumption must be made for the annual value of the current year. In practice, this value is either forecasted using a time series analysis or estimated in talks with experts.

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<sup>22</sup> For example, special taxes and subsidies on products, FISIM, etc.

### **6.3. Price and volume measures in the expenditure account**

Since no use of a double deflator is required in this area and a suitable price survey within the year takes place for most of the aggregates of the expenditure account, calculations in real terms in this area are statistically sounder than in the production account.

The CPI is used to deflate nominal consumption. The different price base year and the slightly divergent goods structure has only little adverse impact and is compensated by the regression approach used. In the public consumption sector, the use of a regression approach with the help of wage increases in the civil services proved satisfactory.

For calculations in real terms of formation of fixed capital in machinery and equipment, either primary surveys (such as construction PI) or, as an alternative, the corresponding wholesale price indices are available.

In the absence of a suitable deflator, investment in inventories is determined using the Boot-Fibes-Lisman method described in the production approach.

The German goods export prices proved as a suitable indicator for calculations in real terms of goods exports, due to the similarity of the sales markets and the economic structure. Detailed information is adjusted to the Austrian product structure and used as a regressor in an econometric equation which includes the Austrian annual values as the benchmark. For service exports, the same service prices as the values surveyed for Austria are used, with a special index for tourism exports.

Since a substantial part of the Austrian imports comes from Germany, a mixture of German export and import prices is used as an indicator for specific groups of products. In tourism, a special index compiled by the Austrian Institute for Economic Research is used which explicitly takes account of the destinations of Austrian residents spending time abroad and the respective weightings.