

EXECUTIVE SUMMARY

Introduction

1. The executive summary provides an overview of the principal features of the Eurostat-OECD PPP Programme. More complete and detailed descriptions of these and other aspects of the Programme can be found in the relevant chapters and annexes of the manual.¹
2. The Programme was started in the 1980s to compare the price and volume levels of GDP of the Member States of the European Union (EU) and the Member Countries of the OECD. This remains the Programme's purpose, even though its coverage has been broadened to include countries that are neither EU Member States nor OECD Member Countries.² Before the price and volume levels of the GDPs of different countries can be compared, it is first necessary to express their GDPs - which are in national currencies and valued at national price levels - in a common currency at a uniform price level. To do this, Eurostat and the OECD use purchasing power parities (PPPs).

BACKGROUND

Gross domestic product (GDP)

3. GDP is the sum of the value added generated by producers residing in the economic territory of a country during the accounting period. Its coverage and its usefulness as a summary measure of economic and social progress are continually being debated. Despite this, it is still the aggregate used most frequently to represent the economic size of countries and, when placed on a per capita basis, the economic welfare of their residents.
4. As a measure of economic welfare, GDP per head has its limitations. Besides covering the goods and services that resident households consume to satisfy their individual needs, it also includes services, such as defence and police, that government produces to meet the collective requirements of the community, as well as gross capital formation and net exports neither of which constitute final consumption.
5. An alternative measure is the aggregate "actual individual consumption". This comprises only the goods and services that households actually consume to satisfy their individual wants. It covers all such goods and services irrespective of whether they are purchased by the households themselves or are provided as social transfers in kind by government and non-profit institutions serving households (NPISHs). Eurostat-OECD comparisons are organised so that both the GDP and the actual individual consumption of participating countries can be compared.
6. GDP can be estimated from the production side, the expenditure side and the income side. All three approaches will yield the same result in theory. Price and volume comparisons of GDP are based on the identity: value = price x volume. The values of income aggregates, unlike the values of production and expenditure aggregates, cannot be split into meaningful price and volume components. Price and volume comparisons of GDP can be made only from the production side or the expenditure side.

Eurostat-OECD approach

7. Eurostat-OECD comparisons are made from the expenditure side. These have the advantage of enabling the levels and structures of the principal components of final demand to be compared. They are also relatively easy to organise having less onerous data requirements. Their disadvantage is that, because industries are not identified on the expenditure side, productivity comparisons can be made only at the level of the whole economy. To compare productivity at the industry level, international comparisons of GDP should be made from the production side. These are more difficult to organise as they require data for both intermediate consumption and gross output.
8. Comparing the values of the final expenditure that countries make on GDP will not provide a comparison of the volumes of goods and services purchased in the countries unless the differences in their price levels have been removed. Differences in price levels between countries can be removed either by observing the volumes directly or by deriving them indirectly using a measure of relative prices to place the expenditures of all the countries on the same price level. Prices are easier to observe than volumes and, as a rule, direct measures of relative prices have a smaller variability than direct measures of relative volumes. Eurostat-OECD comparisons estimate volumes indirectly.
9. International volume comparisons of GDP depend on four conditions being met, namely:
 - the definition of GDP is the same;
 - the measurement of GDP is the same;
 - the currency unit in which GDP is expressed is the same; and
 - the price level at which GDP is valued is the same.
10. GDP estimates of countries participating in Eurostat-OECD comparisons generally meet the first condition as they are compiled in line with one of the two complementary international systems of national accounts: the SNA 93³ or the ESA 95⁴. But the measurement of GDP is not always equally

exhaustive across all participating countries to satisfy the second condition. In particular, the GDPs of countries with a large informal or underground sector may be underestimated, depending on how well the national accountants have been able to include these “non-observed” activities in their estimates of GDP.

11. The third condition of a common currency unit is not met except by countries in the Euro Zone. The GDP estimates of the majority of participating countries are expressed in different national currencies. Nor is the fourth condition met as the GDP estimates of participating countries are valued at national price levels. To meet these last two conditions it is necessary to have conversion rates that both convert to a common currency and equalise the purchasing power of different currencies in the process of conversion. Such conversion rates are called “purchasing power parities” or “PPPs”. Eurostat and OECD comparisons are made using PPPs.

Exchange rates

12. Exchange rates had to be used to make international comparisons of GDP before PPPs became available. Exchange rates provide GDP estimates that are expressed in the same currency unit, but they do not provide GDP estimates that are valued at the same price level. To do this, exchange rates would have to reflect the relative purchasing powers of currencies in their national markets. And this they do not do. First, because exchange rates are determined by the supply and demand for different currencies and the supply and demand for currencies are influenced by factors such as capital flows between countries and currency speculation rather than by the needs of international trade. And second, because many goods and services, such as buildings and government services, are not traded internationally.
13. GDPs of countries converted to a common currency using exchange rates continue to be valued at national price levels. They reflect both differences in the volumes produced in the countries and differences in their price levels. They are, therefore, *nominal* measures and measures of value. PPPs, on the other hand, are conversion rates that are both currency converters and spatial price deflators. GDPs of countries converted to a common currency using PPPs are also valued at a uniform price level. They reflect only differences in the volumes produced in the countries. They are, therefore, *real* measures and measures of volume.⁵
14. The differences between GDPs converted with exchange rates and GDPs converted with PPPs can be significant. Comparisons between the two show that exchange rate converted GDPs are generally misleading on the relative sizes of economies.⁶ Exchange rates overstate the size of economies with relatively high price levels and understate the size of economies with relatively low price levels.⁷

15. Exchange rates are subject to fluctuations. And countries may suddenly appear to become “richer” or “poorer” even though there has been no change in the relative volumes of goods and services produced. It is the volatility of exchange rates, and not that they do not correct for price level differences between countries, that is sometimes perceived as their weakness when making international comparisons of GDP. Fluctuations can be avoided by using moving averages of exchange rates to convert GDP to a common currency. Averaging exchange rates over several years does dampen their fluctuations, but it does not bring them any closer to PPPs.⁸

Purchasing power parities (PPPs)

16. In their simplest form PPPs are nothing more than price relatives that show the ratio of the prices in national currencies of the same good or service in different countries. For example, if the price of a hamburger in France is 2.84 euros and in the United States it is 2.20 dollars, the PPP for hamburgers between France and the United States is 2.84 euros to 2.20 dollars or 1.29 euros to the dollar. In other words, for every dollar spent on hamburgers in the United States, 1.29 euros would have to be spent in France in order to obtain the same quantity and quality – or volume – of hamburgers.
17. PPPs are calculated in three stages. The first is at the product level, where price relatives are calculated for individual goods and services. The second is at the product group level, where the price relatives calculated for the products in the group are averaged to obtain unweighted PPPs for the group. And the third is at the aggregation levels, where the PPPs for the product groups covered by the aggregation level are weighted and averaged to obtain weighted PPPs for the aggregation level. The weights used to aggregate the PPPs in the third stage are the expenditures on the product groups.
18. PPPs are still price relatives when they refer to a product group or to an aggregate. It is just that in moving up the levels of aggregation the price relatives refer to increasingly complex assortments of goods and services. Thus, if the PPP for GDP between France and the United States is 0.97 euros to the dollar, it means that 0.97 euros has to be spent in France to obtain the same volume of final goods and services that one dollar purchases in the United States. This does not imply that the baskets of goods and services purchased in both countries will be identical. The composition of the baskets will vary between countries reflecting their economic, social and cultural differences, but both baskets will, in principle, provide equivalent satisfaction or utility.

Price, volume and value measures

19. PPPs are used to convert national final expenditures on product groups, aggregates and GDP of

different countries into real final expenditures. The final expenditures are called “real” because they are valued at a uniform price level and so reflect only differences in the volumes purchased in countries. PPPs and real final expenditures provide the price and volume measures required for international comparisons. Those for GDP are the most important, but those for product groups and aggregates are also useful in their own right.

20. Three sets of indices are typically derived using data on PPPs, real final expenditures, population and exchange rates.⁹
 - *Indices of real final expenditure*: These are volume measures that reflect the relative magnitudes of the product groups or aggregates being compared. At the level of GDP they are used to compare the economic size of countries.
 - *Indices of real final expenditure per head*: These are standardised measures of volume that reflect the relative levels of the product groups or aggregates being compared after adjusting for differences in the size of populations between countries. At the level of GDP they are often used to compare the economic welfare of populations.
 - *Comparative price levels*: These are the ratios of PPPs to exchange rates. They provide a measure of the differences in price levels between countries by indicating for a given product group or aggregate the number of units of common currency needed to buy the same volume of the product group or aggregate in each country. At the level of GDP they provide a measure of the differences in the general price levels of countries.
21. Final expenditures converted to a common currency with exchange rates are referred to as “nominal final expenditures”. They are called “nominal” because they remain valued at national price levels and so reflect differences in both price levels and volume levels between countries. Nominal final expenditures give rise to two sets of indices, namely: *indices of nominal final expenditure* and *indices of nominal final expenditure per head*.¹⁰ These indices are measures of value. They are not measures of volume and should not be used as such.

Users and use of PPPs

22. PPPs are of interest to an increasing number of international and national users. These include international organisations, government agencies, universities, research institutes, public enterprises, private firms, banks, journalists and individuals.
23. International organisations, government agencies, universities and research institutes use PPPs as inputs into economic research and policy analysis requiring comparisons between countries. PPPs are employed either as currency converters to

generate volume measures with which to compare levels of economic performance, economic welfare, consumption, investment, overall productivity and government expenditure on defence, health, etc., or as price measures with which to compare price levels, price structures, price convergence and competitiveness. Journalists use PPPs in both these ways in their commentaries on economic and social policy.

24. Public enterprises apply PPPs when comparing their prices and operating costs with those of similar public enterprises in other countries. Private firms operating in different countries apply PPPs for the purposes of comparative analysis involving prices, sales, market shares and production costs. Banks employ PPPs in economic analysis and in the monitoring of exchange rates. Individuals often refer to PPPs in salary negotiations when moving from one country to another (as do the personnel managers with whom they are negotiating).
25. International organisations also use the real final expenditures generated by PPPs for statistical purposes. The real final expenditures are used to sum GDP and its component expenditures over countries to provide totals for groups of countries, such as the European Union and the OECD. Country shares in these totals are used as weights when non-additive economic indicators, such as growth rates or consumer price indices, are combined to obtain averages for groups of countries.
26. With one exception, PPPs are not used by international organisations for calculating member countries’ contributions nor for assessing their eligibility for aid grants or their access to loans on favourable terms. The exception is the European Commission. Some 30 per cent of its total budget is spent on the Structural Funds, the overall aim of which is to gradually reduce economic disparities between and within EU Member States. The allocation of the bulk of the funds is made on the basis of PPP-converted regional GDP per capita.

Limitations of price and volume indices

27. GDP and GDP per head are often used to rank countries by economic size and economic welfare. But neither the indices of real final expenditure on GDP nor the indices of real final expenditure per head on GDP should be used to establish a strict ranking of countries. Rather, it is recommended that they be used to establish groups of countries with similar GDP per head. Likewise, comparative price level indices for GDP can be used to rank countries by their general level of prices, but here too it is recommended that countries with similar price levels be grouped together rather than ranked strictly.¹¹
28. PPPs are statistical constructs rather than precise measures. They are, like all statistics, point estimates lying within a range of estimates – the “error margin” – that includes the true value. The error

margins surrounding PPPs depend on the reliability of the expenditure weights and the price data as well as to the extent to which the particular goods and services selected for pricing by participating countries actually represent the price levels in each country. As with national accounts data in general, it is not possible to calculate precise error margins for PPPs or for the real final expenditure levels and comparative price levels derived from them.

29. Nonetheless, it is possible to provide some indications about the uses for which PPPs are recommended and the uses for which they are not recommended.¹² Recommended uses include volume comparisons of GDP and GDP per head as well as the comparison of price levels (providing countries are grouped rather than ranked). With some limitations, PPPs can be employed to trace changes in relative GDP per capita and in relative price levels over time.
30. Indices of real final expenditure on GDP provide a “snapshot” of the relative volume levels of GDP among participating countries for a given reference year. Indices of consecutive reference years appear to provide a “moving picture” of relative GDP volume levels over the years. This apparent time series of volume measures is actually a current price time series showing the combined effect of changes in both relative price levels and relative volume levels. The indices are at the same uniform price level within each reference year, but the uniform price level changes from one reference year to another. And so the rates of relative growth derived from the indices are not consistent with those obtained from the constant price estimates of GDP of countries.
31. To obtain a time series of volume indices at a constant uniform price level that replicates exactly the relative movements of GDP volume growth of each country, it is necessary to select one of the reference years as a base year and to extrapolate its relative GDP volume levels over the other years by applying the relative rates of GDP volume growth observed in the different countries. This assumes that price structures do not change over time. But relative prices do change over time and, if such changes are ignored over long periods, a biased picture of the relative economic performances of countries can result. The choice of base year can also influence the picture that emerges.
32. Comparative price levels provide a means of observing the movement of price levels over time, but they have to be used with caution. First, they are influenced by exchange rate fluctuations. Second, independently of exchange rates, they are volatile. This is generally so at lower levels of aggregation where sample sizes are small. Usually such volatility diminishes with aggregation.
33. More important is the volatility that arises when the basket of products to be priced changes from one

benchmark survey to another in order to accommodate market developments. For benchmark surveys such as clothing and footwear, the changes can be substantial. Volatility of this type also diminishes with aggregation. Even so, comparative price levels at higher level aggregates can still appear to jump when there is a change in benchmark prices. Comparative price level indices should be used to monitor price convergence only at higher levels of aggregation and over long periods of time.

DATA REQUIREMENTS

Background

34. To calculate PPPs from the expenditure side, it is necessary for each country participating in the comparison to provide a set of national annual purchasers' prices and a detailed breakdown of final expenditure on GDP. The prices should refer to a selection of products chosen from a common basket of precisely-defined goods and services. The final expenditures should be broken down by product groups – called “basic headings” - according to a common classification. Both prices and expenditures should refer to the year of the comparison – that is, the “reference year”. And both should cover the whole range of final goods and services included under GDP. Participating countries have also to provide annual average exchange rates and mid-year resident population for the reference year.
35. The prices reported by participating countries are used to calculate PPPs first at the product level, then at the basic heading level and finally at the various aggregation levels above the basic heading level. The PPPs at the aggregation levels are calculated using the final expenditures that participating countries have supplied on the constituent basic headings as weights. The PPPs are used to convert national final expenditures on GDP into real final expenditures on GDP. The exchange rates are used to derive comparative price levels. They are also used as proxy PPPs for exports and imports when calculating the PPPs for GDP. The population data are used to compute real final expenditures per head.

Consistency

36. PPPs are primarily price deflators. The prices supplied by participating countries should be *consistent* with the methods of valuation used to estimate final expenditure on GDP. The basis of a comparison is the identity: expenditure = price x volume. Volumes are obtained by dividing expenditures by prices. If the volumes are to be estimated correctly, the prices collected should be those used to derive the expenditures. Deflating with prices that are not consistent with those underlying the expenditure values will result in volumes being underestimated if the prices are too high or overestimated if the prices are too low.

37. In principle, the final expenditures on GDP that participating countries report for the reference year are estimated using national annual purchasers' prices of actual market transactions. Consistency requires participating countries to collect *national* prices that are also *annual* prices. The national annual prices have to be *purchasers'* prices – where a purchaser's price is defined as the amount paid by the purchaser in order to take delivery of a unit of a good or service at the time and place required by the purchaser. Finally, the national annual purchasers' prices have to be *market* or *transaction* prices – that is, the actual price for a transaction agreed on by the transactors.
38. Besides being consistent with the final expenditures on GDP, the prices participating countries report must be for items that are *representative* of their final expenditure on GDP and which are *comparable* between them.

Comparability

39. Products are considered to be comparable if they have identical or equivalent physical and economic characteristics. Equivalence between products is defined as meeting the same requirements with equal efficiency so that purchasers are indifferent between them and are not prepared to pay more for one than for the other. The pricing of comparable products ensures that differences in prices between countries for a product reflect “actual” price differences and are not influenced by differences in quality. Pricing goods and services of the same quality avoids quality differences being mistaken for “apparent” price differences and the consequent underestimation or overestimation of price levels.
40. Comparability is obtained in Eurostat-OECD comparisons by participating countries pricing product specifications that fully define the products in terms of the principal characteristics that influence their market prices. The approach is called “specification pricing” and requires the characteristics of both the product and the transaction to be specified. Product specifications can be brand and model specific – that is, a specification in which a particular brand and model, or a cluster of comparable brands, is stipulated. Or they can be generic – that is, a specification where only the relevant technical parameters and other price determining characteristics are given and no brand or cluster of brands is designated.
41. Ideally, all product specifications would be brand and model specific so that countries would price products of identical quality. In practice, this is not possible for reasons of availability and representativity. Generic specifications have also to be employed and inevitably some variability in quality between the products priced by countries will occur. Usually these differences are identified when the price data are edited. Neither Eurostat nor the OECD adjusts prices to compensate for differences in quality. Mismatches in quality are dealt with either by re-matching the prices reported or by discarding them.

Representativity

42. Representativity is a concept that relates to individual products within a basic heading. It has had to be introduced because there are no expenditure weights below the basic heading level with which to determine the relative importance of the various products priced within a basic heading. To ensure that there are enough prices to be compared between countries, participating countries are required to price both representative products and unrepresentative products within each basic heading. Representative products normally have a lower price level than unrepresentative products and, if this is not taken into account when calculating the PPPs for a basic heading, the PPPs will be biased. To avoid this, participating countries are required to identify which of the products they have priced within a basic heading are representative when reporting their prices.
43. Representativity is defined in terms of an individual country within a basic heading. A product is either representative or unrepresentative of the price level in country A for a given basic heading. It is representative, if in country A, its price level is close to the average for all products within the basic heading. Generally, the purchases of the product will account for a significant proportion of the total purchases of all products covered by the basic heading. In any event, to count as representative, the product will at least be sold in sufficient quantities for its price level to be typical for the basic heading.
44. In practice, basic headings can cover a heterogeneous mixture of goods or services with significant disparities in their price levels. In such circumstances, representativity is defined in two stages. First in terms of the product types included in the basic heading – representative product types are those that account for the bulk of the expenditure on the basic heading. And then in terms of products within the representative product types – representative products are those whose price level is close to the average for all products of its type.

Equi-representativity

45. A comparison based on products that are not equally representative of all participating countries will result in biased price relatives. Price levels for countries pricing a smaller number of representative products will overestimated, while price levels for countries pricing a larger number of representative products will be underestimated. It is crucial to ensure that the product list for a comparison is “equi-representative” of all participating countries for each basic heading identified in the common expenditure classification.

46. This does not mean that all countries should price the same number of representative products for each basic heading because the method used by Eurostat and the OECD to calculate PPPs for a basic heading ensures that any imbalance between countries in the number of representative products priced does not produce biased PPPs. What it does mean is that each country should be able to price that number of representative products which is commensurate with the heterogeneity of the products and price levels covered by the basic heading and its expenditure on the basic heading. The objective is to obtain PPPs that are both unbiased and reliable.

Comparability and representativity

47. Comparability and representativity are not necessarily complementary requirements. Consumption patterns can vary from country to country for a variety of reasons. Products representative of one country are not necessarily representative of other countries, while products that are strictly comparable across countries are unlikely to be equally representative of them all. Even so, failure to observe either of these two requirements will result in either an overestimation or underestimation of price levels and a corresponding underestimation or overestimation of volumes. Eurostat and the OECD employ methods for selecting products and for calculating PPPs that are designed to respect both requirements. When compromises have to be made, comparability is favoured over representativity. A lack of representativity can lead to biased results that may compromise the comparison, but a loss of comparability negates the comparison.

Primacy of volume comparisons

48. Eurostat and OECD comparisons give priority to the volume comparison. The primary objective is to obtain comparable volume measures by deflating final expenditures with prices that are consistent with their valuation. Whether the prices employed as deflators also give comparable price measures is a secondary concern. Consistency requires participating countries to provide purchasers' prices because these are the prices that should be used to value final expenditures. Generally, this is not an issue. But there are occasions when a country is unable to use purchasers' prices to value a particular expenditure and uses other prices, such as list prices, instead. When this happens, the country is required to report prices that correspond to those actually used to value the expenditure. The prices, being consistent with the expenditure estimate, will give comparable volume measures. But they will not give comparable price measures, unless other countries have also reported the same type of price.¹³

Classification of final expenditures

49. The classification of final expenditure on GDP around which Eurostat and OECD comparisons are organised comprises seven main aggregates:
- Individual consumption expenditure by households,
 - Individual consumption expenditure by NPISHs,
 - Individual consumption expenditure by government,
 - Collective consumption expenditure by government,
 - Gross fixed capital formation,
 - Change in inventories and acquisitions less disposals of valuables,
 - Balance of exports and imports.
50. The seven main aggregates are broken down into 31 expenditure categories, 71 expenditure groups, 152 expenditure classes and 226 basic headings.¹⁴ The most important of these aggregation levels is the basic heading level.
51. Basic headings are the building blocks of Eurostat-OECD comparisons. It is at the level of the basic heading that expenditures are defined, products selected, prices collected, prices edited and PPPs first calculated and averaged. In theory, a basic heading comprises a group of similar well-defined goods or services. In practice, coverage is determined by the lowest level of final expenditure for which explicit expenditure weights can be estimated. This means that an actual basic heading can include a broader range of products than is theoretically desirable. It also means that quasi expenditure weights have to be used to indicate the relative importance – or representativity – of the products covered.
52. The Eurostat-OECD classification is an expenditure classification. Individual consumption expenditure is clearly structured by “who pays” – households, NPISHs or general government. Participating countries are required to provide a breakdown of their final expenditure on GDP in line with this structure. But the results of Eurostat-OECD comparisons are presented by “who consumes” – households or general government. A principal aim of the comparisons is to compare actual individual consumption (by households)¹⁵ at various levels of aggregation. The Eurostat-OECD classification is designed to allow the individual consumption expenditures of NPISHs and general government to be reclassified as actual individual consumption by combining them with the individual consumption expenditure of households at the lowest level of aggregation that

expenditure data from participating countries permit.

53. Government expenditure on market services is valued differently from government expenditure on non-market services and their PPPs have to be calculated differently. PPPs for government expenditure on market services are calculated with the purchasers' prices of outputs. PPPs for government expenditure on non-market services are calculated with the purchasers' prices of inputs. To do this, government expenditure on market services has to be clearly separated from government expenditure on non-market services. In addition, government expenditure on non-market services has to be broken down by cost components¹⁶. The Eurostat-OECD classification meets these two requirements.

Actual data requirements

54. The range of final goods and services included in GDP covers consumer goods and services, general government services, capital goods and services, inventories, valuables, exports and imports. Countries participating in Eurostat-OECD comparisons are required to price only consumer products, capital goods and general government services.

- *Consumer goods and services:* Participating countries are required to report purchasers' prices for all consumer products (with the possible exception of rents). The prices are to be collected from a variety of outlet types located in the capital city. This is the practice followed by the majority of countries. But some countries do not limit their price collections to capital cities and collect prices in other cities and towns as well. When averaged, these prices are considered to be national prices.

To reduce the response burden that national statistical offices would have to shoulder if they were required to price the full set of consumer products in a single year, prices are collected over three years. The product list is divided into six parts. Two parts are surveyed each year: one part in the first half of the year, the other in the second half of the year. For the reference year t , one third of the prices that countries report for consumer products will refer to the year $t-2$, one third to the year $t-1$ and one third to the reference year t .

In most cases, these prices are not national because they refer to the capital city. In all cases, they are not annual because they refer to a point in time. Those countries that collect capital city prices are required to provide spatial adjustment factors with which to convert their capital city prices to national prices. All countries are required to provide temporal adjustment factors with which to centre the prices collected in the years

$t-2$, $t-1$ and t on the reference year t . Spatial adjustment factors and temporal adjustment factors are to be supplied for each basic heading. Temporal adjustment factors are also to be supplied at the product level when the products are seasonal.

For rents, countries have to provide national annual purchasers' prices. But, if their rent market is small or unrepresentative, they provide instead data on the quality and quantity of their housing stock so that volume measures can be estimated directly.

- *Capital goods and services:* Participating countries are required to report national purchasers' prices for capital goods once every two years. There are two price surveys: one for equipment goods, the other for construction. April prices are collected because it is too costly to monitor prices over the whole year. Prices for equipment goods are to be obtained from producers, importers, distributors or actual purchasers. The prices collected can be for actual market transactions or for hypothetical market transactions. Prices for construction are to be compiled with a set of standard construction projects covering different types of buildings and civil engineering works. Prices for the projects are to be at the level of prevailing tender prices.
- *General government services:* Participating countries are required to report national annual purchasers' prices for general government services every year. The services produced by general government are non-market services and have no economically-significant market price. By convention, non-market services are valued in the national accounts at cost. And the prices that countries are to collect for general government services are the prices of the inputs used in their production. But not all inputs are priced. Only the most important input, labour, is priced. Participating countries are required to provide the annual compensation of employees that general government pays to a cross-section of occupations in general public services, public health services and public education services.

55. Participating countries also have to provide expenditure weights, annual average exchange rates and mid-year resident population for the reference year. Countries supply details of their final expenditure on GDP for the reference year, t , twice. Provisional estimates are returned in September of year $t+1$. These are used to calculate the preliminary PPPs for t that are released in December of $t+1$. Final, or near final, estimates are returned in September of $t+2$. These are used to calculate the final PPPs for t that are released in December of $t+2$. Countries report expenditures weights directly to Eurostat or the OECD. Data on exchange rates and population are extracted by Eurostat or the OECD from in-house data bases.

ORGANISATION OF COMPARISONS

Coverage and frequency

56. When the Programme was established during the 1980s, Eurostat-OECD comparisons covered only OECD Member Countries. Benchmark comparisons were made every five years and all data were collected over an 18 month period centred on the reference year. Each comparison was a combination of two comparisons. One, organised by Eurostat, covered OECD Member Countries that were either EU Member States or EU associated countries¹⁷. The other, organised by the OECD, covered OECD Member Countries that were neither EU Member States nor EU associated countries. Combining the two comparisons was the responsibility of the OECD.
57. The division of tasks remains essentially the same. Eurostat continues to organise comparisons for EU Member States and EU associated countries¹⁸, but now there are 31 countries, instead of the original 14, and only 23 of them are OECD Member Countries.¹⁹ The OECD continues to organise comparisons for non-European OECD Member Countries, but the comparisons also include a number of European countries that are neither EU Member States nor OECD Member Countries. OECD comparisons currently cover 14 countries, having covered ten countries initially.²⁰ The OECD also continues to be responsible for combining the two groups of countries in one comparison.
58. Since 1990, Eurostat and the OECD have used the “rolling benchmark approach” for their comparisons. With this approach, data collection is carried out in continuous cycles. Each cycle takes three years and comprises fifteen surveys: ten to collect prices and five to collect a miscellany of other data.²¹ The advantages of the approach are that it reduces response burden on participating countries, it enables them to include the price surveys in their regular programme of data collection and it fosters continuity of expertise in their national statistical agencies.²² Also, by “rolling” data collected in one year over to the next year, it is possible to make “benchmark” comparisons annually.²³
59. Eurostat makes comparisons every year, while the OECD, to reduce the financial burden on participating countries, makes them every three years.²⁴ Joint comparisons are therefore every three years. The next joint comparison will be 2005 and it will cover 45 countries.²⁵ The cycle of price surveys for the 2005 comparison started in 2003 and will finish in 2005. But data collection will not be complete until the third quarter of 2007 when countries report their final detailed estimates of final expenditure on GDP for 2005. Preliminary results of the comparison will be released at the end of 2006. Final results will be released at the end of 2007.

Price surveys and country groups

60. There are ten price surveys to a cycle: the six surveys that cover consumer goods and services and take place once every three years; the two surveys that cover capital goods and take place once every two years; and the two surveys, one covering actual and imputed rents, the other covering compensation of employees paid to producers of government services, that take place every year.
61. Before each price survey for consumer products and each price survey for capital goods, there are meetings at which the participating countries, with Eurostat and the OECD, select the products to be priced during the survey. An essential input into the selection process is the pre-survey that participating countries are required to conduct before the meeting to familiarise themselves with the situation in their domestic markets regarding the products about to be surveyed. The meetings have a direct bearing on the quality of the price collections carried out by countries.
62. Experience shows that the effectiveness of these meetings depends on the number of products to be considered, the number of countries at the meeting and the thoroughness of the pre-survey carried out by countries prior to the meeting. The three variables interact. As the number of countries increases, the number of products increases. As the number of products increases, the quality of the pre-survey decreases. Experience shows too that this interaction can be a serious problem for meetings held to select consumer products where there are a large number of products to be considered. (It is much less of a problem for meetings held to select capital goods where the number of products to be discussed is much smaller.)
63. When the number of countries Eurostat co-ordinated rose from 21 to 31 in 1999, it was clear that meetings to select consumer products involving 31 countries discussing between four to five hundred products per survey would be unmanageable and detrimental to the quality of the comparison. For the purposes of organising the surveys of consumer prices, Eurostat divided the 31 countries into three groups with one of the countries in the group acting as group leader.²⁶ (In the OECD comparison, it is the OECD that acts as group leader for its dispersed, and mainly non-European, group of countries.)
64. Group leaders are responsible only for the six price surveys covering consumer goods and services. All other price surveys are the responsibility of Eurostat or the OECD.²⁷

Linking country groups

65. The country groups are organised by the group leaders to conduct their own surveys of consumer prices. Although prices are collected according to a

common set of guidelines and following a common timetable, the products selected for pricing are not common to all groups. Each group is virtually a separate comparison. Their data sets need to be combined before a comparison covering all participating countries can be made. The groups are linked using “overlap products” – that is, products that are priced by two or more country groups.

66. To this end, Eurostat co-ordinates the surveys of consumer prices among its three country groups and the OECD co-ordinates the surveys between the OECD group and the Eurostat groups. This co-ordination is vital. Without it, price and volume comparisons of household final consumption expenditure could not be made between the three Eurostat groups or between European countries and non-European countries. Similar co-ordination is needed for the price surveys organised centrally by Eurostat or the OECD. It is the OECD’s responsibility to ensure that the product lists for OECD countries for these surveys overlap sufficiently with those for Eurostat countries.

COLLECTION AND EDITING OF DATA

CONSUMER GOODS AND SERVICES

67. Individual consumption expenditure by households covers the actual and imputed final consumption expenditure incurred by households on the goods and services they require to satisfy their individual needs. It accounts on average for over 60 per cent of GDP in participating countries. This makes it the most important of the seven main aggregates comprising final expenditure on GDP and, as such, it is central to Eurostat-OECD comparisons.
68. One feature of Eurostat-OECD comparisons mentioned already is that prices for consumer goods and services are surveyed over three years. The basket of products comprising household final consumption expenditure is divided into six parts with prices for two parts being collected each year. This requires the organisation of six separate price surveys.²⁸ Each survey takes from 18 to 20 months to complete.²⁹ Hence, within any calendar year, work is underway on five surveys: the two surveys of the previous year are being finalised; the two surveys of the current year are being carried out; and the first survey of the following year is being prepared.
69. Another feature of Eurostat-OECD comparisons, also mentioned already, is that there are too many participating countries for the six price surveys for consumer goods and services to be managed centrally by either Eurostat or the OECD. Organisation is decentralised. Participating countries are divided into groups with one of the countries in the group acting as group leader.

Product selection

70. Households purchase a large and diverse assortment of individual goods and services, but only a selection of these are priced for the purpose of calculating PPPs. The selection is made at the level of the basic heading. The object is to select a sample of products that reflects the principal expenditures on the basic heading - that is, to select from the products covered by the basic heading those that households are commonly buying.
71. Choosing a sample of products for a basic heading that can be priced over a number of countries is much more difficult than it is to select the products to be priced at the elementary level of a consumer price index (CPI) within a single country. Selection for a CPI can be left to the price collector whose choice may differ from outlet to outlet providing it does not change over time. This initiative cannot be permitted to price collectors collecting prices for spatial comparisons such as Eurostat-OECD comparisons. The products priced must be comparable across all participating countries pricing them and at all outlets at which the products are priced. If they are not, quality differences will be disguised as price differences leading to biased price relatives.
72. The products selected also have to be representative of each country’s expenditure on the basic heading. But consumption patterns differ between countries. Products that are comparable across countries may be representative for some of them but not for others. For a comparison to be based on products that are both comparable and representative, participating countries have to price their own representative products and, as available, the representative products of others. Representative products normally have lower price levels than unrepresentative products and this will lead to biased price relatives if the representativity of the products selected for the basic heading is unevenly distributed among participating countries. To avoid this, the selection of representative products for a basic heading should be equi-representative.
73. Product selection is made for each price survey separately. The aim is to compile a product list for the survey that comprises an equi-representative selection of comparable products for each basic heading that is to be surveyed. To this end, countries participating in Eurostat-OECD comparisons are required to carry out a pre-survey beforehand. During the pre-survey, countries ascertain the availability and representativity of products proposed for the product list. They also verify whether the products have been specified sufficiently to ensure that countries pricing them will be pricing comparable products.

Group product lists

74. The selection of products for a price survey is organised by the group leaders in consultation with the other members of their group. The process begins with the group leaders attending the “planning meeting” convened by Eurostat and the OECD. The purpose of the meeting is to agree on a common approach to the pre-survey and the survey. The exchange and pooling of information between group leaders that begins at the planning meeting continues until the group product lists are finalised at the “overlap meeting”.
75. Consultation with group members starts with the group leader sending them the “pre-survey questionnaire”. The questionnaire is based on the product list used the last time the country group conducted the price survey and on market research carried out in the meantime by the group leader. The result is an amended and updated version of the previous product list. Some products will have been deleted, some will have been proposed for deletion, others will have had their specifications redefined, and new products, complete with their specifications, will have been added. The pre-survey questionnaire is an annotated first draft of the group product list for forthcoming price survey.³⁰
76. On receipt of the questionnaire, the group members carry out the “pre-survey”. This involves visiting outlets to ascertain the availability, the comparability and the representativity of the products specified in the questionnaire. Countries use the findings of the pre-survey to reply to the questionnaire. They have a number of options: to accept or reject (possibly with modifications) the deletions proposed; to accept, reject or modify the redefined specifications and the specifications of the proposed new products; and to propose precisely-defined new products themselves. Countries are expected to support their modifications and proposals with technical documentation and pictures.
77. On the basis of the replies received from group members, the group leader revises the product list contained in the pre-survey questionnaire to produce the “draft group product list”. On completion, the draft product list is circulated to group members for them to review prior to the “group meeting”. The group meeting is convened by the group leader. It is attended by the group members, the other group leaders, Eurostat and the OECD. Its principal object is to complete the process began with the pre-survey - namely, the establishment of the final group product list for the ensuing price survey.
78. The pre-survey and the group meeting provide the means whereby group members can ensure that the final group product list reflects the availability of comparable products in their domestic markets and is equally representative for all of them. The group product list agreed at the group meeting is not the final list however.

Overlap products

79. Group product lists can be expected to differ from one country group to the other. Some of the products specified will be common to more than one group, but comparisons across the country groups cannot be left to chance. Before the group product lists are finalised and countries begin price collection, Eurostat and the OECD convene a meeting with the group leaders. This is the “overlap meeting” at which the group product lists are merged and examined to make sure that, for each basic heading covered by the survey, there are enough overlap products to allow each country group to be compared with each of the other country groups.
80. When there are not enough overlap products for a basic heading, new ones have to be added. Overlap products can often be “created” by combining the specifications of two products with similar characteristics by widening the range of one or more parameters. The process of creating overlaps begins during the group meetings which are held one after another and are attended by all group leaders. Because group leaders know what products are specified in their own draft group product list, they are able to propose modified or new product specifications to another group as appropriate. At the same time, they learn what products are available in the countries of the other groups and, when necessary, can modify their own group product list accordingly.
81. When participating countries receive the final product list for their group prior to price collection, they will find that it has been altered to provide the necessary overlaps between the groups. New products will have been introduced, some products on the original list will have had their specifications modified, while other products agreed at the group meeting will have been omitted in order to accommodate the overlap products added and to avoid imbalances among the different types of products specified. Each overlap product has a code number that identifies with which of the other groups it provides an overlap.³¹

Product specifications

82. The product specifications used for Eurostat and OECD comparisons are either “brand and model specific” or “generic”. A brand and model specification designates the particular brand and model to be priced. A generic specification lists only the relevant technical parameters of the product to be priced. It does not identify any brand. A brand and model specification has a tight definition. Countries pricing a specification stipulating a specific brand and model are, in principle, pricing identical products. A generic specification has a looser definition. Countries pricing a generic specification are, in principle, pricing comparable products.³²

83. Particular importance is given to brand for two reasons. First, brands provide tight specifications that make possible the identification and pricing of goods that are exactly the same in the countries pricing them. Second, the brand itself may have a value. Consumers often perceive products with certain brand names as preferable to similar products sold under other brand names and are prepared to pay more for them. In such cases, the brand name is a price determining characteristic and should be included in the product specification.
84. Product specifications that are brand and model specific have two possible drawbacks. The brand and model stipulated may not be available or, if available, the brand and model may not be representative. Forming clusters of comparable brands and models partly addresses these issues, particularly that of availability.
85. Generic specifications, especially those with too loose or too open-ended definitions, are susceptible to variations in quality. As neither Eurostat nor the OECD adjust prices to accommodate quality differences, it is important that the generic specifications are sufficiently detailed – or tight - to make sure that participating countries price products of comparable quality.
86. Product specifications should be supported by pictures of the products they specify. Price collectors do not always envisage the same product from a written description. The pictures will show them what it is they have to price. Pictures are not necessary for all product specifications. They are less essential for brand and model specifications and more useful for generic specifications where they can help to reduce quality differences arising from misinterpretation. Countries participating in Eurostat-OECD comparisons are provided with pictures for a selection of product specifications.
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91. “Conditions of sale” – such as the availability of advice from shop assistants, the provision of after-sales service and the ability to return defective goods - constitute a service element. If the service element changes from one outlet type to another, the product being purchased is not the same at both outlets even if it is physically identical. The difference in the service element is a quality difference and contributes to the price difference. If, when averaging the prices collected for the product, no account is taken of the different service elements of the outlets at which they were observed, the average price is likely to be too high or too low.
92. To avoid this, countries participating in Eurostat-OECD comparisons are required to select outlets so that the selection mirrors consumer purchasing patterns at various outlet types for the products being priced. If consumers buy 50 per cent of their clothing from departmental stores, 30 per cent from supermarkets and 20 per cent from specialist shops, then a sample of ten outlets would comprise five departmental stores, three supermarkets and two specialist shops. As the products being surveyed differ from price survey to price survey, the selection of outlets will also differ between surveys. By selecting outlets in this way, implicit weights are introduced to accommodate the varying service elements of outlets and their impact on price. Unbiased average prices are the result.
93. Location is another consideration that participating countries need to take into account when selecting outlets. The number of outlets selected in each location should be proportional to the area distribution of the volume of sales of the products in question. The location of selected outlets can also be expected to differ from survey to survey.
94. A common starting point for the selection of outlets is the sample of outlets used for the CPI, but it is only a starting point. The product lists for Eurostat and OECD price surveys are larger than CPI lists, specifying products not included in the CPI. The CPI sample may not be ideal to collect reliable prices for these products because the selection of outlets by type is not in proportion to the volume of their sales of the products. In this case, it is necessary to augment the CPI sample with additional outlets. At the same time, because the resources available for the price surveys are limited, the CPI sample may be too large and has to be reduced.

Price collection

87. Price collection is the responsibility of the participating countries. Before they can begin price collection, they have to complete a number of tasks. These involve: selecting and contacting the outlets to be visited by price collectors; preparing the pricing materials and supplementary documentation for price collectors (including, if necessary, the translation of survey guidelines and product specifications into the national language); identifying which specifications on the final group product list are to be priced and, in the case of generic specifications, which brands are to be priced; and holding a meeting with price collectors to clarify issues such as how many items per basic heading, how many price observations per item, etc.

Selection of outlets

88. The selection of outlets is of particular importance because of the effect it will have on the average prices of the products to be surveyed. Different

Products per basic heading

93. The number of products to be priced per basic heading will differ from basic heading to basic heading. It will depend on the heterogeneity of

products covered by the basic heading and on the importance of the basic heading. The minimum that countries participating in Eurostat-OECD comparisons have to price is one representative product per basic heading. This provides for the calculation of unbiased PPPs. But, as the object is to calculate PPPs that are also reliable, participating countries are expected to price more than one representative product per basic heading. In principle, they should price that number of representative products that are commensurate with the price variation within the basic heading and their expenditure on the basic heading.

94. Participating countries are also required to price the representative products of other participating countries, otherwise it may not be possible to make a comparison. Which unrepresentative products a country should price depends on availability. Price collectors should not be asked to waste resources tracking down products that are not easily found. Also, it is preferable that the prices collected for unrepresentative products provide relatively reliable average prices. In this respect, countries are advised to prune the product list of products they cannot price or cannot price without difficulty. Price collectors would then attempt to price all products left on the list.

Price observations per product

95. The number of prices to be collected for a product will differ from one basic heading to another. It will also differ from product to product within a basic heading. In general, the number of prices collected for a product determines the reliability of its average price. The larger the number of price observations, the more accurate the average price. The actual number depends on the extent to which the prices of the product vary and the degree of accuracy wanted. It also depends on the product specification, the tighter the specification the smaller the price variation.
96. On the assumptions that price variation is usually between 5 and 15 per cent and that the desired level of precision is 10 per cent, participating countries are advised that between 5 and 10 observations are required for brand specific specifications and between 15 to 20 observations are required for generic specifications.³⁴ These numbers refer to a single pricing location such as the capital city. They are indicative only. Each participating country has to decide on the number of price observations to be collected per product according to the type of specification being priced and the conditions prevailing in its market.

Prices to be collected

97. The object of the price surveys is to collect the prices that purchasers actually pay to sellers to acquire the goods and services specified on the final group product list at the time of the survey. As it is not

practical to collect prices from purchasers, the prices are collected from sellers. Most sellers display the prices at which they are prepared to sell their products. But the prices at which products are offered for sale are not necessarily the prices at which they are actually sold. Price collectors observe offer prices but, before recording them as actual purchasers' prices, they have to establish whether the offer price includes all the relevant price components – such as delivery costs, VAT, discounts, service charges and gratuities – and, if not, adjust it accordingly.

Medical goods and services

98. Sales of most consumer goods and services entail a transaction between a seller and a single buyer. This is not always the situation with medical goods and services which can involve a transaction between a seller and two independent buyers. Such a situation arises when the medical products are paid for in part by a household and in part by the government. The purchasers' price that participating countries are required to report is the total price or the sum of the price paid by the household and the price paid by government. If total prices are not used to calculate PPPs when they should be, the volume of medical products purchased will be twice what it should be.³⁵ Usually there are regulations that determine what the household should pay and what the government will pay and this information can be obtained from the government office responsible.

Seasonal products

99. Seasonal products are defined as those products for which both prices and the quantities sold vary considerably throughout the year. Typically, the patterns of variation are repeated from one year to the next. By this definition, certain fruits, vegetables, fish and flowers are obviously seasonal products. Various types of clothing are also seasonal products. So too are those goods that are sold in substantial amounts at prices well below "normal" prices during seasonal sales. For the purposes of Eurostat and OECD comparisons, only seasonal food products warrant special treatment.
100. Annual prices for seasonal products, other than seasonal food products, are obtained as they are for non-seasonal products. Their survey prices are adjusted to annual averages using monthly temporal adjustment factors that participating countries extract from their CPI data bases. The temporal adjustment factors are unweighted – that is, they are not weighted by the quantity sold in the corresponding month.
101. Annual prices for seasonal food products are derived by adjusting survey prices with weighted temporal adjustment factors. This requires participating countries to provide monthly or quarterly weights as well as an appropriate CPI sub-index for each sea-

sonal food product they priced. The weights should be quantity weights reflecting the quantities of the item purchased throughout the survey year. If quantity weights are not available, expenditure weights based on expenditure on the item during the survey year should be provided instead.³⁶

Assigning representativity indicators

102. So that representative products can be distinguished from unrepresentative products when PPPs are calculated for a basic heading, countries participating in Eurostat-OECD comparisons are required to indicate which of the products they have priced are representative when reporting their prices. Representative products are designated by a “representativity indicator”. The indicator currently employed is an asterisk (*) and representative products are called “asterisk products”.
103. Participating countries have problems identifying representative products. The problem is not with products that they themselves have proposed for the product lists because they are supposed to be representative. The problem lies with the products that other countries have proposed. The openness of domestic markets, particularly in the European Union, has progressively increased the availability of many of these products. And, without reliable expenditure data by product within basic headings, it is difficult to determine whether they are being sold in sufficiently large numbers to be representative.
104. The decision as to whether or not these products are representative has to be based on other data sources. Such sources include motor vehicle registration statistics, internet sites with country-specific information on a range of “best selling” products, and sales personnel at the outlets visited during the pre-survey and the price survey. The number of prices collected during the price survey can also be used as a measure of representativity. Finally, in the absence of any relevant data or informed opinion, the decision has to be subjective.

Housing services and the rent survey

105. Although housing services are part of individual consumption expenditure by households, they are not included in the survey cycle. They are covered instead by a special rent survey for which participating countries are not expected to collect data specifically but to extract them from existent statistical sources. The survey is held every benchmark year. It is organised by Eurostat or the OECD and not by the group leaders. Data are collected on the rents paid by tenants, and on the rents imputed to owner-occupiers, for a sample of precisely-defined dwellings.³⁷ Quantitative and qualitative data on the housing stock are also collected.³⁸
106. The data on rents are used to calculate PPPs with which the final expenditures on actual and imputed rents are deflated to obtain volume measures on

housing services indirectly. The quantitative and qualitative data on housing stock are used to compute volume measures on housing services directly.³⁹ These direct volume measures serve two purposes. They provide a check on the volume measures derived indirectly. And, more importantly, they can be used in place of the indirect measures for those participating countries that do not have a sufficiently developed and representative rent market and so are not able to supply the data required on actual and imputed rents.

The reporting and validation of prices

107. After finishing price collection, participating countries are required to enter their price observations on the electronic reporting form that Eurostat provides for each survey in the survey cycle. Countries send the completed reporting form to their group leader for validation.
108. Validation is an iterative process. Reporting forms go backwards and forwards with questions and answers between group leaders and group members. There are two phases. The first phase is the intra-country editing. During this phase, the price observations of each group member are checked separately without reference to the price data of other group members. The second phase is the inter-country editing within country groups. During this phase, the average survey prices of each group member are checked against the average survey prices of other group members. As soon as both phases have been concluded to the satisfaction of all members of the group, the group leader returns the validated reporting forms to Eurostat.
109. On receipt of the reporting forms, Eurostat starts the third and final phase of validation: the inter-country editing across country groups. Again it is an iterative process, but this time between countries and Eurostat. As with the second phase, it consists of checking the average survey prices of each country against the average survey prices of other countries, but this time all countries are involved and not just other group members. Validation finishes when both Eurostat and the countries agree on the average survey prices and the underlying price observations. Once approved, the average survey prices are considered final.
110. The reporting, validation and approval of a survey's prices takes place in the ten months that follow price collection.⁴⁰
111. The three phases of validation have the same object: to identify and eliminate non-sampling errors from the survey price data. Editing involves identifying prices that are outliers – that is, prices that are determined to be either too high or too low according to given criteria. Prices that are outliers are not necessarily wrong. But the fact that they are outliers suggests that they could be wrong and that they need to be verified. Intra-country editing looks for

outliers among the individual prices that a country has collected for each product it has chosen to survey. Inter-country editing looks for outliers among the average survey prices that countries have reported for the same products within a basic heading.

112. Countries and group leaders are assisted in the identification of outliers by two software packages. The first package involves entering individual price observations on price input sheets and generating price output sheets. Outliers are flagged on both the price input sheets and the price output sheets following different criteria.⁴¹ Besides being designed specifically for the intra-country editing of individual price observations, the price input and output sheets are also the means by which price data are transmitted between countries, group leaders and Eurostat during the three phases of validation. The second package involves the Quaranta editing procedure. This generates tables flagging outliers among average survey prices by applying various criteria. Quaranta tables are used in both phases of inter-country editing of average survey prices.⁴²
113. Price input and output sheets are employed solely to edit the prices of consumer goods and services collected by the six surveys constituting the survey cycle. These six price surveys are the only surveys for which countries report individual price observations. The Quaranta editing procedure has a wider application than just editing the prices collected for consumer products. It is also used to edit the average survey prices for rents, compensation of employees, equipment goods and construction.

Conversion to national annual prices

114. The majority of participating countries conduct the six price surveys for consumer goods and services only in their capital city and so the average survey prices they report for consumer products are capital city prices. Two months after data collection for a survey is completed countries reporting capital city prices are required to provide Eurostat with spatial adjustment factors with which their capital city prices can be converted to national prices. A spatial adjustment factor is to be supplied for each basic heading surveyed. Eurostat adjusts the capital city prices to national prices, basic heading by basic heading, once the average prices for the survey have been validated. Participating countries obtain the spatial adjustment factors from the surveys of regional price differences that they are required to hold every six years.
115. The national survey prices, irrespective of whether they are capital city prices adjusted by Eurostat or national prices supplied directly by countries, refer to the point in time when the survey was held. They need to be converted to annual prices. At the close of each year, participating countries are required to provide Eurostat or the OECD monthly temporal adjustment factors for each basic heading under individual consumption expenditure by households.

Those that refer to the basic headings that were surveyed during the year are used to adjust the national survey prices for these basic headings to national annual prices. Participating countries extract the temporal adjustment factors from their CPI data base.

GOVERNMENT SERVICES

116. Government services are the services provided to households by general government. They comprise individual services and collective services. Individual services are the services that general government provides to specific identifiable households: services, such as health and education, which benefit individual households. Collective services are those that general government provides simultaneously to all members of the community: services, such as defence and public order and safety, which benefit households collectively.

Market and non-market services

117. Collective services are produced by government. Individual services can be both produced by government and purchased by government from market producers. The individual services that government purchases from market producers are called "market services" because they are sold at prices that are economically significant – that is, at prices that determine the amounts producers supply and purchasers buy. Being economically significant, the prices are used to value the outputs of market producers by multiplying the quantities produced by the prices at which they are sold. Thus they are also the prices with which to calculate PPPs for market services.
118. The collective and individual services that government produces itself are referred to as "non-market services" because they are provided free or sold at prices that are not economically significant. Without economically-significant prices, it is not possible to value the outputs of non-market producers in the same way as the outputs of market producers are valued. National accountants value the outputs of non-market producers by summing the costs to produce them. To maintain consistency with the prices underlying these expenditures, it is necessary to use the purchasers' prices of inputs to calculate the PPPs for non-market services.

Treatment of market services

119. Collecting the economically-significant prices paid for market services is not as straight forward as it is for most consumer services. Purchases of individual services from market producers by government are financed differently from country to country. The government may buy the services, in full or in part, direct from the producers or it may reimburse households, either in full or in part, after the households themselves have made the purchase. When

both government and households pay the market producer, there are two purchasers and two prices.

120. The prices to be collected are “total prices”. In countries where either government or households pay the whole purchasers’ price direct to the market producer, the total price is the price that either government or households pay (irrespective of any subsequent reimbursement in the case of households). In countries where households pay only a portion of the purchasers’ price to the market producer and the remainder is paid to the market producer by government, the total price is the composite price – that is, the sum of the non-reimbursable part paid by households and the part paid by government.
121. Although it is possible to collect total prices for individual services purchased by government from market producers in principle, it is difficult to collect internationally comparable total prices for health and education services in practice. For Eurostat-OECD comparisons, total prices are only collected for medical goods and services delivered to outpatients. Output prices are not collected for hospital services or for education services. Reference PPPs are used instead.⁴³

Treatment of non-market services

122. Employing purchasers’ prices of inputs to calculate PPPs for non-market services is called the “input-price approach”. It requires a breakdown of the expenditure on non-market services by cost components. The cost components identified in the Eurostat-OECD expenditure classification are: compensation of employees, intermediate consumption, gross operating surplus (which is essentially consumption of fixed capital as net operating surplus is likely to be negligible), net taxes on production, and receipts from sales which is negative.
123. Eurostat and the OECD only apply the input-price approach for the three most important services produced by government: health, education and collective services. Reference PPPs are used for the remaining services: housing, recreation and culture, and social protection.

Survey of compensation of employees

124. Not all inputs are priced for Eurostat-OECD comparisons. Only the labour input is priced. Participating countries are required to provide the annual compensation of employees that general government pays to employees in selected occupations in general public services, public health services and public education services during the reference year.⁴⁴ The compensation of employees collected for an occupation is a purchaser’s price for a hypothetical market transaction – that is, what general government would pay an employee of a specified seniority working in the occupation. In principle, the price is to be computed using general government

salary scales.⁴⁵ In practice, it is often extracted from payroll statistics.

125. Countries are also required to report for each selected occupation: the standard number of hours worked per week, the number of working days paid leave, the number of public holidays falling on working days during the reference year, and the percentage share of the occupation within the basic heading for which it has been selected. Eurostat and the OECD use the standard number of hours worked per week and the number of working days taken as holidays to normalise the compensation of employees across countries. The norm applied is 1710 hours worked per year.⁴⁶ The compensation of employees of selected occupations working less or more than the norm are increased or decreased proportionally.
126. The percentage shares of the selected occupations within their basic headings should refer to the wider groups of employees that the selected occupations represent and not just to the employees in the selected occupations. The selected occupations are a sample. Each selected occupation represents a stratum of employees that have comparable occupations and similar levels of compensation of employees. The percentage shares are to relate to these occupational strata.⁴⁷ Eurostat uses the percentage shares together with the standardised compensation of employees to obtain expenditure weights for each selected occupation that can be used when calculating PPPs for the basic heading to which it is assigned.

Validation of prices

127. Two edits should be carried out by participating countries before reporting the compensation of employees and related data to Eurostat or the OECD. The first edit is to look at the internal coherency of the data set. For example, it is normally the case that: doctors earn more than nurses; head teachers earn more than other teachers; officers in the army earn more than privates; etc. Income differentials between occupations that are contrary to expectations should be verified and the errors identified should be corrected.
128. The second edit is to check the consistency between the compensation of employees that are to be reported for the latest reference year and the compensation of employees that were reported for the previous reference year. Differences can be expected between the two data sets because either the salary scales have changed between the two periods or, but less likely, the modal categories have changed. Discrepancies that cannot be explained in this way should be verified and the errors discovered should be corrected.
129. Eurostat and the OECD will repeat these two edits and ask countries to explain or correct the discrepancies observed. They will also apply the Quaranta

editing procedure to compare the price levels of the compensation of employees reported for the occupations across countries. Outliers identified through this procedure will be returned to the countries reporting them for verification. Countries are required to either correct the compensation of employees originally reported or confirm that they are correct.

Productivity adjustments

130. The input-price approach as applied by Eurostat and the OECD does not take account of the differences in productivity between the producers of non-market services in different countries. Non-market producers are assumed to be equally efficient so that the same level of input yields the same volume of output regardless of the country in which the non-market producer is operating. Given the extent to which income levels vary among participating countries, this assumption is difficult to defend. Differences in productivity are being disguised as price differences with output volumes being overestimated for countries whose cost of inputs are relatively low and underestimated for countries whose cost of inputs are relatively high.
131. The failure to take account of productivity differences between the producers of non-market services in participating countries affects not only the PPPs and volume indices of health services, education services and collective services, but also the PPPs and volume indices of the main aggregates to which these expenditure categories belong: actual individual consumption, actual collective consumption and GDP. It is the effect on the volume indices of these aggregates – particularly the volume indices of GDP – that is the primary concern.⁴⁸
132. The problem is not specific to international spatial comparisons, it is also a problem for national temporal comparisons. But it is a much more serious problem for international comparisons. Differences between countries in the productivity of producers of non-market services are significantly larger than the year-to-year changes in productivity of non-market producers of individual countries. Even so, EU Member States and OECD Member Countries have not been in favour of adjustments for productivity differences being employed in Eurostat and OECD comparisons. It is argued that productivity adjustments are inevitably based on assumptions that cannot be verified without a genuine measurement of output. And, if output could be measured, then input methods would not be necessary.

CAPITAL GOODS AND SERVICES

133. Gross fixed capital formation (GFCF) in the Eurostat-OECD expenditure classification comprises the following three expenditure categories: equipment goods, construction projects and other products⁴⁹. Eurostat-OECD comparisons collect prices and calculate PPPs for equipment goods and construction projects. With the exception of software, prices are

not collected for other products and, as PPPs cannot be calculated for these items, reference PPPs are used instead.

134. GFCF is one of the more difficult and costly aggregates for which to collect internationally comparable and representative prices. One reason for this is the complexity and variability of the products being priced. It is because of this that Eurostat-OECD product specifications for equipment goods and construction projects are drawn up by engineers and quantity surveyors and not by statisticians. Another reason is that the expertise needed to draw up the product specifications is also required to match and price them and this expertise is not normally available in most national statistical agencies. Typically the pricing of capital goods – particularly the pricing of construction projects – has to be contracted out to consultancy firms that specialise in engineering or in construction.

EQUIPMENT GOODS

135. The complexity of equipment goods, the variation in purchasing patterns among participating countries, the number of participating countries being compared and resource constraints requires the survey of equipment prices to focus on the pricing of comparable products. The approach adopted for the survey is the standard one of specification pricing. It involves the selection of a basket of precisely-defined products so that countries price to a constant quality and any price differences observed are “pure” price differences. The selection is made by Eurostat and the OECD in consultation with participating countries. The products are defined in terms of characteristics that influence their purchasers’ price.

Product specifications

136. The characteristics specified cover both the product (performance, operation and quality) and the transaction (order size, discounts, delivery and installation).⁵⁰ The products priced by countries should be identical, but, if they are not, they should at least be equivalent. The products priced do not necessarily have to be the same make and model and deviation from the technical parameters is tolerated. Transaction characteristics have to be respected because countries are required to report actual transaction prices and not list or catalogue prices.

Second-hand assets

137. All the products specified for the survey are new. Second-hand equipment goods bought by resident producers are only recorded as GFCF if they are purchased from non-residents and imports of second-hand equipment goods are not typical for the majority of countries participating in Eurostat-OECD comparisons. Moreover, the quality of second-hand equipment goods varies considerably making it diffi-

cult to price comparable items without adjusting for quality differences. And quality adjustments are not a feature of Eurostat-OECD methodology. Countries are required to price only new items even when imported second-hand items are more representative.

Representativity

138. Representativity is introduced into the survey by including in the product list a number of alternative specifications for the same product. This allows the different factors that can influence a country's purchasing patterns, such as domestic producers, traditional trade links or average size of farms and factories, to be accommodated. Representativity is also introduced by allowing countries some flexibility in the interpretation of product specifications. Besides, countries are expected to price representative products when it does not compromise comparability.

Flexibility in interpretation

139. To price products that are equivalent, countries have to match the technical parameters of the makes and models that are available in their market with the technical parameters of the make and model specified.⁵¹ This requires flexibility in the interpretation of product specifications, but flexibility exercised with caution. Too liberal an interpretation will result in the loss of comparability, too strict an interpretation can mean that items cannot be priced. To avoid either of these extremes and to minimise quality differences, countries are provided with pricing guidelines. These usually allow a substitution when the parameter affected by the deviation contributes only a small share to the total price.

Sources of prices

140. Countries can obtain prices directly from producers, importers or distributors or from their catalogues. They may even obtain them from purchasers, if practical. The prices can be collected by whichever method, or combination of methods, countries find the most convenient – personal visit, telephone, letter, internet, etc. But whatever the source, whatever the method, strict conformity to the concept of purchasers' price is essential in all cases.
141. Some countries obtain prices through their producer price index (PPI). Either they are able to match the equipment good specifications directly with the specifications used for the PPI or they request the PPI respondents who are producers of the types of equipment goods being surveyed to price the equipment good specifications. As PPIs generally collect basic prices, these need to be adjusted to purchasers' prices.

Validation of prices

142. Countries report average national purchasers' prices for the reference month of the survey year.

Eurostat and the OECD use the Quaranta editing procedure to validate these average prices. But, because of the complexity of the items priced, the prices of equipment goods cannot be verified on the basis of price alone. The fact that prices for an item appear consistent across countries does not mean that the items priced are comparable across countries. Before applying the Quaranta editing procedure, Eurostat and the OECD compare the technical parameters of the products priced first. Products are sorted into groups on the basis of the comparability of their technical parameters with those of their product specifications or with those of products priced by other countries.

143. Matched products have parameters that are either identical to those of their product specification or equivalent to those of their product specification or identical to those of a product priced by another country. (Unmatched products are discarded.) By grouping products in this way it is easier to interpret the Quaranta editing procedure. If the prices reported for a product specification are shown to be consistent across countries, it is reasonable to assume that they refer to comparable items. Whereas when outliers are identified, the mistake, if any, is more likely to be an incorrect price than an incorrect match. Outliers are returned to the reporting country. It is asked to confirm or to correct the price.

CONSTRUCTION PROJECTS

144. The approach used for Eurostat-OECD construction price comparisons emphasises comparability. Participating countries are required to price a number of standard construction projects covering different types of residential buildings, non-residential buildings and civil engineering works.⁵² Countries are currently expected to price a total of nine projects – three residential buildings, three non-residential buildings and three civil engineering works.

Bills of quantities

145. The standard construction projects are not actual constructions, but they designed to be representative of actual constructions to be found in participating countries. Each standard project is defined by a "bill of quantities" and a set of technical drawings. The bill of quantities breaks down the project into a number of major components (earthworks, joinery, masonry, etc.) each of which comprises a number of elementary components (mechanical excavation of foundation trenches; supply, transport, dumping and compacting of crushed aggregate for foundation trenches; etc.).⁵³
146. Each elementary component is specified by a quantity. The total price for the elementary component is computed by multiplying the quantity specified by a unit price. By summing the total prices of its elementary components, a total price can be obtained for each major component. And, by summing the total prices of the major components, an overall price for work done can be obtained. The overall

price for work done is not the final price of the project. It needs to be augmented by architects' and engineers' fees and by non-deductible taxes on products in order to arrive at the desired purchasers' price.⁵⁴

Flexibility in interpretation

147. All countries pricing a particular standard project price the same bill of quantities so that, in principle, all of them are pricing a comparable product. In practice, this may not be so. Materials and methods of construction can vary among countries. National standards and regulations also vary between countries. Some flexibility in interpretation has to be allowed if countries are to provide representative prices.
148. Countries are provided with pricing guidelines to ensure that flexible interpretation does not become too liberal and result in marked differences in quality or in a different construction being priced. Usually, substitutions are acceptable when the components affected represent only a small share of the total price and the basic features of the construction remain unchanged. When substitutions are made, they should be clearly identified and explained in the bill of quantities.

Unit prices

149. The unit prices used in the bills of quantities must cover not only the contractor's direct cost for each of the specified elementary components (such as materials, labour, hire of equipment, sub-contractors' fees), but also the profits (or losses) of the contractor, general expenses (including a share of main office overheads), and preliminary expenses (including the cost of site preparation) connected with the construction.⁵⁵
150. The unit prices do not include architects' and engineers' fees and non-deductible VAT. As mentioned already, these are added after the overall price of work has been established. Nor do the unit prices include the expenditure incurred for the purchase of the land. But in this case no addition is made to the overall price of work either for the cost of the land itself or for the costs associated with the transfer of ownership.

Source of prices

151. The unit prices with which to value the elementary components of the bills of quantities can be extracted either from actual bills of quantities that have been valued for tenders submitted by construction companies or from one of the computerised systems of unit costs that major consultancy firms and research institutes maintain for the construction industry. If the first source is adopted, only unit prices from tenders that have been successful - or from tenders that can be considered realistic because they would permit the carrying out of work in good

condition - should be used to value the standard construction projects.

152. If the second source is employed, the standard construction projects will be valued at resource cost and not at purchasers' prices. It is necessary to adjust the underlying unit costs to unit prices using the total prices of successful tenders to establish the level to which the unit costs have to be raised.

Validation of prices

153. Countries report the average national purchasers' price for the reference month of the survey year for each standard construction project they price. Before doing so, they are required to compare the bills of quantities of the projects priced in the current survey with the bills of quantities for the same projects from the previous survey. This is possible because the standard construction projects and their bills of quantities do not change - or change only marginally - from one survey to the next. The object is to see whether the contribution to the total price of each major component is approximately the same in both surveys and, if it is not, to check the unit prices of its elementary components over the two surveys. Errors identified in this way are to be corrected.
154. Eurostat and the OECD apply the Quaranta editing procedure to detect outliers by comparing the total prices for the standard construction projects across countries. Editing bills of quantities by total price alone is not sufficient. Outliers do not necessarily mean that the projects priced are not comparable, while, conversely, the absence of outliers does not necessarily mean that the projects priced are comparable. Validation at lower levels of aggregation is also required.
155. The validation is carried out at the level of major components initially. An edit similar to the inter-temporal edit described above is employed. It involves matching the bills of quantities for the projects priced by countries and comparing them to establish whether the contribution of each major component to total price is approximately the same in each country. If it is not, the shares of the elementary components to the total price of the major component under review are then compared to see whether there are any questionable unit prices. Suspect unit prices are referred back to the countries reporting them for correction or confirmation that they are correct.

PPPS FOR GFCF IN INTERIM YEARS

156. Eurostat is required to calculate PPPs for GDP and its component final expenditures every year for EU Member States and EU associated countries. To do this, it needs PPPs for all basic headings, including those comprising GFCF, for the year in question. Even though the programme of price collection is continuous, not all goods and services are priced

each year. Most consumer products are priced once every three years and capital goods are priced once every two years. PPPs cannot be calculated for all basic headings every year. Other means have to be employed to obtain the PPPs for those basic headings for which PPPs cannot be calculated.

157. For consumer products that are priced every three years, the PPPs they generate are advanced over time with a corresponding sub-index from the CPI. This is not an option for capital goods because the majority of participating countries do not have the price indices required. Instead of extrapolation, Eurostat has decided to use interpolation to derive basic heading PPPs for GFCF for the interim years when prices of equipment goods and construction projects are not surveyed. Basic heading PPPs for GFCF for the interim year t are obtained by taking the geometric average of the basic heading PPPs for year $t-1$ and $t+1$.⁵⁶ This ensures that the PPPs for t are base country invariant.

COMPUTATION OF PPPS

The EKS method

158. The computation of PPPs for GDP is made in two stages. First, there is the calculation of unweighted PPPs at the basic heading level; then, there is the weighted aggregation of the basic heading PPPs up to the level of GDP. Eurostat and the OECD use the *Éltető-Köves-Szulc* (EKS) method both to calculate basic heading PPPs and to aggregate them.⁵⁷
159. Participating countries price both products that are representative of their national market and products that are representative of the national markets of others. Generally, representative products have a lower price level than unrepresentative products. This has to be taken into account when calculating the PPPs for a basic heading otherwise the PPPs will be biased. As there are no expenditure weights below the basic heading with which to determine the relative importance of the products priced for a basic heading, participating countries are required to indicate whether or not the products they priced are representative of their national markets when reporting their prices.
160. The information on representativeness, together with the prices to which it refers, is used to obtain unweighted PPPs at the basic heading level as follows:
- For each pair of countries, two PPPs are calculated. The first is the geometric mean of the price relatives for products representative of the first country; the second is the geometric mean of the price relatives for products representative of the second country. The geometric mean of these two PPPs is then taken to derive a single PPP between the two countries.

- By following this procedure each basic heading is provided with a matrix of binary PPPs. In some cases, the matrix is incomplete because it is not always possible to calculate a PPP directly between each pair of countries. In addition, the PPPs in the matrix are intransitive⁵⁸.
- The matrix is made complete by taking the geometric mean of all the available indirect PPPs⁵⁹ bridging the pairs of countries for which direct PPPs are missing. This procedure does not always work in which case it is necessary to take PPPs from elsewhere in the comparison to act as proxies for the missing PPPs.
- The matrix is made transitive by applying the EKS procedure. Transitivity is achieved by replacing the PPP between each pair of countries by the geometric mean of itself squared and all the corresponding indirect PPPs between the pair obtained using the other countries as a bridge. The resulting EKS PPPs differ as little as possible from the original binary PPPs.⁶⁰

161. The aggregation of basic heading EKS PPPs is undertaken at each level of expenditure up to the level of GDP as follows:

- For each pair of countries, the basic heading EKS PPPs are weighted, summed and averaged using first the expenditures on the basic headings of the first country as weights and then the corresponding expenditures of the second country as weights. This provides two weighted PPPs which are referred to as a "Laspeyres type" PPP and a "Paasche type" PPP. The geometric mean of these two PPPs gives a single "Fisher type" PPP between the two countries.⁶¹
- By following this procedure each level of aggregation is provided with a matrix of intransitive Fisher PPPs. Application of the EKS procedure makes the matrix transitive. This involves replacing the Fisher PPP between each pair of countries by the geometric mean of itself squared and all the corresponding indirect Fisher PPPs between the pair obtained using each of the other countries as a bridge.
- The EKS PPPs that result are used to convert the national final expenditures in national currencies to real final expenditures in a common currency.

162. The EKS method provides PPPs for each pair of countries in the comparison that are close to the PPPs that would be obtained if each pair of countries had been compared separately. This is because the EKS procedure in making the Fisher PPPs transitive minimises the differences between them and the resulting EKS PPPs. It also provides real final expenditures that are neither additive⁶² nor subject to the Gerschenkron effect⁶³.

PPPs for country groups

163. The EKS method just described generates PPPs and real final expenditures for individual countries. It does not provide PPPs and real final expenditures for groups of countries such as those used to present the results of Eurostat-OECD comparisons: EURO 12, EU 15, EU 25 and OECD 30.⁶⁴
164. The PPPs and the real and nominal final expenditures for groups of countries are derived using the PPPs and the national expenditures in national currencies of their constituent countries. Before doing this, it is necessary to nominate a currency for each group. The euro is normally selected for EURO 12, EU 15 and EU 25 and the US dollar for OECD 30. It is also necessary to designate a reference country. Traditionally Germany is chosen for this purpose. It should be noted that neither the choice of currencies nor the choice of reference country influences the final results because the PPPs with which they are derived are base country invariant.
165. Having selected the currencies for the groups and the reference country, the PPPs and the real and nominal final expenditures are calculated for the groups as follows:
- First, the national expenditures in national currencies of the countries are converted to real final expenditures in the currency (the euro) of the reference country (Germany) using PPPs. Real final expenditures for the groups are obtained by summing the real final expenditures of their constituent countries.
 - Next, the national expenditures in national currencies of the countries in each group are converted to nominal final expenditures in the currency nominated for the group (euros for EURO 12, EU 15 and EU 25, and US dollars for OECD 30) using exchange rates. Nominal final expenditures for the groups are then obtained by summing the nominal final expenditures of their constituent countries.
 - Finally, the nominal final expenditures for the groups are divided by their real final expenditures to provide PPPs for each group in the currency (the euro) of the reference country (Germany). For example, euro per “German euro” for EU 25 and US dollar per “German euro” for OECD 30.

The PPPs and the real and nominal final expenditures for the country groups are, like the PPPs and the real and nominal final expenditures for the individual countries, based on the reference country and its currency. For presentational purposes, the PPPs and the real and nominal final expenditures for both individual countries and country groups are subsequently rebased on the euro and the EU 25 and the US dollar and the OECD 30.⁶⁵

Fixity

166. The relative position of countries can change as the composition of the group of countries being compared changes. Hence, as the results for the European Union are used for administrative purposes as well as for economic analysis, Eurostat requires that only one set of results be recognised as the official results for the European Union. Eurostat and the OECD have therefore agreed that the official results for EU Member States will remain unchanged when these countries are included in comparisons with a wider group of countries such as the OECD. This is referred to as the “fixity convention”. The convention has been observed since the 1980 comparison. It now covers all countries that participate in both Eurostat comparisons and OECD comparisons irrespective of whether or not they are EU Member States.
167. Fixity involves two groups of countries, one smaller than the other, with the smaller group being a sub-group of the larger group. For example, all countries covered in a Eurostat comparison are included in the larger Eurostat-OECD comparison. There are two sets of PPPs for the smaller group: the first set is that calculated for the group on its own, the second set is that calculated for the group as a sub-group of the larger group. Fixity requires that the first set replaces the second set in the larger comparison. This is achieved by taking the ratio of the geometric means of the two sets of PPPs and multiplying the first set of PPPs by the ratio so as to put them at the same overall level as the second set of PPPs. The procedure preserves the relationships between the countries in the sub-group and the relationships between the other countries in the larger group. It also preserves the relationship between the other countries and the sub-group as a whole.

PUBLICATION OF RESULTS

Presentation of Eurostat-OECD results

168. Eurostat and the OECD publish the results of common benchmark years jointly. This has required the adoption of a standard set of tables covering the same final expenditures, the same countries and the same country groups. Complete uniformity has not been possible. Eurostat results are presented at average EU price levels with the European Union (EU 25) as “reference country” and with the euro as numéraire⁶⁶. OECD results are presented at average OECD price levels with the OECD (OECD 30) as “reference country” and with the US dollar as numéraire. The joint publication has two parts as a consequence.
169. There are eleven standard tables.⁶⁷ They show first the national expenditures and the PPPs on which the results are based, then the nominal final expenditures and the corresponding value indices, then

the real final expenditures and the corresponding volume indices and, finally, the price level indices. In the tables, final expenditure on GDP is broken down into 38 analytical categories⁶⁸ that are classified either in line with the SNA 93 and the ESA 95 or by type of product. In addition to the countries participating in the comparison, the tables cover four country groups: EURO 12, EU 15, EU 25 and OECD 30.

Purchasing power standards (PPS)

170. As neither the EU 25 nor the OECD 30 has an actual “national” currency, euros and US dollar are used instead. Euros based on the EU 25 are euros that have the same purchasing power over the whole of the EU 25. Their purchasing power is a weighted average of the purchasing power of the national currencies of EU Member States. They reflect the average price levels in the EU 25. Similarly, US dollars based on the OECD 30 are US dollars that have the same purchasing power over all the OECD 30 and reflect the average price levels of the OECD 30.
171. Eurostat has adopted the practice of calling the currency units in which the PPPs and real final expenditures for the EU 25 are expressed, “purchasing power standards” or “PPS”. The OECD calls the currency units in which the PPPs and real expenditures for the OECD 30, “US dollars at average OECD prices”. This is sometimes shortened to “OECD dollars”.

Publication of annual results

172. Eurostat employs the rolling benchmark approach to make comparisons covering EU Member States and EU associated countries every year. The annual results produced are published in Eurostat’s *Statistics in Focus* series. The publication calendar is synchronised with the timetable for the delivery of national accounts data. Countries are required to provide in September of the year *t* a first estimate of the detailed breakdown of final expenditure on GDP for the year *t-1* and a final estimate of the detailed breakdown of final expenditure on GDP for the year *t-2*. Also available at this time are a provisional matrix of basic heading PPPs for the year *t-1* and a final matrix of basic heading PPPs for the year *t-2*.
173. Eurostat uses the expenditure data and the matrices of basic heading PPPs to calculate preliminary results for the year *t-1* and final results for the year *t-2*. Results at the level GDP for the two years are then published in *Statistics in Focus* in December of the year *t*. At the same time, the results are also loaded into Eurostat’s public database which covers 50 analytical categories, twelve more than the joint publication.⁶⁹

Publication of price level indices

174. Eurostat also publishes in the year *t* the comparative price level indices for the two price surveys of consumer goods and services that were held in the year *t-1*. Publication is twice a year, in May and December, in the *Statistics in Focus* series. The level of aggregation at which the price level indices are published varies from survey to survey. The level depends on the perceived reliability of the indices and on whether the level is analytically meaningful.

Access to data and confidentiality

175. The national statistical institutes (NSIs) of participating countries have access to all basic data necessary for the calculation of PPPs and real final expenditure including data from other participating countries. They also have access to results at the basic heading level. Such access is necessary both for the editing of the price data and for the assessment and approval of results. Even so, the NSIs of participating countries are not allowed to publish or disseminate results at a level below that given in Eurostat’s public database.
176. More generally, government departments of participating countries have access to basic heading results and, on a selective basis, to the average prices of products. But this is on the understanding that they are to be used for internal purposes only and are not for publication. This access and the rules surrounding it also apply to services, other than Eurostat, of the European Commission and to directorates, other than the Statistics Directorate, of the OECD.
177. Academics and other researchers are interested in having access to PPPs at the basic heading level to further their research. Requests by the academic community for access are granted by Eurostat and OECD on two conditions. The first is that there is a clear scientific purpose for which the PPPs are to be applied. The second is that the researcher signs a written agreement of confidentiality specifying that the PPPs will be used only for research purposes and will not be published.
178. Eurostat and the OECD also provide PPPs and national expenditures at the basic heading level for the International Comparison Programme (ICP). This is on the understanding that fixity is respected when the ICP results are published; that the global results for countries participating in the Eurostat-OECD comparison are not published at a level of aggregation lower than that shown in Eurostat’s public database; and that the basic heading PPPs and national expenditures supplied by Eurostat and the OECD are not disseminated without the prior agreement of Eurostat and the OECD.

UPDATING AND REVISING RESULTS

Global extrapolation

179. The OECD only makes benchmark calculations every three years. PPPs for GDP for the years between these benchmark calculations are obtained by extrapolation. The PPPs for GDP for the latest benchmark year are extrapolated by the relative rates of inflation in different countries as measured by the implicit price deflators for GDP.
180. Thus, a country's PPP for the year $t+1$ is obtained by multiplying its PPP for the benchmark year t by its GDP implicit price deflator for the year $t+1$ and then dividing by the GDP implicit price deflator for the year $t+1$ for the reference country⁷⁰ when both implicit price deflators are relative to the year t . The method produces robust estimates for intermediate years provided they are not too far from the benchmark year and there have been no significant changes in price or expenditure structures within countries.
181. This method of extrapolation only requires summary data at the level of GDP. For the year $t+1$, these data are usually available at the beginning of the year $t+2$. The GDP PPPs for the year $t+1$ that the OECD estimates for its Member Countries are disseminated in the first quarter of the year $t+2$.
182. Eurostat requires a detailed breakdown of GDP for its annual benchmark calculations. These data for the year $t+1$ usually do not become available before the third quarter of the year $t+2$ and Eurostat calculations are not completed until the end of the fourth quarter of that year. When Eurostat releases its preliminary results for the year $t+1$, the OECD links the PPPs for GDP that Eurostat has calculated for those EU Member States that are OECD Member Countries with the PPPs for GDP that it has estimated for non-EU OECD Member Countries. Linking takes place at the level of GDP. It involves replacing the PPPs for EU OECD Member Countries obtained by global extrapolation by the PPPs calculated for them by Eurostat. This is done the same way as fixity is established.

Nowcasting

183. For the year t , Eurostat makes a preliminary calculation of detailed results at $t+12$ months and a final calculation of detailed results at $t+24$ months. Eurostat also makes a "nowcast" for the year t at $t+5$ months. This is when Eurostat receives the first set of national accounts estimates for the year t from countries. The nowcast produces results at the level of GDP only. It involves the extrapolation of PPPs for $t-1$ using appropriate price indices or implicit price deflators. This is the same technique as that used by the OECD for global extrapolation except that the extrapolation is done at a lower level of aggregation and involves 20 analytical categories. The extrapolated PPPs for the analytical categories are aggregated by the EKS method to obtain the PPP for GDP.

Revision of PPPs

184. The final calculations that Eurostat and the OECD make two years after the close of the benchmark year are final in as much as the calculation will not be repeated to obtain new PPPs when countries subsequently revise their GDP estimates for the benchmark year. When this happens, the revisions are introduced into the original results without recalculating the PPPs. The revised national expenditures are converted to new real final expenditures using the original PPPs. This means that the relativities between countries' volume measures will change, but the relativities between countries' price measures – the PPPs and comparative price levels – will remain as they were.
185. Final calculations will be repeated in exceptional circumstances - namely: to accommodate major changes in the national accounts compilation system or if a mistake is discovered in either the basic data or the calculation. In 2004, Eurostat published revised results for the years 1995 to 2000 – the period when EU Member States and EU associated countries moved from ESA 79 to ESA 95. For a recalculation to take place because of a mistake, the mistake must be found within three months of publication of the final results. For the results of the recalculation to be published, and replace the results initially disseminated, the mistake must result in a change of at least 0.5 per cent in the real GDP per capita of at least one participating country.

- ¹ Eurostat and the OECD organise their parts of the Programme differently. Both apply the same methodology, but, because they follow different timetables, their data requirements are different. Eurostat's requirements are the more demanding. The executive summary, like the manual, focuses on the Eurostat approach. The differences between the Eurostat approach and the OECD approach are summarised in Annex VI.
- ² Annex I gives a brief history of the Programme.
- ³ *System of National Accounts 1993*, Commission of the European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, World Bank, 1993.
- ⁴ *European System of Accounts 1995*, Eurostat, Luxembourg, 1996.
- ⁵ As shown in Box 1.1 of Chapter 1.
- ⁶ As shown in Box 1.2 of Chapter 1.
- ⁷ As shown in Box 1.3 of Chapter 1.
- ⁸ As shown in Box 1.4 of Chapter 1.
- ⁹ As shown in Box 1.5 of Chapter 1.
- ¹⁰ As shown in Box 1.6 of Chapter 1.
- ¹¹ As shown in Box 1.7 of Chapter 1.
- ¹² See Box 1.8 of Chapter 1.
- ¹³ This point is elaborated with examples in paragraphs 2.17 and 2.18 of Chapter 2.
- ¹⁴ The classification is described and defined in Annex II.
- ¹⁵ Actual individual consumption (by households) is the sum of the individual consumption expenditures of households, NPISHs and government.
- ¹⁶ Compensation of employees, intermediate consumption, gross operating surplus, net taxes on production and receipts from sales.
- ¹⁷ Austria and Switzerland.
- ¹⁸ The EU Candidate Countries – Bulgaria, Croatia, Romania and Turkey – and EFTA countries – Iceland, Norway and Switzerland.
- ¹⁹ Table I.A of Annex I shows the evolution of Eurostat comparisons from 1975 to 1999.
- ²⁰ Table I.B of Annex I shows the evolution of OECD comparisons from 1980 to 1999.
- ²¹ Box 2.1 of Chapter 2 lists the surveys, their frequency and their organiser.
- ²² The approach also has advantages for new countries joining the Programme. Either they can ease themselves in gradually over three years or they can adopt a “catch up” strategy by completing the survey cycle over a shorter period.
- ²³ The rolling benchmark approach is explained in Box 2.2 of Chapter 2.
- ²⁴ Price collections in countries, other than EFTA countries, participating in Eurostat comparisons are either partially or wholly funded by Eurostat. Price collections in countries participating in OECD comparisons are funded by the countries themselves.
- ²⁵ The countries are listed in Box 2.3 of Chapter 2.
- ²⁶ Box 2.4 of Chapter 2 gives the composition of the groups and the group leaders.
- ²⁷ Box 2.5 of Chapter 2 lists the respective responsibilities of the Centre, group leaders and participating countries.
- ²⁸ The coverage of the six surveys is summarised in Box 4.1 of Chapter 4 and given in detail in Annex III.
- ²⁹ See Box 4.2 of Chapter 4 for a generalised timetable listing the various phases and steps of a survey.
- ³⁰ Box 4.3 of Chapter 4 provides an example of a pre-survey questionnaire for a basic heading.
- ³¹ The codes are listed in Box 4.4 of Chapter 4.
- ³² Box 4.5 of Chapter 4 gives descriptions of the types of product specifications used by Eurostat and the OECD. Box 4.6 of Chapter 4 provides examples of these different types of product specifications.
- ³³ A classification of outlet by type is given in Box 4.7 of Chapter 4.
- ³⁴ Sample size is determined by $[t^2 CV^2 / SE^2]$ where t is Student's t and which is assumed to equal 2 at 0.95 probability, CV , or coefficient of variation, is the product's price variation, and SE , or standard error, is the desired degree of accuracy.
- ³⁵ Suppose that the quantity of a pharmaceutical product purchased is 1000 units and that the price per unit is 10 € of which households pay 2 € and government 8 €. In the national accounts, 2000 € will be recorded as household expenditure and 8000 € will be recorded as government expenditure. If the amounts actually paid – that is, 2 € by households and 8 € by government – are used to deflate these expenditures, it will seem that both households and government have each purchased 1000 units or 2000 units in total. But if the total amount paid – that is 10 € – is used, households will appear to have purchased 200 units and government 800 units - a total of 1000 units.
- ³⁶ Box 4.9 of Chapter 4 provides an example of the reporting form for seasonal food products.
- ³⁷ See Box 4.10 of Chapter 4.
- ³⁸ See Box 4.11 of Chapter 4.
- ³⁹ As explained in the Annex to Chapter 4.
- ⁴⁰ See Box 4.12 of Chapter 4 for a generalised timetable for the reporting and validation of prices.
- ⁴¹ The price input and output sheets are described in paragraphs 4.81 to 4.87 in Chapter 4.
- ⁴² The Quaranta editing procedure is described in Annex IV.
- ⁴³ Reference PPPs are PPPs that are used for basic headings for which no prices are collected. They are based on prices collected for other basic headings. Reference PPPs serve as proxies for the PPPs that would have been calculated had prices been collected for the basic headings for which no prices were collected.
- ⁴⁴ Selected occupations are listed in Box 5.4 of Chapter 5.
- ⁴⁵ As explained in Box 5.6 of Chapter 5.
- ⁴⁶ 52 working weeks, each 38 hours duration, less 7 working weeks (or 35 working days) of paid leave and public holidays.

- 47 Derivation of percentage shares is explained in Box 5.7 of Chapter 5.
- 48 See Box B of the annex to Chapter 5.
- 49 Comprising: plantation, orchard and vineyard development; change in stocks of breeding stock, draught animals, dairy cattle, animals raised for wool clippings, etc.; computer software that a producer expects to use in production for more than one year; land improvement including dams and dikes which are part of flood control and irrigation projects; mineral exploration; acquisition of entertainment, literary or artistic originals; other intangible fixed assets.
- 50 See Box 6.1 of Chapter 6 for an example of a product specification for an equipment good.
- 51 When matching products and deciding whether or not the one observed is a close substitute to the one specified, it is not just the number of parameters not matching that needs to be taken into account, but also the degree to which they differ. Products observed with “near misses” on most, if not all, parameters could still be an acceptable substitute for the product specified.
- 52 The standard construction projects are listed in Box 6.3 of Chapter 6.
- 53 An example of a major component and its elementary components can be found in Box 6.4 of Chapter 6.
- 54 Box 6.5 of Chapter 6 shows an example of a summary sheet used to obtain the purchasers’ price of a standard construction project.
- 55 The coverage of general and preliminary expenses is given in Box 6.6 of Chapter 6.
- 56 PPPs and not prices are interpolated because the products priced in t-1 and in t+1 will not necessarily be the same.
- 57 Some alternative methods to the EKS method are described in Chapter 7. A worked example of the EKS method can be found in Annex V.
- 58 This means that in the case of three countries A, B and C, the ratio of the PPP between A and C and the PPP between B and C is not equal to the PPP between A and B: $PPP_{AC} / PPP_{BC} \neq PPP_{AB}$.
- 59 An indirect PPP between two countries is one obtained by calculating it indirectly through a third country. Hence, in the case of three countries A, B and C, the indirect PPP for A on B via C is given as ${}_C PPP_{AB} = PPP_{AC} / PPP_{BC}$, where ${}_C PPP_{AB}$ is the indirect PPP and PPP_{AC} and PPP_{BC} are the direct PPPs for A and B on C.
- 60 In other words, the EKS method satisfies characteristicity. This is the property that requires the transitive multilateral comparisons between members of a group of countries to retain the essential features of the intransitive binary comparisons that existed between them before transitivity. A transitive multilateral comparison between a pair of countries is influenced by the price and quantity data of all other participating countries. Characteristicity requires that the impact of these influences should be kept to a minimum when they are introduced into the intransitive binary comparison. The extent to which the EKS PPP and the original binary PPP for a pair of countries differ depends on the degree of homogeneity among the price structures of the group of countries being compared.
- 61 The qualifier “type” is used because the terms “Laspeyres”, “Paasche” and “Fisher” are traditionally used in the context of temporal comparisons. Yet, like traditional Laspeyres and Paasche indexes, the Laspeyres and the Paasche type PPPs are, respectively, weighted arithmetic means and weighted harmonic means.
- 62 This means that the real final expenditures for basic headings do not sum to the real final expenditures of the aggregates of which they are components. Similarly, the real final expenditures for the aggregates do not sum to real final expenditure on GDP.
- 63 The Gerschenkron effect applies to aggregation methods that use either a reference price structure or a reference volume structure to compare countries. For methods employing a reference price structure, a country’s share of total GDP (that is, the total for the group of countries being compared) will rise as the reference price structure becomes less characteristic of its own price structure. For methods employing a reference volume structure, a country’s share of total GDP will fall as the reference volume structure becomes less characteristic of its own volume structure. The EKS method does not use either a reference price structure or a reference volume structure when estimating real expenditures.
- 64 The composition of the country groups is given in Box 8.4 of Chapter 8.
- 65 Box 8.5 of Chapter 8 has a simple example of the whole procedure.
- 66 The common currency in which the PPPs and the real and nominal final expenditures are expressed.
- 67 The standard tables are listed and described in Box 8.1 of Chapter 8.
- 68 The analytical categories are listed in Box 8.2 of Chapter 8.
- 69 The additional analytical categories are shown in Box 8.6 of Chapter 8.
- 70 The choice of reference country does not influence the final results. In practice the OECD uses the United States.