

Chapter 3 **MEASUREMENT AND VALUATION OF AGGREGATES AND COMPONENTS**

3.1 General Practices in the Estimation of the Aggregates

This section deals with the ways the main national accounts aggregates and their components are measured and valued, and with some special problems related to this.

Since the basic aggregate concepts -- Product, Income and Value Added -- are equivalent to each other, an estimate of the value of one of them is at the same time an estimate of the values of the other. For example, an estimate of the value of the gross Value Added is also an estimate of the value of the GDP. Thus, by having more than one estimate for the main aggregate concepts, e.g. one for the gross Value Added and one for GDP; cross checks can be carried out, provided these estimates were obtained independently of each other. This may enhance the reliability of published national accounts data.

The approaches for estimating the various basic concepts are closely related to the way in which the concepts are defined. As such the following three approaches are normally distinguished:

- a) the Expenditure Approach. This approach aims at estimating the value of the domestic product/income aggregate via estimates of the various expenditure components which constitute GDP.
- b) the Value Added (or: Production) Approach. This approach aims at estimating the value of the domestic product/income aggregate via estimates of the value added of the various branches of economic activity in the economy.
- c) the Income (or: Cost) Approach. This approach aims at measuring the value of the domestic product/income aggregate via the (primary) cost components which constitute the domestic income, i.e. compensation of employees, operating surplus, depreciation, and (net) indirect taxes.

Below some more details will be presented about the various approaches to the measurement of the value of the domestic product/income aggregates.

3.1.1 Estimates at current prices

A. Expenditure Approach.

As indicated above, the essence of this approach is found in the measurement of the value of the various expenditure components of GDP.

By subtracting from the sum of the various final expenditure components the value of the imports, an estimate may be obtained of GDP. The main elements to be considered in this connection, are:

- (1) the consumption of households (including private non-profit institutions);
- (2) the value of the services rendered without explicit payment by government to the public (the so-called final consumption of government);
- (3) the investment made in fixed assets;
- (4) the investment in stocks (inventories);
- (5) the exports of goods and services;
- (6) the imports of goods and services.

As far as the estimation of the above mentioned elements is concerned, the following may be said.

Household Consumption.

This component may be estimated in several ways. The most important sources of information are the following:

- (a) household budget/expenditure surveys, giving data on expenditure on consumer goods;
- (b) data from retail trade surveys, giving data on the sales of consumer goods;
- (c) data from producer surveys and customs records, giving data on the supply, export and domestic consumption of consumer goods

Ad a) This data source is normally the most accurate one for estimating household consumption. However, since household surveys are quite costly, they are normally not carried out every year.

Ad b) This data source will in certain respects be less complete than household surveys, since certain expenditure categories will not be included, i.e. expenditure on services (e.g. on health care, on education etc.). Also data on consumption from own production, which is to be included in household consumption according to UN recommendations, is not found in this data source. The data should therefore be complemented with data from other sources.

Ad c) By taking the total supply of goods and services in the economy (i.e. domestic production plus imports), deducting from this what has been exported, and breaking down the remainder according to different uses, i.e. for purposes of final consumption, for investment purposes, for further processing etc., an idea may be obtained of the supply in the domestic economy of consumer goods, capital goods, intermediate goods etc. This method is normally referred to as the 'commodity-flow' method. The method, which may among other things be used for obtaining an estimate of household consumption expenditure, has certain shortcomings. Firstly, there is the multiple-use problem, meaning that certain goods cannot in an unique manner be classified as either consumer good, capital good, or intermediate good. Examples are: motorcars, stationary, furniture etc. Secondly, there is the investment in stocks problem. Part of the domestic supply of goods, irrespective of its nature, will be used for stock formation. From the above it will be clear, that data from this source have to be adjusted, as well as complemented with data from other sources, in order to arrive at a realistic estimate of the value of household consumption. Furthermore, as values from this source are mostly expressed in producer prices (i.e. stated in terms of prices as received by the producers; ie, excluding trade and transport margins) a conversion has to be made to values in purchasers prices (i.e. prices which include trade and transport margins), since the values of the GDP components are supposed to be expressed in the latter kind of prices.

Government Final Consumption

As was already indicated earlier, the value of government final consumption expenditure (i.e. the value of all services produced by government, minus the revenues from the services for which the public has paid) is in practice normally estimated with the help of data from the government accounts. Since such data are usually reliable, estimates of the value of this component normally give no serious problems re reliability and accuracy. See on the treatment of the final output of the government for national accounting purposes also section 3.2.

Investment in Fixed Assets

Investment in fixed assets has as its main components: i) investment in machinery and equipment; ii) investment in building and construction.

Estimates of investment in machinery and equipment may be based on:

- a) Data sources providing information on expenditures on machinery and equipment
- b) Data sources providing information on supply of machinery and equipment in the domestic economy

Ad a) As far as public investment is concerned, government accounts will usually provide adequate information about the value of expenditures in this category of investment. Accounts published by private companies may also contain relevant information in this connection. Finally, special surveys conducted by the statistical office may provide details in investment in machinery and equipment made by establishments.

Ad b) A commodity-flow analysis (see above) may yield this kind of data. As data obtained in this way are in terms of producer prices, a conversion into purchaser's prices (by adding trade and transport margins) is to be made.

Estimates of investment in building and construction are often based on indirect approaches, including the so-called material input approach. The latter approach implies that an estimate is made of the value of the various material inputs used in building and construction (e.g. cement, timber, etc.), after which a certain multiplication factor (coming from a bench-mark survey) is applied in order to arrive at a value estimate of the output in building and construction.

Investment in Stocks

Estimates of the value of investment in stocks may be based on data derived from producer surveys as well as from trade (wholesale and retail) surveys. These sources can provide data on stocks of raw materials, semi-finished products and finished products. The data can be in value terms, or in terms of physical quantities. In the latter case appropriate prices have to be used to arrive at values. By comparing stocks at the beginning of the year to stocks at the end of the year, estimates of the changes in stocks can be made.

This component is normally the smallest of the various components constituting the GDP. Many countries estimate its value as a residual, i.e. as the difference between estimating domestic product according to the value added approach, and the sum of all other expenditure components of GDP.

Exports of Goods and Services

Estimates of the value of goods exported are normally based on data from customs records. This data source can in most cases be considered as accurate. Goods exported should be valued on a F.O.B. basis. As far as services (which include transport and insurance activities) are concerned, details may be obtained from surveys conducted among the producers of them.

Imports of Goods and Services

Also estimates of the value of goods imported are normally based on data from customs records. Imported goods should for national accounting purposes - according to the new SNA - also be valued on a F.O.B. basis. As in the case of exports, details on the import of services may be obtained from surveys among the enterprises involved

In the above, we have given a brief indication of the data sources that are most commonly used to estimate the expenditure components of GDP at current prices. In this connection the following additional point of general nature may be made.

In order to obtain expressions at current prices, the values used should be the product of quantity and price components which both apply to the current year in question. However, the various kinds of surveys referred to above, that render the basic data for the current price estimates, are normally not carried out every year. In such cases, the required estimates can be obtained by means of **extrapolation of estimates for an earlier year**. The latter kind of estimates is often referred to as benchmark-year estimates, and is based on actual surveys. The way in which these extrapolation of benchmark-year estimates is normally done is by applying suitable quantity and price indices to the benchmark-year values, according to the general rule

$$\text{current price value} =$$

$$\text{value benchmark-year} * \frac{\text{price index number}}{100} * \frac{\text{quantity index number}}{100}$$

Theoretically, if the price index to be used in this connection is the one according to Laspeyres, the quantity index should be the one according to Paasche. If on the other hand the price index used is the one according to Paasche, the quantity index should be the one according to Laspeyres. In practice, however, one does not adhere too strictly to this theoretical rule. (See on indices also section 3.1.2)

B. Value Added (or: Production) Approach.

By summing up the value added of all branches of economic activity another estimate of the domestic product/income may be obtained.

For any branch of economic activity, value added is defined as the value of its gross output (GO) minus the value of the intermediate inputs (II) used, i.e. the value of the intermediate consumption. The value of GO is conceptually speaking to be understood as the product of output quantities and output prices, while the value of II is to be considered as the product of quantities of intermediate inputs multiplied by the relevant input prices. In symbolic terms we can express this as follows:

$$\text{VA} = \text{Value GO} - \text{Value II}$$

$$= \sum(P * Q) - \sum(p * q) ,$$

where P = output prices ; Q = output quantities
and p = int. input prices ; q = int. input quantities

Value added at current prices of year t may therefore be expressed as:

$$\text{VA}_t = \text{Value GO}_t - \text{Value II}_t$$

$$= \sum (P_t * Q_t) - \sum (p_t * q_t)$$

Furthermore, value added in a certain reference year, expressed at prices of that year, may be expressed as:

$$\text{VA}_0 = \text{Value GO}_0 - \text{Value II}_0$$

$$= \sum (P_0 * Q_0) - \sum (p_0 * q_0)$$

The type of prices to be used for expressing the value of GO is supposed to be producer prices; ie, the prices received by the producer at the point of production. These prices are therefore exclusive of trade and transport mark - ups, at least in principle. The type of prices to be used for expressing the value of II is supposed to be purchaser prices; ie, the prices paid by the user of the inputs. These prices are inclusive of trade and transport margins.

The formulations given above suggest possible ways in which the value added at current prices of a certain branch of economic activity may be estimated in practice. In this respect two basic approaches may be distinguished:

- 1) estimation of VA_t via its two components, i.e. GO_t and II_t
- 2) estimation of VA_t via an adjustment (for price and quantity changes) of VA_0 ; this is normally done by using suitable price and quantity indices

Ad 1)

In this case, data on the values of GO and II may in the first place come from **producer surveys**, i.e. agricultural surveys, manufacturing surveys, surveys of the trade sector, etc. The data collected through these surveys are largely based on information coming from the accounts of the producers in question. However, in the accounts of producers gross output may not appear as an item, but rather the value of the total sales. By adjusting the value of the total sales for changes in stocks of goods produced, an estimate of the value of total output can be obtained.

In a similar way, producer accounts may give the value of the purchases of intermediate inputs rather than the value of the actual use of intermediate inputs. By adjusting the value of these purchases through subtracting from it the value of the increase in stocks of intermediate inputs, an estimate of the value of the actual consumption of intermediate inputs is obtained.

In some cases, survey data on outputs and inputs may refer to quantities rather than to values (as is e.g. sometimes the case for agricultural surveys). In these cases the relevant quantities have to be multiplied by the proper (average) prices, in order to arrive at the desired value estimates. These prices are in some cases supplied by the price departments of statistical offices.

In many cases the producer surveys referred to above are sample surveys. Therefore, in order to arrive at GO and II estimates for an entire branch of economic activity, proper blowing-up procedures have to be applied.

As the kinds of surveys referred to above are normally not carried out every year, other methods have to be adopted in such cases. One frequently adopted possibility is, to extrapolate the benchmark-year values of both GO and II with suitable quantity and price indices. As far as the estimation of II is concerned, one may, by way of alternative, assume that II is a constant proportion of GO, in which case II_t may be estimated by applying a certain ratio to GO_t . In such case, the ratio to be applied will often have been derived from a previous benchmark survey. The use of such ratio will be justified, provided prices of inputs and output have developed similarly, and intermediate input - output relations in physical terms have remained unchanged. Otherwise, the benchmark-year ratio has to be adjusted.

Ad 2)

As was indicated above, in this case the value added estimate of the benchmark year is extrapolated with the help of a suitable quantity index and a suitable price index in order to arrive at a value added estimate at current prices for the current year. Conceptually, value added is defined as the difference between the value of GO and that of II. In principle, these two components of value added may move in their own way over time,

in terms of prices as well as in terms of quantities. Considering this, it can be concluded that this approach is only justified, if the development over time of GO prices and II prices has been the same, while in addition also the development over time of GO and II quantities has been the same. The latter condition implies, that intermediate input - output relations in physical terms must have remained unchanged.

Some branch-specific remarks.

Agriculture

Possible data sources for the estimation of VA of this branch of activity may be: agricultural surveys; household surveys; farm surveys; crop statistics; livestock statistics; price statistics.

The value of GO of crops is often estimated by using separately collected data on prices and quantities. Care should be taken to include adequately subsistence output. The GO of livestock includes animals for slaughter, export etc., as well as animals which have been added to stocks of cattle.

Data on II are in some countries collected in direct ways (usually sample surveys), in other countries in more indirect ways (i.e. extrapolations).

Note, that inputs (seeds, fertilizers etc.) should be accounted for in the year they are actually used/applied.

Forestry and Lodging

The main output of this sub-branch is timber. Price and quantity data for the estimation of GO normally come from surveys among lumbering establishments. Data re II may also come from such kind of surveys. Otherwise indirect methods (i.e. extrapolations) are applied to estimate this component.

Fishing

Quantity data re GO usually come from annual sample surveys of the fishing industry. Price data may come from the same surveys, or from retail surveys, official sources etc.

Data re II should take account of the different methods of fishing. Current year data are often obtained by extrapolation of benchmark year data.

Mining and Quarrying

Quantity and price data, or value data, re GO for the larger mining companies are often obtained from their annual accounts. The value of GO of small producers is often estimated through extrapolation of benchmark year data.

Valuation should be at pithead prices. Crude oil should be valued at a weighted average of the state sales prices

Data re II may come from the annual company accounts, or be obtained through extrapolation of benchmark year data. Exploration cost should be considered as intermediate expenditure, not as capital expenditure. Development cost, on the other hand should be considered as capital cost.

Manufacturing

This branch includes a variety of transformational activities. It also includes in principle agricultural processing activities, as well as assembly and repair activities.

Manufacturing sample surveys and census surveys are the main data sources in this connection. Special surveys are normally required to cover rural and traditional small scale manufacturing. These may be conducted once in five or ten years.

GO value may be estimated by extrapolation of benchmark year data with the help of direct quantity and price indices which come from (small) annual sample surveys. Alternatively, indirect indices may be used, using for example employment as an index, or total industrial production as an index.

II value often estimated via various indirect methods (extrapolation, adjusted input-output ratios etc.)

Electricity, Gas and Water

These activities are usually government activities. Data re GO and II come from surveys among the producers, or from inspection of their accounts or their annual reports.

Construction

If possible, own-account production by producers in other branches should be included here. If not, it should be included under GO and II of the other branch in question.

Quantity data re GO are sometimes obtained via annual sample surveys. In other cases via extrapolation of benchmark year data with the help of indirect indices, i.e. employment, number of building permits, quantities of building materials used etc. Output are prices often calculated with the help of price indices re inputs.

Estimates of II are often based on indirect methods: extrapolation of benchmark year estimates, use of (adjusted) input- output ratios etc.

Wholesale and Retail Trade

GO of this branch is defined equal to the gross trade margins, which is roughly equal to the receipts from sales minus the costs of goods bought. The value of GO is often estimated by extrapolation of benchmark year data with a sales index calculated from annual sample survey data. Indirect indices (e.g. re employment data) are also sometimes used.

II include mainly packing materials, electricity, rent etc.

The value of II is frequently estimated with the help of (adjusted) input-output ratios, derived from benchmark year surveys.

Hotels and Restaurants

The values of both GO and II are often estimated by extrapolation of benchmark year data, with the help of direct or indirect quantity indices, and a suitable price index.

Transport and Communication

Comprises a varied group of activities, including passenger and freight transport. If possible, transport activities of manufacturing and trading enterprises should be included here.

Quantity data re GO are normally obtained via extrapolation of benchmark year data with a suitable quantity index, e.g. re number of vehicles, passenger or ton kilometres etc. Next a suitable price index is used to obtain a current price estimate.

II estimates often obtained by applying indirect methods: extrapolation of benchmark year estimates, or use of (adjusted) input-output ratios.

Financial Institutions

This includes the activities of a variety of institutions, of which banks are the most important ones. The GO of banks is equal to the value of the explicit service charge plus the value of imputed bank charges. The latter value is equal to the interest received on investment from deposits minus the interest paid on deposits.

Value of GO normally obtained from the published accounts of the larger companies. For smaller enterprises data may come from annual surveys, or from extrapolation of benchmark year data. The value of II is obtained in the same way.

Insurance and Pension Funds

The value of GO is approximately equal to the difference between the value of the premiums received and the claims paid (with some adjustments).

Data re the value of GO and II normally come from published accounts; sometimes from special surveys.

Real Estate

This includes the renting, management and operation of residential and non-residential buildings, as well as brokerage activities. In addition to actually paid rent, the gross output value should include - according to SNA guidelines - an estimate of the imputed rent value associated with the use of owner-occupied dwellings (see also section 3.2).

The GO value is often estimated by extrapolating benchmark year data with a suitable indirect quantity indicator and a suitable price index.

Business Services

Includes a variety of service activities. In view of survey data problems the values of both GO and II , or of VA directly, are normally estimated through indirect methods.

Social and Personal Services of Industries

This concerns services rendered by the private sector mainly to households. Included are among other things: education, health care, repair activities, laundry business, cleaning services, etc.

Because of survey data problems ,GO and II, or VA directly, of most of these activities are estimated through extrapolation of benchmark year data, while often use is made of indirect indicators.

Output of Government and of Non-Profit Producers

This output mainly consists of services. Since for most of this output no reference can be made to market prices, the convention is to set its value equal to the cost of production (see also the section on the treatment of government output below). Data on GO and II of government normally come from government accounts.

Estimates of the values of GO and II of the activities of non-profit institutions are normally obtained via extrapolation of benchmark year data, using in most cases indirect methods.

C. Estimates of the Domestic Income

Direct estimates of the (Domestic) Income are normally obtained via estimates of the various components that constitute this concept. These are in the first place the various factor income categories. Estimates of wages and salaries, rents and interests paid, and of (gross) profits will be required. Such data may be obtained from producer surveys, tax authorities, employment surveys and other sources. By taking together the values for these categories as estimated, an estimate of the Domestic Income at factor costs is obtained. By adding to this the value of the net indirect taxes, an estimate in market prices may subsequently be obtained. Often it is difficult to obtain reliable estimates for certain factor income components. This applies especially to the profit component. Data on profits are in a number of cases incomplete, as well as inaccurate. For this reason, direct estimates of the Domestic or National Income should be dealt with prudently.

3.1.2 Estimates at constant prices

The approaches as outlined above form the basis for the estimates of the national accounts aggregates and components at current prices. In this section some observations will be made re the estimation of national accounts aggregates and components at constant prices.

Conceptually constant price values can be interpreted as being composed of current year's quantities that are valued at reference year prices. From a statistical point of view a constant price value may be arrived at in different ways:

- a) (re)valuation of current year quantities with prices of the base year, i.e multiplication of current year quantities by reference year prices, yielding directly a constant price value
- b) extrapolation of a reference year value with a quantity index, i.e multiplication of a reference year value by a quantity index number.
- c) deflation of a value at current year prices with a price index, i.e. division of a value at current prices by a price index number.

From a theoretical point of view the quantity index in case b) should be according to Laspeyres, the price index in case c) should be according to Paasche.

In order to elaborate these points, the following may be put forward:

Price indices

- 1) Laspeyres: $P_L = \frac{\sum Q_0 P_t}{\sum Q_0 P_0}$;
NB: the weights are the quantities of the reference year
- 2) Paasche: $P_P = \frac{\sum Q_t P_t}{\sum Q_t P_0}$;
NB: the weights are the quantities of the current year

Quantity indices

- 1) Laspeyres: $Q_L = \frac{\sum P_0 Q_t}{\sum P_0 Q_0}$;
NB: the weights are the prices of the reference year
- 2) Paasche: $Q_P = \frac{\sum P_t Q_t}{\sum P_t Q_0}$;
NB: the weights are the prices of the current year

Given a current price value $\sum Q_t P_t$ the constant price value $\sum Q_t P_0$ may be obtained as follows:

$$A) \sum Q_t P_0 = \sum Q_t P_t / (\sum Q_t P_t / \sum Q_t P_0)$$

i.e constant price value = current price value divided by price index Paasche

Alternatively, given a reference year value $\sum Q_0 P_0$ the constant price value $\sum Q_t P_0$ may be obtained as follows:

$$B) \sum Q_t P_0 = \sum Q_0 P_0 * (\sum Q_t P_0 / \sum Q_0 P_0)$$

i.e constant price value = reference year value times quantity index Laspeyres.

From the above it will be clear, that on theoretical grounds in principle three ways can be followed in order to obtain constant price values, i.e a) revaluation b) price deflation, or c) quantity extrapolation.

In practice the availability of a price index according to Paasche is sometimes a problem. This, because the index requires current year quantities as weights, implying that every year a new set of weights has to be composed. For this reason preference is often given to the construction of indices according to Laspeyres. As in practice often only Laspeyres indices are available, these are used for the generation of constant price values. In case current price values are being deflated with that type of index, the estimated value may be subject to bias. This error will be larger, the larger is the difference between reference year weights and current year weights.

Estimates of the domestic product/income at constant prices can be made via the Value Added Approach by making estimates of the Value Added at constant prices of the various branches of economic activity, or via the Expenditure Approach by making estimates of the expenditure components at constant prices. Estimates via the Income Approach, i.e. via the various components of the factor income, gives problems as the interpretation from a conceptual point of view of the operating surplus at constant prices is unclear.

In the case of the Value Added Approach various lines can be followed. In the so-called Double Deflation Technique independent constant price estimates of the two components of value added (i.e. Gross Output and Intermediate Inputs) are made. For each of the components separately a constant price estimate is obtained by revaluation, or by quantity extrapolation, or by price deflation. After these estimates have been obtained, the one is subtracted from the other, yielding a constant price estimate of the Value Added according to:

Value Added at constant prices = Gross Output at constant prices MINUS Intermediate Input at constant prices

Alternatively, it is also possible to use the so-called Single Indicator Technique in which a constant price estimate of the Value Added is obtained directly by either applying the Price Deflation Method to the Value Added estimate at current prices, or the Quantity Extrapolation Method to the Value Added estimate of the benchmark year. In the former case the price-index to be applied may be related to output, or to input. In the latter case the quantity/volume indicator to be used may relate output or to input as well.

The choice between the Double Deflation Technique and the Single Indicator Technique depends among other things on the development of output prices in comparison to that of input prices. If the two kinds of prices are thought to have developed rather differently from each other, preference may be given to the

Double Deflation Technique. This is also the case when input-output ratios are supposed to have changed over time. Otherwise the Single Indicator Technique may be adopted.

Yet another possibility would be to estimate first GO through revaluation, quantity extrapolation, or price deflation; and next to obtain an estimate of II by using an input - output ratio as coming from a benchmark-year survey. This procedure will be justified, provided the input - output relationships in physical terms have remained unchanged over time.

In the case of the Expenditure Approach constant price estimates are normally obtained by deflating the current price values of the various expenditure components with a proper price index.

3.2 Some Further Issues Related to Estimation and Valuation

In principle, the prices at which quantities of goods and services should be valued for national accounting purposes are the prices at which these goods and services have been sold/purchased in the market, i.e. market prices. In practice, however, various kinds of goods and services can be found that have not been exchanged through the market, for which reason no market price can directly be associated with them. This applies among other things to the services rendered by the government to the general public. Also output that has been produced by private producers for own use belongs to this category. In many developing countries especially, an important part of the agricultural output produced is consumed by the household of the producer (i.e. subsistence production), rather than sold in the market. Cases such as those referred to above require therefore a different approach as far as valuation is concerned.

As far as government is concerned it can be said that it provides the larger part of its output of public services without receiving directly an explicit payment for it, as was outlined already elsewhere. The cost of producing these services is largely paid for by government itself out of its current income, i.e from tax revenues etc., rather than by the individuals enjoying these services. It has been suggested that output of services produced by government might therefore be valued by using market prices for similar services supplied in the private sector. However, the difficulty with this approach is that many public services have, in fact, no private counterpart, and are, as such, unique to government. The alternative is to value the government services at the costs at which they have been produced. The main cost categories to be considered here are outlays on salaries paid to civil servants, and on purchases of non-durable material inputs, i.e intermediate consumption. Furthermore depreciation may form part of the production costs. Finally, any indirect taxes paid by government itself in connection with the production of public services should be considered. Under this valuation convention, which is almost universally adopted, the operating surplus from the production of these public services will by definition be equal to zero. The gross value added at market prices generated in the production of public services will therefore be equal to the sum of compensation of employees paid to civil servants, the depreciation and the indirect taxes; the net value added at factor cost will be equal to just the compensation of employees.

By convention the output of public services produced by the government is considered to be of a final character. As such it forms a component of the domestic product, of which the value is equal to its cost of production. While thus on one hand the government produces a variety of public services -- in the production process of which no operating surplus is generated -- it is at the same time, as seen from the expenditure perspective, the purchaser/consumer of the larger part of these services. In this view the government is seen as representing the general public, the latter being, of course, the actual consumers of the government output. The value of this final consumption expenditure by the government is equal to the gross output value of the public services produced minus the revenues from sales of these services to the general public. Note, that the value of these latter sales is included in private final consumption expenditure.

The above may be summarized as follows:

$$\begin{array}{l} \text{Value Gross Output} \\ \text{public services by} \\ \text{government} \end{array} = \begin{array}{l} \text{Cost of} \\ \text{production} \end{array} = \begin{array}{l} \text{wages and salaries} \\ + \\ \text{interm. consumption} \\ + \\ \text{depreciation} \end{array}$$

+
indirect taxes

Government final consumption expenditure	=	Value Gross Output public services by government	-	revenues from sales of services to public
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For completeness' sake it may be mentioned that the above issue re the valuation of output of public services does not arise in relation to the output of public enterprises, since the latter output is normally sold in the market. Consequently, that output should be valued at the actual market prices at which it has been sold. As such, the same valuation rules are applied as in the case of output produced by private producers.

Also in the case of subsistence production use has to be made of alternative valuation approaches in view of the absence of market prices directly associated with it. The solution normally adopted in this case is, where market equivalents exist, to 'borrow' prices from elsewhere, i.e. using data that apply to markets where similar products to those produced for subsistence purposes have been sold. If no market equivalent can be found, as is the case with certain items produced for own use, a price may be constructed on the basis of cost estimates of the main inputs used in the production of these items.

The adoption of suitable prices for valuation purposes is often not the only problem when dealing with subsistence output. The estimation of the quantities involved may also give rise to problems, since producers who produce mainly or exclusively for own consumption/use often keep no records. In such cases one has to establish in other ways -- which may be time consuming and costly -- what they have produced and consumed. In order to avoid costly surveys in this connection, frequent use is made of indirect methods for the estimation of quantities based on extrapolation. These methods may yield, however, sometimes questionable results.

Finally mention may be made here of the practice to include in the final consumption expenditure component of GDP an estimate of imputed rent of owner-occupied dwellings. This concerns the housing services which owner-occupants of residential dwellings render to themselves. It represents yet another example of a kind of output which is not being allocated through the market. The valuation of this output is done with the help of data re actual rent rates charged in the market for comparable kinds of residential dwellings. The imputed rent forms a fictitious income to the occupant-owner who pays to himself the imputed amount of rent. This payment is also included in his final consumption expenditure.