

# COMMISSION

## COMMISSION DECISION

of 30 November 1998

**clarifying Annex A to Council Regulation (EC) No 2223/96 on the European system of national and regional accounts in the Community as concerns the principles for measuring prices and volumes**

*(notified under document number C(1998) 3685)*

(Text with EEA relevance)

(98/715/EC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Council Regulation (EC) No 2223/96 of 25 June 1996 on the European system of national and regional accounts in the Community<sup>(1)</sup>, as amended by Regulation (EC) No 448/98<sup>(2)</sup>, and in particular Article 2(2) thereof,

- (1) Whereas it is necessary to improve the comparability between the Member States in the data for changes in real gross domestic product (GDP), both with a view to the application of Article 2 of Council Regulation (EC) No 1467/97 of 7 July 1997 on speeding up and clarifying the implementation of the excessive deficit procedure<sup>(3)</sup> and the resolution of the European Council on the Stability and Growth Pact (Amsterdam, 17 June 1997)<sup>(4)</sup> and for the purpose of multilateral surveillance more generally;
- (2) Whereas the implementation and supervision of Economic and Monetary Union require comparable, up-to-date and reliable information on the structure and developments in the economic situation of each Member State;
- (3) Whereas the Commission must play a part in the administration of Economic and Monetary Union and, in particular, report to the Council on the budgetary situation and the amount of national debt in the Member States;

- (4) Whereas the economic accounts in real terms, i.e. adjusted for price changes, are a fundamental tool for analysing a country's economic and budgetary situation, provided they are compiled on the basis of unique principles that are not open to different interpretations; whereas for this purpose the recommendations for the calculation of data at constant prices within the framework of Regulation (EC) No 2223/96 shall be deepened and strengthened;
- (5) Whereas the Commission must use national accounts aggregates in real terms for Community policy purposes and, in particular, for the supervision of the stability and growth pact;
- (6) Whereas in order to assess the seriousness of the economic recession the Member States must generally take as a reference any annual reduction of real GDP of at least 0,75 %; whereas exceeding the reference value following a serious economic recession is exceptional only if GDP in real terms records an annual reduction of at least 2 %;
- (7) Whereas the results of the accounts in real terms of all Member States compiled according to the provisions introduced by this Decision must be made available to users by the Commission at specific dates, in particular with regard to the supervision of economic and monetary convergence;
- (8) Whereas the provisions introduced by this Decision are the first steps towards common accounting rules for Member States' accounts in real terms for Community requirements, thereby making it possible to obtain results that are comparable among Member States and of sufficient quality;

<sup>(1)</sup> OJ L 310, 30. 11. 1996, p. 1.

<sup>(2)</sup> OJ L 58, 27. 2. 1998, p. 1.

<sup>(3)</sup> OJ L 209, 2. 8. 1997, p. 6.

<sup>(4)</sup> OJ L 236, 2. 8. 1997, p. 1.

- (9) Whereas the results of the accounts in real terms for Community requirements must be the subject of statistical treatment and communications to the Commission on dates laid down by Regulation (EC) No 2223/96 and by Council Regulation (EC) No 3605/93 of 22 November 1993 on the application of the Protocol on the excessive deficit procedure<sup>(1)</sup>;
- (10) Whereas, however, in view of the importance of the accounts in question and the degree of detail, as well as the situation with regard to statistics in the Member States, additional deadlines for the introduction of these provisions must be granted exceptionally and temporarily to Member States which, objectively, will not be in a position to comply with the rules laid down in this Decision when Regulation (EC) No 2223/96 is implemented;
- (11) Whereas the measures provided for in this Decision are in accordance with the opinion of the Statistical Programme Committee of the European Community (SPC), established by Council Decision 89/382/EEC, Euratom<sup>(2)</sup>, and the Committee on Monetary, Financial and Balance of Payments Statistics (CMFB), established by Decision 91/115/EEC<sup>(3)</sup>,

HAS ADOPTED THIS DECISION:

#### *Article 1*

##### **Objective**

The purpose of this Decision is to clarify the principles for the measurements of prices and volumes contained in Chapter 10 of Annex A to Regulation (EC) No 2223/96, in view of the need to further harmonise price and volume measures.

The clarifications given in the present Decision, shall be used for the data transmitted to Eurostat from the first transmission of data pursuant to Regulation (EC) No 2223/96 onwards, at least for the data referring to the years 1995 and later.

#### *Article 2*

##### **Clarifications to the general principles for the measurement of prices and volumes**

Clarifications to the general principles that shall be followed in the measurement of prices and volumes contained in Chapter 10 of Annex A to Regulation (EC) No 2223/96, particularly as concerns the elementary level

of aggregation, the choice of index formula and the choice of base year, are laid down in Part I of Annex I to the present Decision.

#### *Article 3*

##### **Classification of methods by product**

A classification of methods for certain types of products into most appropriate methods, alternatives which may be used if the most appropriate methods cannot be applied, and methods which shall not be used as from the first transmission of data to Eurostat pursuant to Regulation (EC) No 2223/96 onwards, is laid down in Parts II and III of Annex I to the present Decision.

#### *Article 4*

##### **Research programme**

For those products for which the classification of methods defined in Article 3 is not stated in Annex I to the present Decision, this classification will be defined taking into account the results of a research programme, which shall be completed by the end of the year 2000, and after decision of the SPC.

#### *Article 5*

##### **Transitional periods**

Transitional periods for the application of the principles as clarified in Article 2, are laid down, for each Member State, in Annex II to the present Decision.

Member States may ask, in addition, for transitional periods to be granted for the application of the methods referred to in Article 3, which shall be decided at the latest by the end of the year 1998.

In the case of a Member State for which a transitional period is granted, and which presents for a given year a reduction of GDP in real terms calculated according to the national methods in place, the Member State shall assist Eurostat to the fullest possible extent in evaluating the scale of the effect of any deviation from the principles contained in the present Decision.

#### *Article 6*

##### **Inventory**

Member States shall provide Eurostat, at the latest by the end of the year 2002, with a full inventory of procedures and basic statistics used to measure GDP in real terms and its components. The inventory shall at least cover the methods used in the final accounts.

<sup>(1)</sup> OJ L 332, 31. 12. 1993, p. 7.

<sup>(2)</sup> OJ L 181, 28. 6. 1989, p. 47.

<sup>(3)</sup> OJ L 59, 6. 3. 1991, p. 19.

*Article 7***Addressees**

This Decision is addressed to the Member States.

Done at Brussels, 30 November 1998.

*For the Commission*  
Yves-Thibault DE SILGUY  
*Member of the Commission*

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*ANNEX I*

## PART I

**GENERAL PRINCIPLES FOR THE MEASUREMENT OF PRICES AND VOLUMES.****I.1. Introduction**

The nature of estimates at constant prices is different from that of estimates at current prices, in some fundamental respects. Simplifying, current price accounts can be seen as the aggregation within an accounting framework of transactions which took place and can be evidenced. Constant price accounts however describe the economic situation of a particular year in the prices of another year. In reality the transactions of the current year would not have taken place in an identical manner at the prices of that other year.

Transaction values have to be decomposed into price and volume components. In principle, the price components should include changes arising solely from price changes, while all other changes are to be included in the volume component (ESA 95, point 10.01). For many products however, it is far from clear how to make this decomposition in practice (ESA 95, point 10.06). Therefore, a set of rules for the measurement of prices and volumes has to be adopted, of which the results should approximate the theoretical ideal price/volume decomposition, and which should be applicable in a comparable way in all Member States.

In this Part I the general principles of this framework are set out, while in Parts II and III in more detail the estimation procedures in respectively the production and expenditure approaches are discussed.

The principles laid down in this Decision apply to annual data. Of course, a guiding principle should be that the quarterly accounts shall be consistent with the annual accounts, in order that the quarterly accounts forecast the definitive results as closely as possible. Specific issues related to quarterly accounts in constant prices will be discussed in the forthcoming handbook on quarterly accounts.

Chapter 10 of ESA 95 expresses a clear preference for an integrated accounting approach to constant price calculations (ESA 95, points 10.04 and 10.08). In the accounting approach, the production and expenditure sides of GDP in constant prices can be balanced on a detailed product level using supply and use tables. In using detailed supply and use tables the consistency of the indices can be guarded. Also, deflators from different sources, for example separately compiled CPIs and PPIs can be compared and checked against each other. In a system based on supply and use tables the best of both sides (i.e. production and expenditure approaches) can be combined, for both the current and constant prices.

ESA 95, points 10.12 to 10.23, defines what is to be included in the price and what in the volume component. The volume component should include the effect of changes in quality of products. That implies that price and volume indicators used to calculate national accounts data should be corrected for such changes in quality.

The consistency of the quality adjustments made in the various indicators should be closely monitored. If large differences in various price indices for the same product exist, this might be due to different procedures for quality adjustment.

Volume indicators should at least be calculated at a sufficiently detailed breakdown, in order to take account of structural changes. For example the number of passenger-kilometres in rail transport should at least be subdivided into first and second class passengers. This allows the inclusion of effects of variations in shares of first and second class tickets in the volume components rather than the price component.

Deflation of current year values using an appropriate price index is in general to be preferred above extrapolation of base year values using a volume or quantity index (ESA 95, point 10.32), as the effects of quality change can be taken into account in a better way. Furthermore, price relatives usually have a smaller variance than quantity relatives, yielding a smaller sampling error for price indices.

If values are calculated using a price quantity approach, this underlying price and quantity information can be used to calculate the constant price data (ESA 95, point 10.33). In such a case, explicit adjustments for quality changes will have to be made.

The remainder of Part I of this Annex discusses those principles for which ESA 95 needs clarification.

### **1.2. The elementary level of aggregation**

The measurement of prices and volumes should start from a detailed breakdown of products for the different transaction categories. For each product distinguished for each transaction category, a price index should be found with which the current price value can be deflated, or a volume indicator should be found to extrapolate a base year value. In the ideal case, each product could be distinguished separately, and the pure price and volume changes of that product could be estimated.

In statistical practice, however, it is necessary to aggregate products, which means that price and volume changes of different products have to be weighted together. The statistical sources from which the price indices and volume indicators are derived can use differing weighting methodologies (i.e. differing formulas or differing base years). In the national accounts, however, one consistent weighting methodology for all variables has to be used (to be discussed in the next sections). If indices with a different weighting than the national accounts weighting are used in the national accounts, then implicitly the assumption is made that the indices used are elementary indices, so that the underlying weighting scheme is assumed to be irrelevant. Then, a fixed-weighted Laspeyres index can for example be assumed to be equal to a Paasche index, or a previous-year weighted Laspeyres index. Clearly, the implicit assumption that the indices used are elementary indices is most valid when it is applied on a very detailed level.

Therefore, the more detailed the product breakdown is, the more accurate the results can be expected to be. At a detailed level the products can be assumed to be more homogeneous, yielding indices that are closer to elementary indices, as well as more detailed weighting schemes.

The precise level of aggregation at which the assumption that the indices used are elementary indices is applied in the national accounts is called, for the purpose of this text, the *elementary level of aggregation*. It is often equal to the number of products distinguished in the supply and use tables which are used for balancing purposes.

Member States should make an effort in constructing detailed breakdowns of products for deflation purposes. The elementary level of aggregation, for output as well as all categories of (intermediate and final) use, should be at least as detailed as the P60-level of ESA 95, which is to be used for the submission of supply and use tables to Eurostat. In Part II of this Annex (on the production approach) we will specify for some categories of products additional minimum breakdowns which should be used in estimating deflators or volume indicators.

#### *Principle 1:*

*In the measurement of prices and volumes a detailed level of aggregation of products shall be used. This level of aggregation, which is referred to as the elementary level of aggregation, shall be at least as detailed as the P60-level of ESA 95, for output as well as all categories of (intermediate and final) use.*

In the case of derogations granted in the ESA 95 Regulation on the supply of P60-level data, the most detailed available national data shall be used.

### **1.3. The choice of index formula**

Having defined the elementary level of aggregation, the price and volume indices available at that level have to be weighted together to obtain the price and volume measures of all national accounts aggregates.

For this purpose, first an index formula has to be chosen. ESA 95, points 10.62 to 10.64, expresses a preference for the Fisher price and volume indices, while the Laspeyres volume and Paasche price indices provide acceptable alternatives. In practice, a Fisher index has several disadvantages, among which the larger data requirements, the non-additivity of volume data, and the more difficult explanation to users.

Therefore, it is in practice preferred to use Laspeyres volume and Paasche price indices to aggregate the price and volume measures derived at the elementary level of aggregation.

*Principle 2:*

*Volume measures available at the elementary level of aggregation shall be aggregated using the Laspeyres formula to obtain the volume measures of all national accounts aggregates. Price measures available at the elementary level of aggregation shall be aggregated using the Paasche formula to obtain the price measures of all national accounts aggregates.*

It should be noted however that ESA 95 also allows the use of Fisher indices. Furthermore, it should be stressed that this principle does not apply to the sources of data on prices and volumes used in the national accounts: data at below the elementary level of aggregation need not be calculated according to this principle.

**I.4. The choice of base year**

The Laspeyres volume index uses values from a specified year to weight the volume changes of the components of an aggregate. It now needs to be defined from which year these weights are to be drawn.

For this purpose, first the terms *base year* and *reference year* should be defined.

Definitions:

- the *base year* is the year of which the current price values are used to weigh the price and volume measures derived at the elementary level of aggregation,
- the *reference year* is the year which is used for the submission and presentation of the constant price data. In a series of index numbers it is the year that takes the value 100.

For example take the following series of index numbers:

1990	1991	1992	1993	1994
100	105	108	112	120

Suppose these numbers were calculated using weights from the year 1990. Hence 1990 is the base year. It is also the reference year, since  $1990 = 100$ . The reference year can easily be changed to e.g. 1993 (divide all by  $112/100$  to get  $1993 = 100$ ):

1990	1991	1992	1993	1994
100/1,12	105/1,12	108/1,12	112/1,12	120/1,12

Such a procedure does not change the base year, since the year-to-year variations are still calculated using weights from 1990.

Instead of having a fixed base year as in the example above, one could take each year the weights of the previous year. This could for example lead to the following series of year-to-year changes:

1990	1991	1992	1993	1994
100	105	102	103	106

For each of these indices holds:  $t-1 = 100$ , hence the reference year is equal to the base year, but changes each year. It is easily possible to express the series on one reference year, by 're-referencing'. This would yield:

1990	1991	1992	1993	1994
100	105	107,1	110,3	116,9

( $107,1 = 105 \times 102/100$ ;  $110,3 = 107,1 \times 103/100$ , etc.).

It is important that a change of the reference year does not affect the year-to-year indices. This is obvious for a single series as in this example, but when a variable consists of several sub-variables this is no longer obvious. To keep all year-to-year growth rates of each variable unchanged when the reference year is changed, one should re-reference each variable separately, be it an elementary index, a sub-total or an overall aggregate such as GDP. The consequence is that, in the constant price data of a fixed reference year, discrepancies will arise between individual elements and their totals. This is the well-known 'non-additivity' problem. These discrepancies should not be removed in any way (ESA 95, point 10.67), as that would again distort the growth rates. See the example at the end of this section for further clarification.

The choice of base year and the choice of reference year are in principle unrelated issues. For the purpose of this Commission Decision, i.e. clarification of the principles of calculating price and volume measures, only the problem of the choice of base year is relevant.

Clearly, for a greater comparability of price and volume measures between countries, countries should use the same base year. Furthermore, to derive the most accurate growth rates, the most recent base year possible should be used, since in that case the weights used are most up-to-date, and the problems of disappearance of products and new products are minimised. Together, these considerations lead to the method of deriving the weights always from the previous year.

*Principle 3:*

*Volume measures derived at the elementary level of aggregation shall be aggregated using weights derived from the previous year.*

If a Member State has a transitional period regarding principle 3, then it shall change the base year every five years as from 1995 during the transitional period.

Example: Re-referencing aggregates and their components

Consider two products A and B, and their total. Assume that these are homogeneous products, that means that we can determine price and volume indices for these products which do not depend on an underlying weighting scheme, i.e. these are elementary indices.

The volume and price indices for the total of A and B however depends on how A and B are weighted. In the following scheme the volume changes for the total between T-1 and T are weighted by the current price values of year T-1.

As these are the most up-to-date weights these growth rates can be seen as the most accurate.

	1990 current prices	Volume change 90-91	1991 price of 1990	Price change 90-91	1991 current prices	Volume change 91-92	1992 prices of 1991	Price change 91-92	1992 current prices	Volume change 92-93	1993 prices of 1992	Price change 92-93	1993 current prices
A	100	105,0	105	110,0	115,5	102,0	117,8	108,0	127,2	103,0	131,1	105,0	137,6
B	300	110,0	330	95,0	313,5	90,0	282,2	105,0	296,3	95,0	281,4	102,0	287,1
Total	400	108,8	435	98,6	429,0	93,2	400,0	105,9	423,5	97,4	412,5	103,0	424,7

Now suppose these data have to be expressed in a fixed reference year, say 1990. The only way of doing so without distorting the growth rates of the total is to re-reference each series separately. In index form (1990 = 100) this will become:

	1990	1991	1992	1993
A	100	105,0	107,1	110,3
B	100	110,0	99,0	94,1
Total	100	108,8	101,4	98,8

where  $101,4 = 108,8 \times 93,2/100$  and  $98,8 = 101,4 \times 97,4/100$ .

In terms of volumes with reference year 1990:

	1990	1991	1992	1993
A	100	105,0	107,1	110,3
B	300	330,0	297,0	282,2
Total	400	435,0	405,6	395,0
A+B	400	435,0	404,1	392,5

Clearly, the sum of A and B is no longer equal to the total. This is the famous 'non-additivity problem'. Despite this problem, the 'correct' volume for 1993 is 395 and not 392,5, because that is the only figure consistent with the previously calculated growth rates of the total.

Moreover, in this way the year-to-year growth rates will not change with a change of the reference year. The discrepancies between A, B and their total should not be removed, but explained to the users. These discrepancies cannot be interpreted as indication of the reliability of the results.

## PART II

**MEASUREMENT OF PRICES AND VOLUMES ACCORDING TO THE PRODUCTION APPROACH****II.1. Classification of methods**

The following classification of methods will be used throughout the remainder of this Annex:

- A methods: most appropriate methods  
B methods: those methods which can be used in case an A method cannot be applied  
C methods: those methods which shall not be used.

**II.2. Market output and output for own final use**

In this section the calculations for market output and output for own final use are considered. First, some principles are stated regarding the various methods of calculating value added in constant prices. These principles provide the general criteria of classifying calculation methods into A, B and C methods. These principles must however first be applied on a product by product basis, for all types of market production, to give specific guidance on the methods to be applied in each case.

Regarding the choice between double indicator and single indicator methods, the following classification can be given:

*A method:* The ESA 95 clearly states (point 10.28) that double deflation is theoretically the correct method, since current price value added is also estimated as the difference between output and intermediate consumption. This argument holds in fact for all double indicator methods (e.g. extrapolation of output by a volume indicator and deflation of intermediate consumption). There are some more reasons that can be mentioned why double indicator methods are preferred:

- the indicators that are used are output or input indicators. In single indicator methods such indicators are directly applied to value added which is less appropriate,
- double indicator methods give an independent assessment of productivity changes.

*B method:* In practice it might be necessary to use methods based on single indicators, because of, for example, insufficient data on intermediate consumption, or because the reliability of the data is insufficient.

Regarding the appropriateness of indicators to be used in either deflation of current year values or extrapolation of base year values, the following criteria can be used:

- the completeness of the coverage of the product heading by the indicator. For example, whether the indicator covers all of the products under the heading or just a selection of them, such as only those products sold to households,
- the valuation basis of the indicator. For market output, this should be basic prices, rather than, for example, purchasers' prices or input costs,
- the indicator should take quality changes into account, recording them within the volume estimates,
- the conceptual consistency between the indicator and the national accounts concepts.

These criteria lead to the following general conclusions about the appropriateness of indicators, but, as said above, these general conclusions must then be applied on a product by product basis, for all types of market production, to give specific guidance on the methods to be applied in each case. The following criteria for distinguishing A, B and C methods are absolute criteria, i.e. they do not depend on the availability of data. In practice it might be that the A methods are not attainable, and conventions need to be sought on B methods.

*A method:* In the output approach, in principle, using appropriate price indices of production, usually referred to as Producer Price Indices (PPIs), will be the A method. Each product should be deflated separately by an appropriate PPI. An appropriate PPI satisfies the following criteria:

- it is an index of the (domestic and export) price(s) of exactly that (group of) product(s),
- it takes account of changes in quality of the product(s),



- it is valued at basic prices,
- its underlying concepts are consistent with the national accounts concepts.

Any method that can be shown to be fully equivalent to the use of PPIs can also be seen as an A method.

*B method:* If an appropriate PPI is not available, several alternative types of indicators exist. For example, the following will usually be B methods:

- a less appropriate PPI, e.g. an index without quality adjustments, or having a smaller or larger coverage than the product heading,
- a Consumer Price Index (CPI). The same three criteria as for PPIs apply (CPIs will normally have to be corrected for taxes, subsidies and margins in order to obtain valuation in basic prices), and in addition, the weighting should be appropriate and the concepts should correspond to national accounting concepts,
- output volume indicators. Volume indicators should also take quality changes into account. This can be done in part by applying volume indicators in sufficient detail so as to take structural changes into account.

Such indicators do not in general respect all four of the criteria set out above.

*C method:* The use of some other possible indicators, as follows, will usually be C methods.

- input methods (for market output),
- secondary indicators, i.e. indicators not directly related to the output,
- PPIs, CPIs or volume indicators that do not correspond at all with the product(s) in question, e.g. the overall CPI.

Such indicators will, in general, fall a long way short of respecting the four criteria, much more so than the B methods do.

These criteria will now be applied to the products of each heading of CPA below. Market output and output for own final use will be dealt with together. ESA 95, point 3.49 states that 'output for own final use is to be valued at the basic prices of similar products sold on the market'. Therefore, the principles for deflation of output for own final use are the same as for market output.

For each type of product, the aim is to define A, B and C methods. If, for a certain type of product, the use of appropriate PPIs does not pose specific problems (i.e. the A method is feasible), the manner in which other particular indicators respect the criteria is not discussed. For a significant number of types of products it is not yet possible to define A, B and C methods. This will be done within the research programme. The research programme might also investigate further improvement of the classifications for those products for which an initial classification is given below.

This text discusses mainly the estimation of *output* in constant prices. For double indicator methods, it is also necessary to deflate *intermediate consumption*. The preferred method of deflating intermediate consumption is product by product, using genuine price data on intermediate uses, collected from the purchasers. This will however in practice often not be available. Therefore, intermediate consumption of domestically produced products can be deflated using the same method as described below for the output of that product, taking into account the difference in valuation (intermediate consumption is valued in purchasers' prices). Special attention should be paid to the deflation of intermediate consumption of imported products. Furthermore, differences in prices for different users should be taken into account. An example is electricity, for which large price discrimination can exist between different user branches.

When considering the estimation of intermediate consumption at constant prices, an important factor to take into account is how the impact of unreliable estimates of output at constant prices (e.g. for a type of business service) can be mitigated at the level of total GDP at constant prices. Within the production approach the impact of unreliable deflators or implicit deflators for some products on the estimates of total GDP at constant prices is minimised if:

- the accounts at constant prices are compiled within a supply and use framework
- double indicator methods are used throughout the accounts
- any unreliable deflators for production are also used for the deflation of intermediate consumption.

The use of supply and use tables for integrating the estimates, combined with double deflation, therefore plays a clear role in minimising inaccuracies at the level of total GDP at constant prices.

CPA A: *Products of agriculture, hunting and forestry*

CPA B: *Fish*

Most current price calculations for these products are based on price and quantity information. This information can and should therefore also be used to calculate output in constant prices. Quantity information should be corrected for quality changes wherever appropriate. In some cases, genuine PPIs are compiled as well. All these methods are A methods.

CPA C: *Products from mining and quarrying*

CPA D: *Manufactured products*

CPA E: *Electrical energy, gas, steam and hot water*

For these three groups of products, Member States submit already many PPIs to Eurostat. The use of these PPIs, if the abovementioned criteria are fulfilled, is the A method for these products. These data should then be used in the constant price calculations.

There are some important problems in the price and volume measurement of specific products. This relates in particular to:

- computers and other information processing equipment
- large equipment, such as aircraft and ships.

For these products, the price measurement is usually very difficult, while they are economically quite significant. Improvement of the procedures for these products needs to be studied in the research programme.

CPA F: *Construction work*

For construction, price and volume measurement is often complicated by, for example, the one-off character of many of the products. The methodological problems of estimating construction output in constant prices have to be studied in the research programme.

CPA G: *Wholesale and retail trade services, repair services of motor vehicles, motorcycles and personal and household goods*

***50: Sale, maintenance and repair services of motor vehicles and motorcycles; retail trade services of automotive fuel***

This group consists of two types of products:

- service output for maintenance and repair of motor vehicles and motorcycles
- trade margin output for sale of motor vehicles, motorcycles and automotive fuel.

For the first type of output, PPIs could be available, in which case they constitute the A method. If they are not available, the products can be deflated using CPIs (corrected for any taxes or subsidies), which are a B method, because it might not sufficiently cover business expenditure.

For the deflation of trade margins the same procedures should be adopted as described below for wholesale trade.

***51: Wholesale trade and commission trade services, except of motor vehicles and motorcycles***

The main output of this group consists of wholesale trade margins. For margin output the following rules can be specified:

*A method:* The A method for margin output is a method taking the changes in quality of the trade services into account. This can be achieved by deflating separately sales and purchases of traders (taking appropriate account of changes in inventories). For this purpose, price indices of a very high quality are required.

*B method:* The B method can be used as the assumption that the volume of margins follows the volume of turnover. This assumes that margin ratios are constant in constant prices.

The most simple way to apply this is to extrapolate total margin output by a volume index of turnover. A volume index of turnover can be obtained by deflating turnover by a turnover price index.

An improvement to this simple method would be to add product detail, preferably by calculating trade margins in constant prices within the detailed framework of supply and use tables. Then, the margin ratio on a specific transaction calculated in a certain base year can be applied to the volume of that transaction in the current year. In that way the volume of the margin is growing with the volume of the commodity flow.

Another improvement to the procedure is taking into account changes in trade channels (e.g. the move from small neighbourhood shops to big hypermarkets). That would include some of the quality change of trade services in the volume component.

Such methods should be regarded as B methods, as the change in quality of the trade service cannot be taken into account.

*C method:* Any other method, e.g. the deflation of margin output directly by a turnover price index.

***52: Retail trade services, except of motor vehicles and motorcycles; repair of personal and household goods***

For retail trade margin output, the same assumption should be used as outlined above for wholesale trade. An advantage here is that a good measure of the retail turnover price index exists: the CPI. To obtain a volume index of retail turnover of a particular good, the corresponding item of the CPI can be used to deflate.

For the output of repair of personal and household goods, the CPI can be used. As there will be little business expenditure on these services, the CPI will be quite appropriate, and might be regarded as an A method. However, various CPI headings will have to be used as various different products are included here. Therefore, deflation is necessary on a detailed level in order to be able to apply the various detailed CPI headings involved.

***CPA H: Hotel and restaurant services***

The A method for hotels and restaurants is deflation by an appropriate PPI. In case a PPI does not exist, the CPI can be used as an approximation. This is in this case a B method, as business expenditure is not taken into account.

***CPA I: Transport, storage and communication services***

***60, 61 and 62: Transport by land, water and air***

Passenger and freight transport should be deflated separately.

For *passenger* transport, the A method is the use of appropriate PPIs. In case they are not available, the following methods are B methods:

- deflation by a CPI provided it takes sufficient account of quality changes,
- extrapolation by an indicator of the number of passenger-kilometres, provided this indicator is available for a sufficient number of categories of transport. At least a distinction should be made between different class types (e.g. first and second class for rail transport, business and tourist class for air transport, etc.).

These methods need to be applied individually to at least the following types of (passenger) transport, as long as they are significant in the Member States:

- transport via railways
- other land transport

- water transport
- air transport.

If such breakdowns are not attained, then these methods are C methods. Any other methods (e.g. using the number of passengers as volume indicator) are also C methods.

For *freight* transport, the A method is also the use of appropriate PPIs. If they are not available, then the following method is a B method:

- it can be assumed that the volume of the transport service follows the volume of the goods transported. For this purpose, an indicator like tonne-kilometres transported is appropriate, although obviously no quality changes in the transport service can be taken into account. The more detail available on tonne-kilometres of different transport types, the better the result will be.

This method needs to be applied individually to at least the following types of (freight) transport, as long as they are significant in the Member States:

- transport via railways
- other land transport
- transport via pipelines
- sea and coastal water transport
- inland water transport
- air transport.

If such breakdowns are not attained, then these methods are C methods. Any other methods (e.g. using an indicator such as tonnes transported) are also C methods.

For both passenger and freight transport, in principle, a correct deflation requires current price data in the above breakdowns as weight. If this detail is not available in current prices, other weights could be used to weigh indicators for each of the types of transport distinguished. These other weights should approximate the current values as close as possible.

### ***63: Supporting and auxiliary transport services; travel agencies services***

This group covers a wide variety of services, hence it is not possible to specify a particular method or indicator. Therefore, it is referred to the general classification of methods and indicators.

For travel agencies, the ESA 95 makes specific recommendations (see point 10.39).

### ***64: Post and telecommunication services***

Estimating post and telecommunication services at constant prices is complicated by the ever expanding range of different types of services provided and of tariffs charged. For this reason specific guidance on the practices to be used for these products will be developed as part of the research programme.

### ***CPA J: Financial intermediation services***

For products such as financial intermediation services indirectly measured (FISIM), securities and foreign exchange trading margins and insurance, output at current prices is defined as the balance between different transactions. A harmonised definition and measure of output at constant prices must be specified.

Accounting for quality change in finance and insurance is another issue needing further consideration, as is the comparability of estimates for financial services for which explicit prices are charged.

Specific guidance on the practices to be used for these products will be developed as part of the research programme.

### ***CPA K: Real estate, renting and business services***

#### ***Dwelling services***

For the estimation of the output of dwelling services at current prices, all of the Member States will introduce the so-called stratification method to measure output for GNP purposes by 1998 or 1999 (!).

(<sup>1</sup>) Commission Decision 95/309/EC, Euratom (OJ L 186, 5. 8. 1995, p. 59) and Commission Decision 97/619/EC, Euratom (OJ L 252, 16. 9. 1997, p. 33).

This method is essentially one by which output at current prices is estimated in an objective manner using data on quantities and qualities of dwellings and the prices paid for their use. There will be therefore, by definition, the output price information needed for deflation. This same price, quality and quantity information should be used to produce the estimates at constant prices. The application of the approach outlined above can be described as the A method. It gives the opportunity to take quality changes in the dwelling service provided into account.

#### *Other renting, real estate and business services*

For these services, producer price data can be difficult to collect, for example, because of the one-off nature of some of the products. As a consequence, many different alternative measures of price or volume changes, often indirect or secondary measures, may be used instead.

The suitability of these indirect measures must be assessed for each service under this heading. Specific guidance will be developed as part of the research programme. Special attention in the research programme should be given to the deflation of output of software, which is also included in this product group.

#### *CPA M: Education services*

#### *CPA N: Health and social services*

In some Member States the main parts of health and education provision are recorded as market production, while in others they are recorded as non-market production. The methods needed to measure output at constant prices should take account of the need to arrive at comparable statistics for the two groups of countries.

Price statistics for deflating market output should reflect the total price of the product, not only the consumer's contribution towards the total price or a conventional tariff price. Price statistics should also allow for quality changes in the health and education products.

Specific guidance on the practices to be used for these products, using price statistics or other methods, will be developed as part of the research programme. The programme will cover both the market output of these services and, as described below, the non-market output of them.

#### *CPA O: Other community, social and personal services*

For these services producer price data is often not available and alternative indicators are commonly used in their place. As with health and education, there can be both market and non-market output of some of the activities under this heading and statistical methods need to take account of this. Specific guidance on the practices to be used for these products will be developed as part of the research programme.

#### *CPA P: Private households with employed persons*

This output, which is output for own final use, is valued by convention as the compensation of the employees, including any income in kind.

The usual methods for producing the estimates at constant prices are to use CPI data or wages data for deflation, or to use volume extrapolation (with the numbers of employees used as the extrapolator). In principle, the deflators used (CPI or wage data) should be verified to ensure that they correctly allow for income in kind.

These methods do not take productivity changes into account, but this omission will have only minor consequences for GDP. Such methods are B methods, unless they take account of productivity changes (in which case they are A methods).

#### *Taxes and subsidies on products and imports and VAT*

ESA 95, points 10.47 to 10.52, sets out in sufficient detail the principles to be used to estimate taxes and subsidies on products and imports and VAT at constant prices. These principles represent the A method.

### II.3. Non-market output

As noted earlier, statistical methods for the measurement of output at constant prices need to give comparable statistics for both market and non-market output, particularly for services like education and health.

For non-market services, output at constant prices can be estimated by using either output volume indicators or input methods (for example, deflation of the labour and other inputs, or extrapolation of the base year volume of labour inputs). Some price data may also exist which can be used.

The distinction between A, B and C methods for non-market services will be defined within the research programme.

#### II.3.1. CPA M: Education

Non-market educational output at constant prices can be estimated by using either output volume indicators or input methods.

Specific guidance on the methods to be used for estimating educational output (whether by means of output volume indicators, input methods, or, for market output, price data) will be developed as part of the research programme. This programme will also assess accounting for quality change.

#### II.3.2. CPA N (part): Health

Non-market health service output at constant prices can also be estimated by using either output volume indicators or input methods.

Specific guidance on the methods to be used for estimating health output (whether by means of output volume indicators, input methods, or, for market output, prices data) will be developed as part of the research programme. This programme will also assess accounting for quality change, which is of particular importance for health service output.

#### II.3.3. Other non-market output

The other non-market outputs can take many different forms. Some are provided on an individual basis (e.g. social security services), while others are provided on a collective basis (e.g. defence services). Still others may have an individual element and a collective element (e.g. police services — classified within collective services by convention in ESA 95).

Output volume indicators can be used to estimate the output of services provided on an individual basis, and, perhaps, some of the services provided on a collective basis. Input methods can be used for all of these services. Comparable results will require some harmonisation of the manner in which the two methods are applied.

Specific guidance on the methods to be used for these products (whether output volume indicators or input methods) will be developed as part of the research programme.

## PART III

### MEASUREMENT OF PRICES AND VOLUMES ACCORDING TO THE EXPENDITURE APPROACH

On the expenditure side, GDP in constant prices is the sum of final consumption, gross capital formation and net exports.

Regarding the *appropriateness of indicators* to be used in either deflation of current year values or extrapolation of base year values on the expenditure side, the following criteria can be used:

- the completeness of the coverage of the product heading by the indicator. For example, whether the indicator covers all of the products under the heading or just a selection of them

- the valuation basis of the indicator. For final consumption and gross capital formation this should be purchasers' prices rather than, for example, producers' prices
- the indicator should take quality changes into account, recording them within the volume estimates rather than the price estimates
- the conceptual consistency between the indicator and the national accounts concepts.

These criteria lead to the following general conclusions about the procedures of estimating price and volume measures in the different categories of the expenditure approach.

#### **Household final consumption**

Household final consumption (HFC) should, where appropriate, be deflated as much as possible using information from the CPI.

The CPI can be said to be appropriate if it satisfies the following criteria:

- it is an index with a coverage of exactly that (group of) product(s),
- it takes proper account of changes in quality of the product(s),
- it is valued in purchasers' prices including VAT,
- the concepts underlying the CPI correspond to those of the national accounts.

If a CPI is not available for a certain product, then other, more approximate, indicators have to be used. These might be PPIs, export or import price indices or, perhaps, in certain circumstances, volume indicators. Such methods are B methods.

C methods involve the use of indices that do not correspond at all with the product(s) in question.

#### **Government final consumption (GFC) and final consumption of NPISHs**

For these final consumption headings the same observations can be made as for the estimation of non-market output in the production approach (Section II.3), since the values of the goods and services produced by general government and NPISHs are main components of these categories (ESA 95, points 3.78 and 3.79).

Purchases by general government of goods and services produced by market producers that are supplied to households — without any transformation — as social transfers in kind, which also form part of government final consumption (ESA 95, point 3.79), are to be deflated by appropriate price indices corresponding to these (market) goods and services.

ESA 95, point 3.85 describes the distinction between individual and collective goods and services provided by government units. When this distinction is made then the concept of *actual final consumption* can readily be derived. This representation of the accounts does not introduce any specific problems regarding the estimates in constant prices.

#### **Gross fixed capital formation**

For gross fixed capital formation (GFCF) the A method is the use of genuine investment price indices. Such an index should satisfy the following criteria:

- it is an index with a coverage of exactly that (group of) product(s),
- it takes proper account of changes in quality of the product(s),
- it is valued in purchasers' prices including non-deductible VAT,
- the concepts underlying the index correspond to those of the national accounts.

In practice often PPIs will be used, which are B methods if they are not revalued in purchasers' prices. For PPIs of specific products, the same remarks apply as made in Section II.2, including the references to the research programme.

#### **Changes in inventories**

It is important that stocks are deflated specifically and independently, and not calculated as the residual item of the constant price calculations.

ESA 95, point 10.56 states that changes in inventories in constant prices can be calculated by deflating entries into and withdrawals from inventories separately with appropriate price indices. When volume and price changes of inventories are not too large, the direct deflation of the change in inventories with an average price index of the year provides an alternative.

There are four types of inventories (ESA 95, point 3.119):

- materials and supplies: the same principles can be stated here as were stated for the deflation of intermediate consumption in Section II.2
- work-in-progress: this category should be investigated in the research programme,
- finished goods: these can be deflated using PPIs at basic prices,
- goods for resale: these are valued in the prices at which they were purchased, for which a PPI will often be a good indicator.

The problem of holding gains should also be investigated in the research programme.

**Acquisitions less disposals of valuables**

This category should be investigated in the research programme.

**Exports and imports in goods and services**

This category should be investigated in the research programme.

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*ANNEX II*

## TRANSITIONAL PERIODS

**Transitional periods to Principle No 3**

Country	Until
Ireland	2004
Portugal	—
Denmark	2000 (in 1999 the base year will be 1990)
Finland	2005
Netherlands	—
Italy	2003
Germany	2005
Belgium	—
United Kingdom	2003
France	—
Spain	2003
Greece	—
Sweden	—
Luxembourg	—
Austria	2005