

# **Methodology**

## **I. The Concept of Supply and Use Tables**

Supply and use tables (SUTs) represent a full framework of resources and uses within the framework of national accounts system 2008 (SNA2008). Supply table presents the sources of production in the national economy (domestic or imported). However, use table presents the way that these resources of products are used. In addition, it represents other primary income generated from the production process, where the GDP can be derived.

## **II. The Importance of Supply and Use Tables**

- 1- The supply and use tables represent a systematic framework for preparing the national accounts estimates according to the three estimate approaches (expenditure, production and income), with the assumption of the balance between the uses and resources.
- 2- they consider the basic framework to reassess the data and the continued estimation for the sources not covered statistically Whereas such tables depended on many detailed data about the production and use of goods and services,. In addition, it reflects the coverage's comprehension, deficiencies and insufficiency of statistical frameworks, and the extent of consistency among different statistics.
- 3- The supply and use matrix can be used as a basis of the quarterly estimates which rely on quick and short-term statistics.
- 4- The supply and use matrix can be used as the basic starting point for compiling the input and output tables and deriving the technical coefficients matrix.
- 5- It helps in deriving the weights in compiling the price indices.
- 6- Supply and use tables consider the main source for compiling social accounting matrix because it provides details of the products account, activities and factors of production.

### **III. The Structure of the Supply and Use Tables**

These tables Display the supply and use of goods and services classified by activities that produced or consumed them. However, activities are classified by International Standards Industrial Classification of all economic activities (**ISIC 4**), and Classification of Function of Government (**COFOG**) with its major sectors which are:

- 1- Non-Financial Corporations Sector.
- 2- Financial Corporations Sector.
- 3- General Government Sector.
- 4- Non-Profit Institution Serving Households Sector.
- 5- Household Sector.

Whereas, the Economic activities of the first and second sectors based on the production of goods and services for sale in the market, such goods and services have market or market-equivalent prices (including the output for own final use). However, the third and fourth sectors are representing the producers of government services and non-profit institution serving households, these services haven't market or market-equivalent prices. The last sector illustrates the paid services that offer among households.

The supply table shows both of the value of various products produced in each industry valued by basic Prices (basic price does not include transportation and trade margins or net taxes on products) and total supply of each product valued by both basic prices and purchasers prices (the price paid by the buyer, i.e. after adding margins and net taxes on production and products). However, the use table displays both the costs of production in each industry (the uses of each product valued by purchaser price).

It is assumed that the supply of each product must equivalent to its uses when each of them measured by the same price. In addition, the value of each product in any industry must equal to its production costs including the primary inputs.

#### **IV. The Balance Between the Value-added and Final Demand in the Use Table**

The SUTs have a great importance not only for the possibility of deriving the symmetric input-output tables that use for analytical purposes, but also for the possibility of compiling the value added by industry (activity) and final demand by product type and by sector. As well as these tables verify the link between the value -added and the final demand, on the basis that the aggregate GDP must be equal to final demand. By this way, the integration occurred between the three approaches of measuring GDP: production, income and expenditure approach, as follows:

##### **1- Production Approach**

We get the GDP by subtracting intermediate consumption from production of all producers in the economy plus any taxes and minus any subsidies on products.

GDP = Total Output at basic prices

- Intermediate consumption at purchasers' prices
- + Taxes on products
- Subsidies on products

##### **2- Income Approach**

GDP is measured as the sum of the components of value added generated by producers or industries, and is calculated as follows:

GDP = Total compensation of employees

- + Taxes on production
- Subsidies on production
- + Mixed income
- + Gross operating surplus
- + Taxes on products
- Subsidies on products

### **3- Expenditure Approach**

GDP can be measured by expenditure approach as this approach calculates GDP by adding together the components of final demand as follows:

$$\begin{aligned} \text{GDP} = & \text{Household consumption expenditure} \\ & + \text{Final consumption expenditure of non-profit institution serving} \\ & \text{households} \\ & + \text{Final consumption expenditure of government} \\ & + \text{Gross fixed capital formation} \\ & + \text{Changes in inventories} \\ & + \text{Exports of goods and services} \\ & - \text{Imports of goods and services} \end{aligned}$$

## **V. Definitions and Concepts:**

Supply and use tables have been compiled according to the United Nations System of National Accounts for the year 1993 (the SNA1993) and the SNA2008. Hereunder the most important definitions used in the framework of this system:

**1- The Residence:** The residence of each institutional unit is the economic territory with which it has the strongest connection, in other words, its centre of predominant economic interest. The concept of economic territory in the SNA coincides with that of the balance of payments' manual sixth (BPM6). Some key features are as follows. In its broadest sense, an economic territory can be any geographic area or jurisdiction for which statistics are required. The connection of entities to a particular economic territory is determined from aspects such as physical presence and being subject to the jurisdiction of the government of the territory. The most commonly used concept of economic territory is the area under the effective economic control of a single government. However economic territory may be larger or smaller than this, as in a currency or economic union or a part of a country or the world.

- 2- Non-Financial Corporations:** Are corporations whose principal activity is the production of market goods or non-financial services.
- 3- Financial Corporations:** Consist of all resident corporations that are principally engaged in providing financial services, including insurance and pension funding services, to other institutional units.
- 4- General Government:** The general government sector consists of the totality of 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.
- 5- Non-Profit Institutions Serving Households (NPISHs):** consist of non-market NPIs that are not controlled by government. They provide goods and services to households free or at prices that are not economically significant. Most of these goods and services represent individual consumption but it is possible for NPISHs to provide collective services.
- 6- Household:** is a group of persons who share the same living accommodation, who pool some, or all, of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food. As well as individual households, there are units described as institutional households that comprise groups of persons staying in hospitals, retirement homes, convents, prisons, etc. for long periods of time.
- 7- The Rest of the World:** Consists of all non-resident institutional units that enter into transactions with resident units, or have other economic links with resident units. It is not a sector for which complete sets of accounts have to be compiled, although it is often convenient to describe the rest of the world as if it were a sector. The accounts, or tables, for the rest of the world are confined to those that record transactions between residents and non-residents or other economic relationships, such as claims by residents on non-residents and vice versa. The rest of the world includes certain institutional units that may be physically located within the geographic boundary of a country; for example,

foreign enclaves such as embassies, consulates or military bases, and also international organizations.

**8- Market Output:** consists of output intended for sale at economically significant prices.

**9- Market Producers:** are establishments, all or most of whose output is market production.

**10- Non-Market Producers:** consist of establishments owned by government units or NPISHs that supply goods or services free, or at prices that are not economically significant, to households or the community as a whole.

**11- Market Prices:** market prices for transactions are the amounts of money willing buyers pay to acquire something from willing sellers.

**12- Market Price Equivalents:** market price equivalents are proxies, or substitute measures, for market prices in those cases for which no actual market prices have been set; a customary approach is to construct such prices by analogy with known market prices established under conditions that are considered essentially the same.

**13- The Purchaser's Price:** is the amount paid by the purchaser, excluding any VAT or similar tax deductible 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. The purchaser's price of a good includes any transport charges paid separately by the purchaser to take delivery at the required time and place.

**14- The Basic Price:** is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any tax payable, and plus any subsidy receivable, by the producer as a consequence of its production or sale. It excludes any transport charges invoiced separately by the producer.

**15- Transport Margin:** a transport margin consists of those transport charges paid separately by the purchaser in taking delivery of the goods at the required time and place.

**16- Trade Margin:** is defined as the difference between the actual or imputed price realized on a good purchased for resale and the price that would have to be paid by the distributor to replace the good at the time it is sold or otherwise disposed.

**17- Taxes on Production:** taxes on production consist of taxes payable on goods and services when they are produced, delivered, sold, transferred or otherwise disposed of by their producers; they also include other taxes on production, which consist mainly of taxes on the ownership or use of land, buildings or other assets used in production or on the labor employed, or compensation of employees paid.

**18- Taxes on Products:** is a tax that is payable per unit of some good or service. The tax may be a specific amount of money per unit of quantity of a good or service (the quantity units being measured either in terms of discrete units or continuous physical variables such as volume, weight, strength, distance, time, etc.), or it may be calculated ad valorem as a specified percentage of the price per unit or value of the goods or services transacted. A tax on a product usually becomes payable when it is produced, sold or imported, but it may also become payable in other circumstances, such as when a good is exported, leased, transferred, delivered, or used for own consumption or own capital formation. An enterprise may or may not itemize the amount of a tax on a product separately on the invoice or bill that it charges its customers.

**19- Customs and Duties on Imports:** consist of taxes on goods and services that become payable at the moment when those goods cross the national or customs frontiers of the economic territory or when those services are delivered by non-resident producers to resident institutional units.

**20- Subsidies:** are current unrequited payments that government units, including non-resident government units, make to enterprises on the basis of the levels of their production activities or the quantities or values of the goods or services that they produce, sell or import. They are receivable by resident producers or importers. In the case of resident producers, they may be designed to influence their levels of production, the prices at which their outputs are sold or the remuneration of the institutional units engaged in production.

- 21- Intermediate Consumption:** consists of the value of the goods and services consumed as inputs by a process of production, excluding fixed assets whose consumption is recorded as consumption of fixed capital.
- 22- Value-added by Basic Prices:** The value of output by basic prices less the value of intermediate consumption by purchasers prices.
- 23- Gross Domestic Product:** is the sum of the gross values added of all resident producers at basic prices, plus all taxes less subsidies on products.
- 24- Depreciation:** Consumption of fixed capital is the decline, during the course of the accounting period, in the current value of the stock of fixed assets owned and used by a producer as a result of physical deterioration, normal obsolescence or normal accidental damage.
- 25- Compensation of Employees:** Is defined as the total remuneration, in cash or in kind, payable by an enterprise to an employee in return for work done by the latter during the accounting period. Taxes less subsidies on production consist of taxes payable or subsidies receivable on goods or services produced as outputs and other taxes or subsidies on production, such as those payable on the labor, machinery, buildings or other assets used in production.
- 26- Gross Operating Surplus:** gross operating surplus is the value-added by basic prices less the compensation of employees.
- 27- Net Operating Surplus:** net operating surplus is the value of gross operating surplus less the value of depreciation (the consumption of fixed capital).
- 28- Final Consumption Expenditure of Household:** consists of the expenditure, including expenditure whose value must be estimated indirectly, incurred by resident households on individual consumption goods and services, including those sold at prices that are not economically significant and including consumption goods and services acquired abroad.
- 29- Final Consumption Expenditure of General Government:** consists of expenditure, including expenditure whose value must be estimated indirectly, incurred by general government on both individual consumption goods and services and collective consumption services.



**30- Final Consumption Expenditure of NPISHs:** consists of the expenditure, including expenditure whose value must be estimated indirectly, incurred by resident NPISHs on individual consumption goods and services and possibly on collective consumption services.

**31- Fixed Capital Formation:** fixed capital formation is the certain additions to the value of fixed assets during the accounting period.

**32- Changes in Inventories:** are measured by the value of the entries into inventories less the value of withdrawals and less the value of any recurrent losses of goods held in inventories during the accounting period.

**33- RAS Method:** is a mathematical method used to conduct the balance between supply and use tables.

## **VI. Reference period:**

Year 2016/2017 for public, public business sector, exports and imports while year 2016 for the private sector.

## **VII. Data Sources:**

The compilation of supply and use tables for 2016/2017 depends mainly on: (1) the detailed data of the periodic bulletins issued by the CAPMAS for various economic activities, (2) Results of some periodic and non-periodic surveys conducted by the CAPMAS such as: Household Income, Expenditure and Consumption Survey (HIECS) and Labor Force Survey (LFS). In addition to some data that published by other relevant authorities where the most important of them are:

- Bulletin of Statistical Costs of Production and Net Return issued by the Ministry of Agricultural and Land Reclamation (MOALC),
- Bulletin of Estimates Agricultural Income issued by the MOALC,
- The State Closing Account issued by the Ministry of Finance,
- Financial Statements of the Economic Authorities,
- Balance of Payments (BOP) issued by the Central Bank of Egypt (CBE).
- The balance sheet of Central Bank of Egypt.

## **VIII. Classifications:**

- 1- Classification Of Function of Government (COFOG)
- 2- Central Product Classification Version 1.1 (CPC)
- 3- International Standard Industrial Classification Version 4 (ISIC4)
- 4- Classification of Individual Consumption According To Purpose (COICOP)
- 5- Harmonized Commodity Description and Coding System (HS)
- 6- Transactions Classification, SNA 1993, 2008
- 7- Transactors Classification, SNA 1993, 2008
- 8- Balance of payments manual (Sixth Edition)

Production activities have classified by ISIC4 while products have classified by CPC1.1.

## **IX. The Most Important Processing:**

- 1- **Agricultural Activities:** The estimates in these activities based on the Annual Bulletins issued by the Ministry of Agriculture and CAPMAS for the agriculture year 2016/2017 to estimate the output at basic prices, intermediate consumption at purchaser prices and wages for each activity. It is worth noting that the livestock output, production of agricultural services and post-harvest activities that is not estimated in the publications of the ministry of agriculture have been estimated in these activities.
- 2- **Petroleum Refining Activity:** it represents special importance within the manufacturing industries. Regarding subsidies on petroleum products, it depends on data from the Ministry of petroleum and the industrial Annual Bulletins issued by CAPMAS, The State Closing Account in addition to the ministry of planning data. The production was measured at basic price, and the intermediate consumption at purchaser price like the production inputs in the other activities. This treatment shows implicit subsidy on petroleum products paid by the government.

**3- Electricity and Gas Activities:** The estimates in these activities based on the Annual Bulletins of Electricity and Energy Statistics for 2016/2017 issued by CAPMAS.

**4- Banking output:** Banks offer two types of services as follow:

a. **Financial intermediary service indirectly measured (FISIM):**

The monthly reports of the Central Bank of Egypt have used to know the opening and closing value of deposits and loans in banks of the concerned year, and to know the interest rate on loans and deposits and Interbank discount rate. where FISIM is estimated as follows:

FISIM = (Total value of loans multiplied by the interest rate on loans minus the total value of loans multiplied by the inter-bank discount rate) + (Total value of deposits multiplied by the discount rate between banks minus the total value of deposits multiplied by the interest rate on deposits).

This way is more accurate than that relying on the difference between interests earned and interests paid. The financial services that estimated indirectly have been distributed among the sector and economic activities passed on the types of loans and deposits by activities.

b. **The actual output of banks:**

It includes revenue from commissions, profits and losses on the sale of foreign currencies and other banking services.

**5- Insurance Companies Output:** Insurance Corporations receive insurance premiums, investing them and pay compensations for damages.

The estimated production = Collected premiums

- Paid Compensation

+ Net investment income

- Changes in reserves

While for the actual output is calculated as follow:

The actual output = Reinsurance commissions

+ Other earnings

+ Rentals

**6- Social Insurance Output:** Social Insurance Companies receive social premiums, invest them, and pay retired pensions. It estimated by cost according to the recommended equation in SNA 2008 as follow:

$$\begin{aligned} \text{The estimated Output} &= \text{Intermediate Consumption} \\ &\quad - \text{Employees' compensation} \\ &\quad + \text{Fixed Capital Consumption} \\ &\quad + \text{Other taxes on production} \\ &\quad - \text{Other subsidies on production} \end{aligned}$$

**7- Government Accounts:** the government outputs is estimated in a different way than the output of other sectors, where the government produces services of general purpose without profits seeking. Consequently, the value of government output will not be the value of the revenues received by the government, but will be the value of the spent costs in providing the public services (Costs approach). Such expenses include the employees' compensation, the purchases of goods and services, imposed taxes and fees paid by government units and the value of depreciation. Whereas the government accounts do not involve depreciation estimates, it estimated in national accounts as a percentage of governmental wages.

**8- Health Insurance Authority** treated as a health activity but not insurance activity.

**9- Real estate Activities:** The number of units is obtained from the Population, Housing and Establishment Census 2017 which had been conducted by the CAPMAS by governorate that is adjusted according to the status in 2016/2017. However, average monthly rent per unit has obtained from the Rent Survey conducted by CAPMAS in 2014/2015

**10- Actual and imputed rents for housing:** the estimates of the value of actual and imputed rentals for households depended mainly on the data from HIECS 2015.

**11- Transportation and Trade Margins:** Trade and Transport Margins are estimated as follow:

- a. Tourism Survey details are used in estimating total transport margin of freights by activity (land, railways, water and air transport).
- b. The annual bulletins of wholesaler and retailer trade for both public and private sectors are used in estimating the trade margins of products. In

- doing the same, the details of sales, purchases, change in inventories and commissions by economic activity as well as the details of sales and
- d. The margins of transport and trade on the products were distributed in a special column in the supply table to obtain the value of these products at the purchaser's price. These margins were set at a negative value in front of the rows of the trade and transport products, In order to achieve a balance between the supply and use of transport and trade services at the purchaser's price.

## **12- Exports and Imports:**

- a. **Exports and imports goods:** It depend on the foreign trade database issued by CAPMAS according to (HS) classification, and it has been converted in accordance with the Central Product Classification (CPC1.1), by linking between the two classifications.
- b. **Exports and imports services:** It depends on the data of balance of payments prepared by the Central Bank of Egypt and was placed in a special column for exports and imports services separately from exports and imports goods.
- c. **Residents' purchases from the ROW:** The data of this item have obtained from the debtor side in the BOP (Travel Item). Two columns for **Residents' purchases from the ROW** have added to imports at the SUPPLY table and to Final Consumption Expenditure at the USE table. Thus, the final consumption expenditure and imports have increased by such values on the merchandise products level.
- d. **Non-Residents' Purchases from the Domestic Market:** The data of this item have obtained from the creditor side in the BOP (Travel Item). Two columns for **Non-Residents' purchases from the domestic market** have added to exports and subtract from Final Consumption Expenditure in USE table. Thus, such values have deducted from the final consumption expenditure and exports have increased by such values on the merchandise products level.

- e. distribution of the purchases of residents abroad and the purchases of non-residents at home is distributed according to the main items of expenditure of goods and services depending on the results of the tourism survey. Purchases by residents abroad are allocated to household Final Consumption expenditure at the product level and are considered Imports, while the purchase of non-resident is subtracted from household Final Consumption expenditure and is considered Exports.

**13- Matrix of taxes and custom duties on imports:** The estimation of taxes and tariffs depend on the closing accounts of general government issued by the Ministry of Finance, as it represented in taxes on goods and services, international trade taxes, and business taxes. These taxes were divided into two column in the supply table:

- a. **Custom duties on imports:** They represent the value of international trade taxes, except taxes on exports, and The distribution of customs duties on products and taxes on imported goods was obtained from foreign trade statistics based on Customs Department data.
- b. **Sales taxes on imported goods:** They represent the value of sales taxes on imported goods; the distribution of taxes on imported goods is obtained from foreign trade statistics based on customs data.
- c. **Sales taxes on domestic goods:** They represent the value of sales taxes on domestic goods.
- d. **Other taxes on products:** They represent the gross taxes on goods and services, while they do not include customs taxes and sales taxes on imported and domestic goods. They have been distributed according to products of supply tables through the details existing in the losing accounts of general government.
- e. **Subsidies Matrix on products:** The estimation of subsidies depends on closing accounts of general government according to the economic classification.

- 14- Final Consumption Expenditure of Households:** This final expenditure was calculated based on Household Income, Expenditure and Consumption Survey (HIECS) 2015, where a link between the Central Product Classification (CPC 1.1) and Classification of Individual Consumption According To Purpose (COICOP) has been done, beside that taking into account the nature of each product in terms of use as intermediate or final consumption, or capital formation where the final expenditure for certain products were estimated as a residual in use table. As a result there is a big difference between household consumption in the use table and income and expenditure survey.
- 15- Final Consumption Expenditure of General Government:** It was estimated by indirect way, through the cost of production minus the value of sales of goods and services and Fees which is equivalent to the total of non-marketed production in government.
- 16- Capital Formation:** Capital formation was distributed by product type for each activity.
- 17- Adjustment of Prices from Basic To Purchases Prices:** As noted earlier, the supply table is converted from basic prices to the purchaser prices by adding transportation and trade margins, net taxes and custom duties. By this way, the total supply at purchasers price was obtained for consistency with the use table which prepared by purchasers prices.
- 18- Estimation of Non-Observed Sector:** The Labor Force Survey (LFS) data had used in estimating the output of statistically non-observed sector for some economic activities. Output was estimated by using the difference between the number of employees in the concerned bulletins by activity and the number of employees in the corresponding activity in the LFS by multiplied by the average employee productivity by activity obtained from the concerned bulletins. In addition to the usage of the Consumer and Producer Price Indices. Also the Industrial Production Index is used to estimate some Manufacturing activities. Merchandise and service requirements, wages and other economic data were estimated by using ratios and technical coefficients from the concerned bulletins. The HIECS was used to derive the outputs of some services by using the total households' expenditure on services. The Commodity Flow Methodology was used during the balancing process

between supply side and use side to estimate the domestic output of some products.

- 19- The structure of supply and use tables for year 2014/2015 had been used in compiling supply and use tables for year 2016/2017 (technical coefficient matrix).
- 20- The RAS technique is used to balance the intermediate consumption matrix after redistributing the differences, by product, between the supply side and use side.

### **The Main Problems:**

- 1- The difficulty of classification of taxes and subsidies by product on which taxes are imposed and received subsidies.
- 2- The difficulties of allocating transport margins by type of product.
- 3- Inconsistency between the data due to relying on different data sources in both supply and use sides.
- 4- Difficulty of estimating non-covered activities statistically or which has lacked comprehensive and accuracy data sources.

### **The Availability of the SUT:**

The tables are available as soft copy on CD and electronically on CAPMAS website.