Arab Republic of Egypt
CAPMAS

Input – Output tables

2008/2009

Within the Framework of National Accounts System

"Input-Output tables" 2008/2009

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Preface

The Central Agency for Public Mobilization and Statistics Pleased to present Input Output tables for the year 2008/2009 in accordance with the methodologies and definitions recommended by the System of National Accounts 1993 and its modification for year 2008**(SNA1993,20008),** where it depends in its compiling on Supply and Use Tables which conducted by CAPMAS.

For the desire to provide a macro-economic data valid to analyze and evaluate the performance of the Egyptian national economy**,** CAPMAS presents these tables to support the purposes of macroeconomic analysis, rationalize the process of economic policy-making, and take the necessary decisions to address the economic tracks.

CAPMAS will be glad to receive suggestions and comments from those interested in economic and financial studies, which contribute in developing the work and improve the quality of data in the future.

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President of Central Agency for Public

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Methodology

I.   <u>What is an Input-Output Table ?</u>

Input-Output tables are considered as an Important progress in the system of National Accounts where some of these systems were limited in depicting national economic aggregates in the form of national income and other economic aggregates, whereas other systems of National Accounts are expanding to include some of the economic models such as monetary and financial flows, and input and output models which is based mainly on the classification of the components of these aggregates in order to clarify the interrelations between the national economic and interrelationships between various industries where every industry uses the products of the other industries as an intermediate consumption and the products of this industry can be used as capital formation in another industry. These tables became an important centre within the system of National Accounts because it can be read from two perspectives:

1. The ways of utilization or demand weather it's intermediate or final demand.
2. The requirements of production which is the input materials that used in production, in other words, the activity cost in achieving this production weather payments for intermediate requirements or payments for using the production factors.

therefore we find that the summation of the row is equal to the summation of the column for the same activity.

In the Input-Output tables, the economic activities are displayed as producer in rows and as consumer in columns. These tables are considered as an important tool in studying the interrelations between the various sectors of national economy in order to know the structure of these interrelations weather between the various activities (intermediate consumption), or the relation between these activities and the components of the final demand (final consumption, gross capital formation, exports minus imports), and the components of value added (compensation of employees, and operating surplus)

II. Structure Of Input-Output Tables

Input - Output tables consists of four main matrices as follows:

1. **Intermediate Demand Matrix**: This matrix displays the interrelation between various economic activities by square tables where the economic activities are displayed as producer in rows and consumer in columns. This matrix includes all transactions of domestic and imported commodities and services, which are used as intermediate consumption in various economic activities of production units. Each row represents a particular economic activity and the method of distributing the intermediate demand for its products, and the intermediate imports, while the corresponding column of the activity shows the uses of this activity from its own production, and from the production of other economic activities, and from imports.

2. **Final Demand Matrix:** This matrix displays the interrelation between economic activities and the components of final demand (final consumption of government and households, gross capital formation, exports minus imports).
   This matrix also includes the domestic production and imports of various commodities and services received by final use sectors which include household sector , non-profit institutions serving households, and public government. This Matrix also includes the gross fixed capital formation in productive activities, and the change in inventory as well as exports minus imports.

3. **Value Added Matrix:** This matrix displays the interrelation between various economic activities and the components of the value added (revenues of production factors, wages, operating surplus).

4. **Production Matrix:** this matrix represents the aggregate production of economic activities horizontally and vertically so that the summation of the inputs is equal to the summation of the outputs for the same activity.

III. Importance of Input–Output Tables:

1. Input-Output tables are used as a basis for coordination between the different objectives of the economic plan in the country so that it can be implemented without causing bottlenecks.

2. The input-Output tables are considered as an important tool for economists. These tables provide details of more productive activities within the economy which shows

participation is more clearly in the GDP. The importance of Input-Output Tables highlight through it's use by researchers and economic analysts in the public and private sectors, in addition to enriching activities of the research centers specialized in this field.

3. Input-Output tables describe the importance of both exports and imports for domestic production, especially if competitive imports and complementary imports are separated.

4. Input-Output tables reflects the interdependence between different economic groups.

5. These tables provide statistically integrated framework for basic statistical data that should be available, as well as shortcomings and deficiencies in the available data which helps statistical agencies to rectify this when preparing statistical programs.

6. These tables reflect the image of the productive structure of the national economy during a certain period that also determines the structure of the production and uses of commodities and services in the national economy.

7. These tables creates an economic criteria which helps in the comparison between the various economic projects in terms of their respective priority in the implementation based on the marginal efficiency of capital and the volume of production, employment and dependency on imports, as well as some other economic indicators.

8. These tables provide the data needed to study the effect of any change in the prices of intermediate inputs, wage rates and tax policies on the pricing of intermediate and final products.

9. The importance of input-Output tables highlights through it's use by decision-makers, policy-makers and development program makers. Their importance is also due to their ability to identify activities leading to the national economy and guiding investments and incentives to them, as well as knowing of all the linkages to a particular industry and by which we can know the impact of economic policy in a particular industry on the rest of the other industries.

10. Using Input-Output tables for the purposes of forecasting gross domestic final demand, or the result of certain policies during a period of time and through the construction of Input-Output models and by installing a matrix of technical coefficient and make Leontief inverse matrix.

11. Input-Output tables are used to measure the structural transformation which describes the degree of intersection among sectors to determine and to calculate the technical coefficient resulting from Input-Output tables to determine the economic structure of

the country weather it is a primary or industrial or service, and describes Input-Output tables structure of final demand, which affects the process of structural transformation.

12. Input-Output tables provide methods of checking estimates of national income in ways of production, expenditure, and income

IV. The Balance Between the Value-added and Final Demand in Input–Output Tables:

Input–Output tables provide a great benefit through their ability to collect the value added according to economic activities, and to calculate the final demand by activity that check these tables connections between the value added and the final demand ,that depends on GDP must equal the final demand. In this frame we check integration between the three methodologies to measure GDP : Production approach, Income approach, Expenditure approach as follows :

1. Production Approach:

We get the GDP by subtracting intermediate input from output of all producers in the national economy.

GDP = Output - Intermediate input

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 - subsidies on production) + mixed income + total surplus

3. Expenditure Approach:

GDP can be measured by expenditure approach, which calculates GDP by adding the components of the final demand.

GDP = Household final consumption expenditure + final consumption expenditure of non-profit institution serving households + final consumption expenditure of government + Gross capital formation + exports - imports + net taxes on products.

V. **Basic Assumptions of Input–Output tables:**

1. **Homogenous Between Products:**

As basic assumption of input–Output table that every industry produces a commodity or group of homogenous commodities which isn't produced in another industry.   Homogenous condition achievement is necessary to find unified cost structure .When the perfect homogenous condition is too difficult to get, the one unit produces more than one product, where the production of a commodity may lead to producing another commodities. That production process in any industry may lead to producing another commodities which differs in their nature from the basic production of this industry, and these products are called :

A. **Auxiliary Products**: these products are produced in an industry and are technically connected with the main product of this industry while producing or may be produced mainly in another industry (for example airplane engines which are produced in the car industry).

B. **Secondary Products:** these products are produced in an industry that is not connected with the main product of this industry and are mainly produced in another industry.

C. **Related Products:** these products are produced in an industry beside the main product of this industry and are not produced mainly in other industries such as leather made by the meat production.
   Auxiliaries products, And secondary products, are treated in Input–Output table in many ways, but Related Products are included in the characteristic production of the industry.

2. **Technical Coefficient Stability:** if the homogenous condition is achieved in classification of columns and rows of the Input–Output table, it will be necessary that the cost structure of this homogenous group of products are stable and if proven cost structure that the technical coefficient extracted from the intermediate demand matrix will be stable but scientific and technological development affects on the art of production, which affects the cost structure and therefore technical coefficient that have been calculated.

VI. Definitions and Concepts:

Input-Output tables have been compiled according to the United Nations System of National Accounts for the year 1993, and the most important definitions used in the framework of this system are as follows:

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 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. **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.

3. **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.

4. **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.

5. **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.

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

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

8. **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.

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

10. **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.

11. **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.

12. **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.

13. **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.

14. **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 of.

15. **Tax 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.

16. **Taxes 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.

17. **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.

18. **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.

19. **Value-added by Basic Prices:** The value of output by basic prices less the value of intermediate consumption by purchasers prices.

20. **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.

21. **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.

22. **Gross Operating Surplus:** Gross operating surplus is the value-added by basic prices less the compensation of employees.

23. **Net Operating Surplus:** Net operating surplus is the value of gross operating surplus less the value of depreciation (the consumption of fixed capital).

24. **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.

25. **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.

26. **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.

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

28. **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.

VII. **Reference Period:**

Year 2008/2009 for the public and public business sector while year 2008 for the private sector.

VIII. **Data Sources**

Compilation Of Input-Output tables depend on Supply and Use tables published by CAPMAS for year 2008 /2009.

IX. Used Classifications

International Standard Industrial Classification of All Economic Activities (ISIC.4)

X. The Method of Derivation Input-Output Tables From Supply And Use Tables

Input-Output tables had been derived from Supply And Use tables published by CAPMAS from compilation some matrices as the follows :

1. Compilation of Taxes and Subsidies Matrix: where the total of the summation of this matrix according to rows should be equal to the total of the column of Net Taxes, Subsidies and Tariffs in supply Table. Make summation for Net Taxes, Subsidies and Tariffs according to one row for all economic Activities and Final Demand Component.

2. Compilation Transportation Margins Matrix: where the total of the summation of this matrix according to each row should be equal the total of the columns of Transportation Margins in supply Table.

3. Compilation Trade Margins Matrix: where the total of the summation of this matrix according to each rows should be equal the total of the column of Trade Margins in the supply Table.

4. Compilation Use Table at Basic Prices: is derived from the following equation

   The use at basic prices = The use at purchasers prices - Net Taxes ,Subsidies and Tariffs - Transportation Margin - Trade Margin.

5. The conversion between Economic Activities and Products in Use Table at basic prices according to rows level , which make aggregates for homogenous products according to Central Product Classification (CPC1.1) and convert it to correspondence economic activities according to International Standard Industrial Classification of All Economic Activities (ISIC.4).

6. The conversion between different Classifications in Use Table at basic prices according to column level, which converts them to the International Standard Industrial Classification (ISIC.4), resulted from converting Government Classification (COFOG), Households Classification (COICOP), and Non-Profit Institutions Serving Households Classification (COICOP) to International Standard Industrial Classification (ISIC.4).

7. Convert the total intermediate inputs from basic prices to purchaser's prices by adding row for net taxes, subsidies and tariffs which calculated from the total net taxes and subsidies on products matrix according to column level.

8. Make the balance between rows and columns in Input-Output tables where the outputs according to every activity equals the inputs for the same activities and makes the balance by adding special row for differences caused by distributing secondary products for every activity in the tail of the table in the value added quadrant.

9. Put the imports in final demand component quadrant and subtract it from final demand value.

XI. Technical Coefficients Matrix

Technical coefficients Matrix represents structural equations that reflect relationships between Inputs and Outputs as featured using absolute values in the Input-Output tables. Technical coefficient reflects the inputs needed to produce one unit of product industry and it is derived from Input-Output tables, where it is considered the main base in using the mathematical method to solve model's equations when used in economic forecasting. The calculation of Technical coefficients based on intermediate consumption matrix, value added matrix, and total inputs for all economic activities contained in used model, and that by dividing each cell of column activity on the total input of this activity, and convert the absolute values of columns and rows to relative values to reflect the technical and technological method used in different industries. It shows what the unit need from products of different industries' production and the values added. Technical coefficients are considered the scientific basis which are used in preparing and updating any future Tables. However that can be applied in the short term where there is a possibility technological changes as well as differences in prices.

XII. Compiled Matrices

1- Input-Output Table at basic current prices by categories for Economic Activities and it involves an Intermediate Demand Square Matrix for twenty categories.

2- Technical coefficients Matrix for Intermediate Demand, which is a Square Matrix for twenty categories.

3- Input-Output Table at basic current prices by economic activity, which involves an Intermediate Demand Square Matrix (44× 44).

4- Technical coefficients Matrix for Intermediate Demand by economic activity, which is a Square Matrix (44× 44).

Note: There are little computational differences due to approximation.