

Appendix B: International Guidance

B1 This appendix gathers the international guidance on compilation of general government final consumption (GGFC) for national accounts, particularly focusing on text which raises key issues. Some of the guidelines included are general to national accounts whereas some are specific to the general government sector. The implications of the ongoing review of the System of National Accounts for GGFC are also explored. As productivity is not a national accounts concept, the guidance for this area is distinguished from national accounts guidance and OECD guidance on estimation of productivity outside of the national accounts framework has also been included.

The appendix covers the following areas:

- a) Sources of International Guidelines
- b) Timing of Recording in National Accounts
- c) General Government Sector and Non-Market Producers
- d) Classification of Government by Function
- e) GGFC Expenditure and Actual Final Consumption
- f) General Government as a Producer
- g) Valuation of Government Output
- h) Measuring the Volume of Government Output
- i) Capital Measures and Definition
- j) OECD Guidance on Productivity
- k) ESA Guidance on Satellite Accounts

Table B1 Sources of international guidance used as reference material for the Atkinson Review of Measurement of Government Output

Title	Organisation/s	Status	Type of guidance
System of National Accounts (1993)	UN, OECD, World Bank, Commission of the European Communities and the IMF. Document prepared by Inter-secretariat Working Group on National Accounts and approved by UN Statistics Commission.	Recommended but not mandatory – recognises need for flexibility. Currently under review for an SNA 2008 edition.	High-level guidance only
European System of Accounts (1995)	Eurostat	An EU version of SNA but with a legal basis to ensure strict application' to ensure 'harmonised and reliable statistics on which to base decisions'. Inventories of methods carried out country by country.	Broadly consistent with SNA (1993) guidance with more clarification.
Handbook on Prices and Volume Measures of National Accounts	Eurostat	Driven by the needs of the 1997 Growth and Stability Pact. SNA 93/ESA 95 'not sufficient to guarantee harmonised price and volume data'. Introduces an A/B/C score for methods.	Expansion of ESA (1995) guidance for government output distinguishing activities, outputs and outcomes and with examples of each.
Organisation for Economic Cooperation and Development Productivity manual	OECD	One of its objectives: to improve international harmonisation: although there is no strong prescriptive element in the manual, it contains indications about desirable properties of productivity measures.'	'Comprehensive guide to the various productivity measures aimed at statisticians, researchers and analysts involved in constructing industry-level productivity indicators'.
United Nations website	UN	Guidance for Classification by Function of Government	http://unstats.un.org/unsd/cr/registry/default.asp

- B2** The following sections are divided by guidance topics, with different sources of guidance where applicable and an outline of the UK practice in relation to the guidance given. The text shown is not exhaustive but has been selected to illustrate the key issues.

Timing of Recording in National Accounts

SNA guidance

- B3** 'The System recommends recording on an accrual basis throughout.' (paragraph 3.91)

'Accrual accounting records flows at the time economic value is created, transformed, exchanged, transferred or extinguished. This means that flows which imply a change of ownership are entered when the ownership passes, services are recorded when provided, output at the time products are created and intermediate consumption when the materials and supplies are being used' (paragraph 3.94)

‘Furthermore, some transactions, in particular government units, do not keep records of purchases on an accruals basis. In these cases, the rules of consistency in the System require that efforts should be undertaken to correct basic statistics for major deviations and flaws.’ (paragraph 3.96)

ESA guidance

- B4** ‘However, in some cases it is necessary to show flexibility as regards time of recording. This applies in particular to taxes and other flows concerning general government, which are often recorded on a cash basis in government accounts. It is sometimes difficult to carry out an exact transformation of these flows from cash basis to accrual basis. In these cases, it might therefore be better to use approximations... Consequently, transactions may be recorded at different times by the transactors involved. These discrepancies must be eliminated by adjustments.’ (paragraph 1.57)

‘Output is to be recorded and valued when it is generated by the production process.’ (paragraph 3.46)

ESA 1995 was modified in two legal acts:

- B5** i) The following text is in *Regulation (EC) No 2516/2000* published Nov 2000: ‘General principles: The impact on net lending/borrowing of general government of taxes and social contributions recorded in the system shall not include amounts unlikely to be collected...’ and ‘Taxes and social contributions recorded in the accounts may be derived from two sources: amounts evidenced by assessments and declarations and cash receipts... if assessments and declarations are used, the amounts shall be adjusted by a coefficient reflecting assessed and declared amounts never collected... if cash receipts are used, they shall be time-adjusted so that the cash is attributed when the activity took place to generate the tax liability...’
- ii) The following text is in *Regulation (EC) No 995/2001* published May 2001 ‘...taxes and social contributions payable to the general government can either be recorded net of the part unlikely to be collected or, if this part is included, it should be neutralised in the same accounting period by a capital transfer from the general government to the relevant sectors’.

General Government Sector and Non-Market Producers

SNA guidance

- B6** ‘General government: institutional units which, in addition to fulfilling their political responsibilities and their role of economic regulation, produce principally non-market services (possibly goods) for individual or collective consumption and redistribute income and wealth’ (paragraph 2.20)

‘The general government sector consists mainly of central, state and local government units together with social security funds imposed and controlled by those units. In addition, it includes non-profit institutions engaged in non-market production that are controlled and mainly financed by government units or social security funds.’ (paragraph 4.9)

ESA guidance

- B7** ‘for the purposes of the system, the institutional units are grouped together into five mutually exclusive institutional sectors composed of the following types of units: (paragraph 1.28)
- a) non-financial corporations;
 - b) financial corporations;
 - c) general government;
 - d) households;
 - e) non-profit institutions serving households..’
- B8** ‘The sector general government (S.13) includes all institutional units which are other non-market producers (...) whose output is intended for individual and collective consumption, and mainly financed by compulsory payments made by units belonging to other sectors, and/or all institutional units principally engaged in the redistribution of national income and wealth. (paragraph 2.68)
- B9** The institutional units included in sector S.13 are the following: (paragraph 2.69)
- a) general government entities (excluding public producers organised as public corporations or, by virtue of special legislation, recognised as independent legal entities, or quasi-corporations, when any of these are classified in the non-financial or financial sectors) which administer or finance a group of activities, principally providing non-market goods and services, intended for the benefit of the community;
 - b) non-profit institutions recognised as legal entities which are other non-market producers and which are controlled and mainly financed by general government;...
- The general government sector is divided into four sub-sectors: (paragraph 2.70)
- a) central government (...);
 - b) state government (...);
 - c) local government (...);
 - d) social security funds (...).’
- B10** ‘Definition: Other non-market producers are local kind-of-activity units or institutional units whose major part of output is provided free or at not economically significant prices.’ (paragraph 3.26)
- ‘if less than 50 per cent of the production costs are covered by sales, the institutional units is an other non-market producer and classified to the sector Non Profit Institutions serving Households (NPISH). But other non-market non profit institutions that are controlled and mainly financed by general government are classified to the general government sector. (paragraph 3.32)

- B11** In distinguishing market and other non-market producers by mean of the 50 per cent criterion, sales and costs are defined as follows: (paragraph 3.33)
- a) sales cover the sales excluding taxes on products but including all payments made by general government... and granted to any kind of producer in this type of activity, i.e. all payments linked to the volume or value of output are included, but payments to cover an overall deficit are excluded...
 - b) production costs are the sum of intermediate consumption, compensation of employees, consumption of fixed capital and other taxes on production. For this criterion other subsidies on production are not deducted. To ensure consistency of the concepts sales and production costs when applying the 50 per cent criterion, the production costs should exclude all costs made for own-account capital formation.
- B12** The 50 per cent criterion should be applied by looking over a range of years: only if the criterion holds for several years or holds for the present year and is expected to hold for the near future, it should be applied strictly. Minor fluctuations in the size of sales from one year to another do not necessitate a reclassification of institutional units...'

Classification of Government by Function

SNA guidance on individual services

- B13** (on collective versus individual services)

'Individual goods and services are essentially "private", as distinct from "public" goods. They have the following characteristics: (paragraph 9.81)

- a) It must be possible to observe and record the acquisition of the good or service by an individual household or member thereof and also the time at which it took place;
- b) The household must have agreed to the provision of the good or service and take whatever action is necessary to make it possible - for example, by attending a school or clinic;
- c) The good or service must be such that its acquisition by one household or person, or possibly by a small restricted group of persons, precludes its acquisition by other households or person...

'From a welfare point of view, the important characteristic of an individual good or service is that its acquisition by one household, person or group of persons brings no (or very little) benefit to the rest of the community...' (paragraph 9.82)

SNA guidance on collective services

- B14** 'Most goods can be privately owned and are individual in the sense used here. On the other hand, certain types of services can be provided collectively to the community as a whole. The characteristics of these services may be summarized as follows:
- a) Collective services can be delivered simultaneously to every member of the community or of particular sections of the community, such as those in a particular region of a locality;

- b) The use of such services is usually passive and does not require the explicit agreement or active participation of all the individuals concerned;
- c) The provision of a collective service to one individual does not reduce the amount available to others in the same community or section of the community. There is no rivalry in acquisition.' (paragraphs 9.81-9.83)

'Expenditures incurred by governments at a national level in connection with individual services such as health and education are to be treated as collective when they are concerned with the formulation and administration of government policy, the setting and enforcing of public standards, the regulation, licensing or supervision of producers, etc... on the other hand, any overhead expenses connected with the administration or functioning of a group of hospitals, schools, colleges or similar institutions are to be included in individual expenditures...' (paragraph 9.86)

SNA guidance on the classification of functions of government

- B15** 'it may not be possible to classify transactions and, as an approximation, the units of classification may have to be agencies, offices, bureaus or project units within government departments...it may happen of course that the smallest units that can be identified still perform two or more classification of the functions of government functions; in such cases it will be usually be best to make an approximate division of the unit's outlays among the different functions performed rather than to allocate them all to that which is judged the largest.' (paragraph 18.10)

Table B2 Classification of the Functions of Government (COFOG) used for compilation of the expenditure measure of GDP

The COFOG classifications are guidelines provided in the System of National Accounts 1993 (UN,OECD, IMF, CEC and World Bank).

	Divisions	Sub-divisions
Collective services	01 General Public Services	01.1 Executive and legislative organs, financial and fiscal affairs, external affairs
		01.2 Foreign economic aid
		01.3 General services
		01.4 Basic research
		01.5 R&D General public services
		01.6 General public services n.e.c.
		01.7 Public debt transactions
		01.8 Transfers of a general character between different levels of government
	02 Defence	02.1 Military defence
		02.2 Civil defence
		02.3 Foreign military aid
		02.4 R&D defence
		02.5 Defence n.e.c.
	03 Public Order and Safety	03.1 Police services
		03.2 Fire-protection services
		03.3 Law courts
		03.4 Prisons
		03.5 R&D Public order and safety
	04 Economic Affairs	04.1 General economic, commercial and labour affairs
		04.2 Agriculture, forestry, fishing and hunting
04.3 Fuel and energy		
04.4 Mining, manufacturing and construction		
04.5 Transport		
04.6 Communication		
04.7 Other sectors		
04.8 R&D Economic Affairs		
04.9 Economic affairs n.e.c.		
05 Environmental Protection	05.1 Waste management	
	05.2 Waste water management	
	05.3 Pollution abatement	
	05.4 Protection of biodiversity and landscape	
	05.5 R&D Environmental protection	
	05.6 Environmental protection n.e.c.	
Individual services	06 Housing and Community Amenities	06.1 Housing development
		06.2 Community development
		06.3 Water supply
		06.4 Street lighting
		06.5 R&D Housing and amenities
		06.6 Housing and community amenities n.e.c.

Table B2 continued

Divisions	Sub-divisions
07 Health	07.1 Medical products, appliances and equipment 07.2 Out-patient services 07.3 Hospital services 07.4 Public health services 07.5 R&D health 07.6 Health n.e.c.
08 Recreation, Culture and Religion	08.1 Recreational services 08.2 Cultural services 08.3 Broadcasting and publishing services 08.4 Religious and other community services 08.5 R&D Recreation, culture and religion 08.6 Recreation, culture and religion n.e.c.
09 Education	09.1 Pre-primary and primary education 09.2 Secondary education 09.3 Post-secondary non-tertiary education 09.4 Tertiary education 09.5 Subsidiary services to education 09.6 R&D Education 09.7 Education n.e.c.
10 Social Protection	10.1 Sickness and disability 10.2 Old age 10.3 Survivors 10.4 Family and children 10.5 Unemployment 10.6 Housing 10.7 Social exclusion n.e.c. 10.8 R&D Social protection 10.9 Social protection n.e.c.

GGFC Expenditure and Actual Final Consumption

SNA guidance

- B16** ‘Final consumption expenditure covers transactions on final consumption of goods and services for which a sector is the ultimate bearer of the expense. Government and NPISH produce non-market goods and services in their production account, where intermediate consumption or compensation of employees are recorded as uses. Final consumption expenditure of these producers relates to the value of their output of non-market goods and services, less their receipts from the sale of non-market goods and services at prices which are not economically significant. However, it also covers services that are purchased by government or NPISHs for ultimate transfer, without transformation, to households’. (paragraph 2.127)

‘The use of adjusted disposable income account (...) records adjusted disposable income as resources and actual final consumption as uses... Actual final consumption of households covers goods and services which are effectively available for individual consumption by households, regardless of whether the ultimate bearer of the expense is government, NPISHs or households themselves. Consequently, actual final consumption of government refers only to collective consumption, whereas NPISHs, whose final consumption expenditure is deemed to be in total individual, have no actual final consumption.’ (paragraph 2.128)

ESA guidance

- B17** ‘The use of adjusted disposable income account includes the concept of actual final consumption, which corresponds to the value of the goods and services actually at the disposal of households for final consumption, even if their acquisition is financed by general government or non-profit institutions serving households. (paragraph 8.40)

Consequently, the actual final consumption of general government corresponds only to collective final consumption. Since final consumption expenditure by non-profit institutions serving households is regarded as entirely individual, their actual final consumption is zero.

At the level of total economy, final consumption expenditure and actual final consumption expenditure are equal...’ (paragraph 8.41)

- B18** ‘Final consumption expenditures by general government or NPISHs are equal to the sum of their output, plus the expenditures on products supplied to households via market producers (i.e. Social transfers in kind) minus the payments by other units minus own-account capital formation.’ (paragraph 3.96)

General Government as a Producer

SNA guidance

- B19** ‘Establishments owned by government or NPISHs commonly provide education, health or other services to individual households without charge or at prices that are not economically significant. The costs of providing these services are incurred by the government or NPISHs, and the values are recorded as internal transactions: that is, as final expenditures by governments or NPISHs on outputs produced by establishments they own themselves. (... the acquisition of these services by households is recorded separately under social transfers in kind, another form of non-monetary transactions that take place between the government units or NPISHs and the households in question.)’ (paragraph 3.47)
- B20** ‘Non-market producers providing final goods or services – such as public administration, defence, health and education - should be partitioned into establishments using the activity classification given in divisions 75, 80, 85 and 90 of the ISIC...’ (paragraph 5.38)

Valuation of Government Output

SNA guidance

B21 ‘In contrast to output produced for own consumption or own gross capital formation by market producers, there are usually no suitable markets whose prices can be used to value government non-market output. By convention, therefore, such output is valued by its production costs.’ (paragraph 4.110)

B22 ‘In the System, the intermediate inputs are recorded and valued at the time they enter the production process, while outputs are recorded and valued as they emerge from the process.... The increase between the value of intermediate inputs and the value of outputs is the gross value added against which must be charged the consumption of fixed capital, taxes on production (less subsidies) and compensation of employees. The positive or negative balance remaining is the net operating surplus or mixed income. The definition measurement and valuation of outputs and inputs is, therefore, fundamental to the System. (paragraph 6.37)

Output therefore consists only of those goods or services that are produced within an establishment that become available for use outside that establishment... (paragraph 6.38)

For simplicity, the output of most goods or services is usually recorded when their production is completed...’ (paragraph 6.38)

B23 ‘There are no markets for collective services such as public administration or defence, but even in the case of non-market education, health or other services provided to individual households, suitable prices may not be available. It is not uncommon for similar kinds of services to be produced on a market basis and sold alongside the non-market services but there are usually important differences between types and quality of services provided. In most cases it is not possible to find enough market services that are sufficiently similar to the corresponding non-market services to enable their prices to be used to value the latter, especially when the non-market services are produced in very large quantities. (paragraph 6.90)

For these reasons, and also to ensure that the various non-market services produced by government and NPISHs are valued consistently with each other, they are all valued in the System by the sum of costs incurred in their production: that is, as the sum of: (paragraph 6.91)

- Intermediate consumption
- Compensation of employees
- Consumption of fixed capital
- Other taxes, less subsidies, on production.

The net operating surplus on the production of non-market goods or services produced by government units and NPISHs is assumed always to be zero.’

Measuring the Volume of Government Output

SNA guidance

- B24** ‘In principle, volume indices may always be compiled directly by calculating a weighted average of the quantity relatives for the various goods and services produced as outputs using the values of these goods and services as weights. Exactly the same method may be applied even when the output values have been estimated on the basis of their costs of production. (paragraph 16.134)

Of course, the calculation of quantity relatives for the outputs of many kinds of non-market services, especially collective services, presents problems. In the case of health and education services provided as social transfers to households, however, the problems are much less, both conceptually and in practice, than for collective services such as public administration or defence. The objective is to measure the quantities of the services actually delivered to households. These should not be confused with the benefits or utility derived from those services...’ (paragraph 16.135)

- B25** ‘Measuring changes in the volume of collective services is distinctly more difficult, however, as it is not possible to observe and record the delivery of such services. Many collective services are preventative in nature; protecting households or other institutional units from acts of violence, including acts of war, or protecting them from other hazards, such as road accidents, pollution, fire, theft or avoidable diseases. It is difficult to measure the output of preventive services, and this is an area in which further research is needed. In practice, it may not be feasible to avoid using changes in the volumes of inputs into such services as proxies for changes in volumes of outputs... (paragraph 16.139)

When it is not possible to avoid using an input measure as a proxy for an output measure, the input measure should be a comprehensive one and not confined to labour inputs... These volume measures can, of course, also be derived by deflating the current values by suitably weighted wage rate, price or tax rate indices.’ (paragraph 16.140)

ESA guidance

- B26** ‘The establishment of a comprehensive system of price and volume indices covering all supply and uses of goods and services encounters a particularly difficulty when measuring the output of non-market services. These services differ from market services in that they are not sold at a market price and their value at current prices is calculated by convention as the sum of the costs incurred. These costs are intermediate consumption, compensation of employees, other taxes less subsidies on production and consumption of fixed capital. (paragraph 10.24)

In the absence of a unit market price, the change in the ‘unit cost’ of a non-market service can be considered as an approximation of the change in the price. If non-market services are consumed on an individual basis, it is in principle possible to estimate quantities which are homogeneous and which reflect the utilisation of these services and apply the unit costs of a base year to obtain data in constant prices. By such type of output-measurement it will be possible to analyse changes in productivity for individual non-market services. For collective services it is generally not possible to establish unit costs and quantities reflecting their utilisation. If attempts are made to account for changes in productivity for collective services by indirect methods, users should be made aware of this. (paragraph 10.25)

In the context of the economic accounts, it is of prime importance to adopt the principle that the production and consumption of non-market services, must be defined in terms of the actual flows of these goods and services and not in terms of the final results obtained from their use. As these results depend on several other factors as well, it is not possible to measure, for example, the volume of teaching services by the rise in the level of education, or the volume of health services by the improvement in the health of the population.’ (paragraph 10.26)

B27 ‘For certain market and non-market service industries, such as finance, business services, education or defence, it may not be possible to obtain satisfactory estimates of price or volume change for output. In these cases the movements of value added at constant prices can be estimated by means of changes in compensation of employees at constant wage rates and consumption of fixed capital at constant prices. Compilers of data may be forced to adopt such expedients, even when there is no good reason to assume that labour productivity remains unchanged in the short or long term.’ (paragraph 10.29)

B28 ‘In the case of services provided to individuals, changes in the volume of their output and consumption should in principle be measured on the basis of the use [sic] which is made of these services; this will avoid using different criteria for the same service depending on whether they are market or non-market. Of course, any change in quality must be treated as a change in volume; but this applies as much to market services as to non-market services provided to individuals.’ (paragraph 10.42)

‘The pure collective services are produced by general government for the benefit of the entire population. In fact, they cover a vast range of activities such as general public services, national defence, foreign affairs, justice and the police, town planning and the environment, economic policy, etc. Since these services are consumed collectively, indirectly and continuously, the volume of their output cannot be measured by the extent to which they are utilised.’ (paragraph 10.43)

Eurostat Handbook guidance

B29 ‘Non-market output can only be produced by non-market producers... that may or may not also produce market outputs. The total value of output of a non-market producer is defined by convention as the total costs of production (i.e. the operating surplus is assumed to be zero). In the case of a local KAU [kind of activity unit] with secondary market output, non-market output is defined as a residual item, i.e. as the difference between the total costs of production minus the revenues from market output. (section 3.1.2)

It is important to note that this valuation principle (calculating current price output as costs) is applied to the producer rather than the product. Non-market producers are either public producers or non-profit institutions, classified in the sectors government or NPISH respectively.

Non-market output can be sub-divided into two types of output:

- individual goods and services: those that are consumed by individual households: and
- collective services: those that are provided simultaneously to the society as a whole (by definition, goods can not be collective)...

Examples of individual products are education, health, social security, recreation services and cultural services. Examples of collective services are general public administration, defence, police services and research and development' (section 3.1.2).

Input, activity, output and outcome

'The following criteria can be formulated for the appropriate use of output indicators: (paragraph 3.1.2.1)

- they should cover all the services produced by the producer that are provided to external users, and only those; activities that are in fact ancillary to the main output should not be counted;
- they should be weighted by the costs of each type of output in the base year;
- they should be defined as detailed as possible;
- they should be quality-adjusted.'

B30 The problem of measuring prices and volumes for non-market output arises from the fact that by definition no market prices exist. For that reason, the value of output at current prices is defined as the sum of costs minus revenues as noted above. Without prices for the output, there are only two options for constant price measurement: deflating inputs and direct volume measurement.

Current practice for constant prices is mostly based on deflating inputs. This implies assuming that the change in volume of inputs is representative for the change in the volume of output. However, it is not at all certain that more or better inputs lead automatically to more or better output. Using this assumption makes it impossible to analyse change in productivity, and will wrongly estimate the true output change if this is different from the change in inputs.

Volume indicators can relate to:

Inputs

B31 for example the number of employees. This would simply assume that twice as large a public service would mean twice as much output, irrespective of how those additional personnel were deployed. The advantage of the method is the ease of implementation, and the ready availability of data. This method however ignores all changes in productivity due to eg. improved equipment (for example increased use of PCs) or more efficient procedures.

A possibility would be to complement input methods with adjustments for changes in productivity...

The problem is that such adjustments are inevitably based on assumptions, which cannot be verified without genuine measurement of the output...

Another problem is that there might be double counting of the productivity changes, if the quality changes of the inputs (eg. the labour) were already taken into account...

Activity

- B32** for example number of operations in hospitals or number of patrols carried out by the police. Such data can often be found. Activity indicators reflect what the non-market units are actually doing with their inputs and are therefore closer to the output. However, suppose for example that new improved forms of medical treatments reduce the number of operations necessary. Taking the number of operations as an indicator would imply a decrease of output and productivity, which does not seem appropriate in this case. Using activity indicators often does not lead to reasonable productivity numbers. However, for some collective services, activity indicators may be the only indicators that can be found.

Output

- B33** the preferred approach. However, it is not always easy to define exactly what the unit of output is. For individual goods and services it is in principle possible to define the output, since an actual delivery of that output takes place from the producer to the consumer(s)... For example, for education, the output is the amount of teaching consumed by a pupil. For hospital services, the output is the amount of care received by a patient. For cultural services, the output is the amount of theatre plays consumed. For collective services, however, there is no transaction between producer and consumer since these are provided simultaneously to the society as a whole. It becomes therefore very difficult to define the output. It is very difficult to say for example what the unit of output is of defence or police services.

Table B3 Summarised from Section 3.1.2.3 of the Eurostat Price and Volume Manual

Type of service	A/B/C methods
Individual services	<p>A methods – output indicator approach where the indicators satisfy the following criteria</p> <ol style="list-style-type: none"> they should cover all the services produced by the producer that are provided to external users, and only those; activities that are in fact ancillary to the main output should not be counted; they should be weighted by the costs of each type of output in the base year; they should be defined as detailed as possible; they should be quality-adjusted. <p>B methods – output indicator approach where the criteria are not fully satisfied, eg level of detail could be improved or does not take into account changes in quality.</p> <p>C methods – if input, activity or outcome is used (unless outcome can be interpreted as quality-adjusted output) or if coverage of output method is not representative.</p>
Collective services	<p>Broadly the same as for individual services but:</p> <p>B methods – input methods are B methods as are the use of volume indicators of activity. If input methods are used they should estimate the volume of each indicator separately, taking quality changes of inputs into account. For each category of inputs (IC, other taxes and subs on prod, comp of employ and CC). Applying productivity or quality adjustments to the sum of the volume of inputs is not recommended.</p> <p>C methods – the use of a single input volume indicator is not a B method.</p>

Outcomes

B34 ‘for example indicators of the level of education of the population, life expectancy, or level of crime. Such indicators might be influenced by factors that are unrelated to the activity, and therefore are generally not representative of the output. In some cases, however, outcome indicators can be used as indicators for the quality of the output...’

B35 Specifically for Education, Eurostat proposes several methods of measuring output, all classified as either A, B or C method. The criteria for the different methods are set out in full in section 4.2 of the Eurostat Handbook. In summary they are as follows:

- A method: complete or near-complete coverage, stratification by category, at least into pre-school, primary, lower secondary, upper secondary, higher education and other education. The A method for non-market education is to use ‘pupil hours’ adjusted for quality as appropriate. The number of pupils can be used as a proxy for pupil hours provided that it can be shown that the amount of hours that pupils spend being taught is sufficiently stable. It is encouraged for some levels of education (tertiary education and distance-learning).
- B method: complete or near-complete coverage stratification by category, at least into pre-school, primary, lower secondary, upper secondary, higher education and other education. The B method is to use ‘pupil hours’ without an adjustment for quality.
- C method: incomplete coverage or incomplete stratification by category. An input-base method is a C method, such as numbers of teacher hours.

Measuring quality change

B36 ‘When a constant price measure is not obtained by deflation with a price index but instead by extrapolation with a volume index, quality changes should also be accounted for. This however provides some special problems...’

When volume indicators with a detailed breakdown of products is used, shifts between different products will be included in the volume components. Therefore, part of the quality change (that part due to compositional changes in an aggregate...) can be captured by differentiating as many qualities of a product as possible. These different qualities are then in fact treated as different products’ (section 2.4.3).

Capital Measures and Definitions

OECD Manual guidance on capital input measures

B37 ‘For any given type of asset, there is a flow of productive services from the cumulative stock of past investments. This flow of productive services is called capital services (sic) of an asset type and is the appropriate measure of capital input for production and productivity analysis. Conceptually, capital services reflect a quantity, or physical concept, not to be confused with the value, or price concept of capital. To illustrate, take the example of an office building. Service flows of an office building are the protection against rain, the comfort and storage services that the building provides to personnel during a given period.’

Because flows of the quantity of capital services are not usually directly observable, they have to be approximated by assuming that the service flows are in proportion to the stock of assets...’ (paragraph 5.2)

B38 ‘The Australian Bureau of Statistics publishes two distinct and complementary capital measures. The Australian methodology stands out in that it ensures full consistency between the different measures:

- A measure of capital services, as part of ABS’ multifactor productivity series.
- An end-year net capital stock, as part of the Australian System of National Accounts.’

SNA guidance on the boundary between current and capital expenditure

B39 ‘The distinction between maintenance and repairs and gross fixed capital formation is not clear-cut. The ordinary, regular maintenance and repair of a fixed asset used in production constitutes intermediate consumption. Ordinary maintenance and repair, including the replacement of defective parts, are typical ancillary activities but such services may also be provided by a separate establishment within the same enterprise or purchased from other enterprises. (paragraph 6.159)

The practical problem is to distinguish ordinary maintenance and repairs from major renovations, reconstructions or enlargements which go considerably beyond what is required simply to keep the fixed assets in good working order. Major renovations, reconstructions, or enlargements of existing fixed assets may enhance their efficiency or capacity or prolong their expected working lives. They must be treated as gross fixed capital formation if they add to the stock of fixed assets in existence. (paragraph 6.160)

B40 Ordinary maintenance and repairs are distinguished by two features; (paragraph 6.161)

- a) They are activities that owners or users of fixed assets are obliged to undertake periodically in order to be able to utilise such assets over their expected service lives...
- b) Maintenance and repairs do not change the fixed asset or its performance, but simply maintain it in good working order or restore it to its previous condition in the event of a breakdown. Defective parts are replaced by new parts of the same kind without changing the basic nature of the fixed asset.

B41 On the other hand, major renovations or enlargements to fixed assets are distinguished by the following features: (paragraph 6.162)

- a) The decision to renovate, reconstruct or enlarge a fixed asset is a deliberate investment decision which may be taken at any time and is not dictated by the condition of the asset...
- b) Major renovations or enlargements increase the performance or capacity of fixed assets or significantly extend their previously expected service lives...

B42 Research and development are undertaken with the objective of improving efficiency or productivity or deriving other future benefits so that they are inherently investment - rather than consumption-type activities. However, other activities, such as staff training, market research or environmental protection, may have similar characteristics. In order to classify such activities as investment type it would be necessary to have clear criteria for delineating them from other activities, to be able to identify and classify the assets produced, to be able to value such assets in an economically meaningful way and to know the rate at which they depreciate over time. In practice it is difficult to meet all of these requirements. By convention, therefore, all the outputs produced by research and development, staff training, market research and similar activities are treated as being consumed as intermediate inputs even though some of them may bring future benefits.' (paragraph 6.163)

'When an enterprise contracts an outside agency to undertake research and development, staff training, market research or similar activities on its behalf, the expenditures incurred by the enterprise are treated as purchases of services used for purposes of intermediate consumption.' (paragraph 6.165)

OECD Guidance on Productivity

B43 Productivity is not defined (at present) within national accounts guidance. The following extracts are therefore from the OECD productivity manual.

OECD guidance

B44 'emphasis is given to productivity measures of those industries that are characterised by a large share of market producers, leaving aside those activities where non-market producers dominate in many OECD countries. These activities pose specific problems of productivity measurement, due to the difficulty or impossibility of observing and/or defining market prices or output. Reference will be made when appropriate but an in-depth treatment of the output measurement in each of these industries would go beyond the scope of the present manual.' (paragraph 1.2)

Defining productivity

B45 'Productivity is commonly defined as a ratio of a volume measure of output to a volume measure of input use... there is neither a unique purpose for, nor a single measure of productivity. The objectives of productivity measurement include: (paragraph 2.1)

- to trace technical change;
- for identifying changes in efficiency;
- to identify real cost savings in production [where real cost savings are as a result of a myriad of sources behind productivity growth including technical change and changes in efficiency];
- to help identify inefficiencies; and
- [as] a key element towards assessing standards of living.

Table B4 Overview of main productivity measures

Type of output measure	Type of input measure			
	Labour	Capital	Capital and Labour	Capital, labour and intermediate inputs (energy, materials, services)
Gross output	Labour productivity (based on gross output)	Capital productivity (based on gross output)	Capital-labour productivity MFP (based on gross output)	KLEMS multifactor productivity
Value added	Labour productivity (based on value added)	Capital productivity (based on value added)	Capital-labour productivity MFP (based on value added)	—
	Single factor productivity measures		Multifactor productivity (MFP) measures	

Source: OECD Productivity manual, Table 1

Satellite Accounts

ESA guidance

B46 'For some specific data needs the best solution is to draw up separate satellite accounts... (paragraph 1.18)

Satellite accounts can serve such data needs by: (paragraph 1.19)

- a) showing more detail where necessary and leaving out superfluous detail;
- b) enlarging the scope of the accounting framework by adding non-monetary information, eg on pollution and environmental assets;
- c) changing some basic concepts, eg by enlarging the concept of capital formation by amount of the expenditure on research & development or the expenditure on education.

B47 An important feature of satellite accounts is that in principle all basic concepts and classifications of the standard framework are retained. Only when the specific purpose of satellite account definitely requires a modification, are changes in concepts introduced. In such instances, the satellite account should also contain a table showing the link between the major aggregates in the satellite account and those in the standard framework. In this way, the standard framework retains its role as a framework of reference and at the same time justice is done to more specific needs. (paragraph 1.20)

B48 The standard framework does not pay much attention to stocks and flows which are not readily observable in monetary terms... By their nature, the analysis of such stocks and flows is usually also well served by compiling statistics in non-monetary terms, eg. (paragraph 1.21)

...b) education can be described in terms of type of education, number of pupils, the average number of years of education before obtaining a diploma, etc...

Table B5 Purposes, advantages and limitations of the most widely used productivity measures, summarized from OECD Productivity Manual

Type of measure	Purposes	Advantages	Limitations
Labour productivity based on gross output	'traces the labour requirements per unit of (physical) output.'	'Ease of measurement and readability. In particular, the gross-output measure requires only price indices on gross output, not on intermediate inputs as is the case for value-added based measures.'	'Labour productivity is a partial productivity measure and reflects the joint influence of a host of factors. It is easily misinterpreted as technical change or as the productivity of individuals in the labour force.'
Labour productivity based on value added	'Analysis of micro-macro links, such as the industry contribution to economy-wide labour productivity and economic growth... a direct link to a widely used measure of living standards, income per capita...'	'Ease of measurement and readability.'	As above, and 'Also, value-added measures based on a double deflation procedure with fixed-weight Laspeyres indices suffer from several theoretical and practical drawbacks.'
Capital-labour productivity MFP based on value added	'Analysis of micro-macro links, such as the industry contribution to economy-wide MFP growth and living standards, analysis of structural change'	'Ease of aggregation across industries, simple conceptual link of industry-level MFP and aggregate MFP growth. Data directly available from national accounts.'	'Not a good measure of technology shifts at the industry or firm level. When based on value added that has been double deflated with a fixed weight Laspeyres quantity index [sic], the measure suffers from the conceptual and empirical drawbacks of this concept.'
Capital productivity based on value added	'Changes in capital productivity indicate the extent to which output growth can be achieved with lower welfare costs in the form of foregone consumption.'	'Ease of readability.'	Capital productivity is a partial 'productivity measure and reflects the joint influence of a host of factors. There is sometimes confusion between rates of return on capital and capital productivity.'
KLEMS multifactor productivity based on gross output		'Conceptually, KLEMS-MFP is the most appropriate tool to measure technical change by industry as the role of intermediate inputs in production is fully acknowledged.'	'Significant data requirements, in particular timely availability of input-output tables that are consistent with national accounts.'

They [extended accounts] can also reclassify the final expenditure on regrettable necessities (eg defence) as intermediate consumption, i.e. as not contributing to welfare... In this way, one could try to construct a very rough and very imperfect indicator of changes in welfare. However, welfare has many dimensions, most of which are best not expressed in monetary terms. A better solution for measuring welfare is therefore to use, for each dimension, separate indicators and units of measurement. The indicators could be, for example, infant mortality, life expectancy, adult literacy and national income per capita. These indicators could be incorporated in a satellite account.' (paragraph 1.22)