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Using (I-O) tables to measure the effectiveness of public spending and trade multiples Foreign Ministry in the Iraqi economy for the period (2010-2018)

[1]Mohammed Hussien Kadom , [2]Ammar Mahmood Hameed , [3]Hyder Jawad Kadhim , [4]Anes Abdulredah Yossef

ABSTRACT-- *We used a new method for calculating the multiplier, which is the input and output method that contains foreign trade, and we used this method to calculate multiples at the level of each sector of the national economy in the Iraqi economy for the period (2010 - 2018). We relied on the technical transactions matrix issued by the Iraqi Ministry of Planning, the National Accounts Department for the year (2010), and we used complex sectoral growth factors to obtain the matrix in 2018, and we made a comparison between the two matrices after applying the product model used in its mathematical formula to the two matrices to solve them and obtain the sectorial outcomes and final and total demand Likewise, the added value, as we obtained sectorial interconnections in all their direct and indirect forms, forward and backward, and then sectorial multiples were obtained which we found to have decreased significantly in the year 2018 compared to 2010 and that the reason The main reason behind this decline is the weakening of the forward and backward sectorial interlink ages due to excessive dependence on the foreign trade sector, especially imports.*

Keywords*--Iraqi economy, measure, (I-O) tables, Foreign Ministry*

I. INTRODUCTION

The multiplier issue occupies a distinct importance at the macroeconomic level as well as at the level of sectors because it represents the amount of response or the amount of influence that a particular variable leaves on another variable as a result of changing demand for products or outputs of the sector or activity or the variable concerned. The study of the multiplier theory means in one way or another the study of demand theory at the macroeconomic level and the mechanism of transmission of the effects of that demand on the output of the sector or the economy as a whole. In our research, we considered calculating the multiplier in a different way from the known traditional methods, and this difference is represented by two aspects. The first side will be the multiplier calculated not at the macroeconomic level but at the level of sectors, and the second aspect is the calculation method, The input and output method (IO) will also be used to calculate sector multiples and knowledge of the mechanism of transferring the effects of demand on sectoral output or sectoral supply and then a reflection on the

[1] *Faculty of Administration and Economics, University of Karbala, Mohammad.h@uokerbala.edu.iq*

[2] *Faculty of Administration and Economics, University of Karbala, Ammar.m@uokerbala.edu.iq*

[3] *Faculty of Administration and Economics, University of Kufa, haiderj.kadum@uokufa.edu.iq*

[4] *Iraqi Civil Aviation Authority, At.eco@icaa.gov.iq*

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size of (gross national product) at the level of the economy as a whole in an open economy to try to know the impact of internal and external demand, because the effects of demand Domestic is known as the public spending multiplier, and the influence of external demand is known by the foreign trade multiplier. Note that the multiplier will be calculated as a whole, meaning that the value of the sectoral multiplier includes the value of the multiplier together[1-6].

The main problem that the research tries to address is that there is a clear decline in the performance of economic sectors during the study period, which is reflected in the effectiveness of sectoral multiples at the level of each sector and the level of the economy as a result of the Iraqi economy's heavy dependence on imports, which leads to weak multiplier effects in the local economy and the emergence of its effects abroad.

Starting from this problem, this research will be based on the assumption that the multiplier of public spending is effective in the Iraqi economy, given the large volume of demand compared to supply at the level of the economy as a whole and at the level of each sector, but there are factors that limit this effectiveness, including the multiplier of foreign trade, which represents a leakage component from the current of income and output, including the weak sectoral response between the local sectors, which leads to the strengthening of the first factor represented by asylum abroad, meaning the increase in the multiplier of imports, which leads to a decrease in the effectiveness of the public spending multiplier[7-10].

First: The productive user method (Input-Output) at the level of the national economy:

Technique of the productive user is based on the analysis of the national economy into a number of sectors so that each sector represents a homogeneous unit and then show the flows of each sector in the form of simple equations that are resources and uses equations. And the flows between these sectors appear in the form of mutual goods and services, and this appears in the form of buying and selling deals. The size or amounts of this exchange vary according to the size and activities of the sectors. And lack of attention to that means that the sectors may become in a state of deficit or surplus in production. In the event of a deficit in production, we find that the receiving sector is in a situation with which it is difficult to continue with production operations, and this in turn represents a failure to provide production requirements for itself and the rest of the sectors. Thus, we see that the growth of a specific sector requires an increase in the amounts of the supplies it uses, but the production of these requirements lies with the sector itself and the rest of the sectors, and therefore these sectors must also expand in order to be able to provide the aforementioned sector with the necessary (increasing) amounts, and the sector expansion the latter calls for the expansion of the sectors that feed its products. Thus continues the chain whose details can only be depicted by the user - product. These sectors are produced to finance themselves and the rest of the sectors, and this means that each sector is a recipient and equipped at the same time, and the sector appears as a recipient in the user-product table horizontally, while the appearance of the sector as a provider appears in the table vertically, so the flow between these sectors is determined in the vertical direction towards the same sector and other sectors.

This method is concerned with tracking the effects of individual decisions of production units or sectors on the rest of the national economy. In spite of the first (user-product) interest is next to production in the economy, it is concerned with the idea of general balance at the sector level and the level of the economy, as it tries to take into consideration the overlapping and interlocking of production plans and the activities of different industries. This interconnection stems from the fact that each sector uses the products of other sectors as intermediate uses and its

output is often used in turn by all or some other producers as a factor of their production, so steel is used, for example, to make railroad carriages, which in turn are used to transport steel, coal, and raw iron used in their manufacture and so on. Examples. This type of studies is sometimes called the economics of industrial relations [11-12].

Secondly: Mathematical Analysis of (I-O) Model

Although the study of the productive user is shrouded in a lot of theoretical complications in order to achieve the applied quantitative measurement, it has proven on the ground the importance of the results of this type of analysis, and after the increased interest by countries in providing the necessary statistical data, the importance of this analysis has increased, especially in the field of economic planning and accounts national income. Building an (I-O) model depends on economic relations that represent the general balance of demand for a good or service and its supply in the market and in a specific period of time, in other words that the total supply of sector products (i) equals the total demand for sector products (i) by economic sectors the other (j) including the sector (i) itself is added to the final demand, which we symbolize (Fd) or consumption that consists of: private consumption, public consumption (current government spending), investment, exports, and imports. This means that the total demand (Xi) of any economic sector is equal to the (ID-Intermediate Demand) of the sector's products plus the final demand (Fd) or consumption.

And it is possible to build a simple mathematical table to clarify the table (I-O) before delving into the applied aspect of the Iraqi economy, by using a matrix called the matrix of transfers, which can be represented in any economy as in table (1) **(5)** through which it is observed:

(X_{11}): represents what sector (1) needs from sector (1) to produce (X_1).

(X_{12}): represents what sector (2) needs from sector (1) to produce (X_2).

(X_{21}): represents the amount of sector (1) that sector (2) needs to produce (X_1).

(X_{22}): represents what sector (2) needs from sector (2) to produce (X_2).

(X_1): The total production for the first sector. (X_2): The total production for the second sector.

(X_i) = (X_j) (aggregate supply = aggregate demand) for each sector.

$\sum X_i = \sum X_j$ Total aggregate supply = sum of aggregate demand.

Whereas, (Xij) represents the amount of sector (i) sold to sector (j) to produce (ij) of the product.

$\sum_{i=1}^{n} Fd_i = \sum_{i=1}^{n} V_i$ Total added value = total final request

Gross Domestic Product = (total aggregate supply or aggregate total demand) + (gross value added or total final demand), i.e. :

$$GDP = \sum Xior \sum Xj + \sum Fdior \sum Vi$$

Assuming that there are (n) sectors and one final request, economics transactions can be represented in the following mathematical model:

$$\sum Xi = \sum_{j=1}^{n} Xij + FDi \quad , \quad \sum Xj = \sum_{i=1}^{n} Xij + Vj$$

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whereas:

Total demand for sectors $X_{11} + X_{12} + FD_1 = X_1$

$$X_{21} + X_{22} + FD_2 = X_2$$

The overall width of the sectors $X_{11} + X_{21} + V_1 = X_1$

$$X_{12} + X_{22} + V_2 = X_2$$

Table 1: Matrix of Remittances in a Simplified Economy

	Intermediate demand		Final demand	Total demand
Output / Input	**Sector (1)**	**Sector (2)**	**Final demand**	**Total output**
Sector (1)	X_{11}	X_{12}	Fd_1	X_1
Sector (2)	X_{21}	X_{22}	Fd_2	X_2
Value Added	V_1	V_2	$\sum_{i=1}^{n} Fd_i = \sum_{i=1}^{n} V_i$	$\sum X_i$
Total input	X_1	X_2	$\sum X_j$	$\sum X_i = \sum X_j$

As the vertical march of the sector gives us the total width of the sector, while the horizontal march of the sector gives us the total demand for the sector.

Third: Technical Coefficients Matrix

In view of the difficulty in dealing with absolute values, we will try to set a table (I-O) in a way that clarifies technical economic relations between different sectors and activities, i.e. the extent of economic intertwining that exists between sectors on the scale of the national economy. The technical laboratories of the receiving sector in relation to the prepared sector show the quantity of the products of the prepared sector distributed from the production value of one monetary unit to the receiving sector in one unit (or by a certain number of units) that requires a quantity of the products of the prepared sector to achieve this volume of production in the receiving sector. These coefficients for inputs can be calculated by dividing the median flow (Xij) by the sum of the sector's total inputs (Xj). These coefficients for outputs

can also be calculated by dividing the intermediate flow (Xij) by the sum of the sector's total outputs (Xi). wherea

Matrix backlinks $\left(aij = \frac{Xij}{Xj}\right)$ and the forward link matrix $\left(bij = \frac{Xij}{Xi}\right)$

Returning to Table (1), (X_{11}) (represents what the sector (X_1) used in its production as a percentage of the total of this production

$\left(\frac{X_{11}}{X_1}\right)$ It represents what the sector used (X_1) of its production as a percentage of the total of this production

$\left(\frac{X_{12}}{X_2}\right)$ It represents what sector (X_2) sold from its output to sector(X_1) as a percentage of total output (X_2)

$\left(\frac{X_{21}}{X_1}\right)$ it represents what the sector (X_2) bought from the sector's production (X_1) as a percentage of the total production (X_1)

$\left(\frac{X_{22}}{X_{22}}\right)$ It represents what the sector used (X_2) of its production as a percentage of the total of this production

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Let the technical coefficients matrix be used to calculate sectoral output, as in the following equations:

$$a_{11}x_1 + a_{12}x_2 + Fd_1 = X_1$$
$$a_{21}x_1 + a_{22}x_2 + Fd_2 = X_2$$

Fourth: Sectoral correlations

The sectoral correlations included in the (I-O) model are divided into two types of correlations:

1- Direct Connections: It is divided into two types as well

1- Direct Backward Linkages (DBL) :

It is extracted from the matrix backlinks (aij) which are extracted according to the following formula:

$$aij = \frac{Xij}{Xj}$$

The general formula used to extract these associations is:

$$DBL = \sum_{i=1}^{n} aij$$

2-: Direct Forward Linkages (DFL):

It is extracted from the forward bindings matrix (bij), which is extracted according to the following formula:

$$bij = \frac{Xij}{Xi}$$

The general formula used to extract these associations is:

$$DFL = \sum_{j=1}^{n} bij$$

2- Indirect Connections: It is divided into two types

1- Indirect Direct Backward Linkages (IDBL)

It is extracted from the matrix of indirect back-links (Cij), which are extracted according to the following formula:

$$Cij = \frac{adj(I - A)}{|I - A|}$$

The general formula used to extract these associations is:

$$IDBL = \sum_{i=1}^{n} Cij$$

2- Indirect Direct Forward Linkages (IDFL)

It is extracted from the direct forward interconnection matrix (Oij), which is extracted according to the following formula:

$$Oij = \frac{adj(I - B)}{|I - B|}$$

The general formula used to extract these associations is:

$$IDFL = \sum_{j=1}^{n} Oij$$

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The sector with the largest direct and indirect front and back linkages is a leading sector (vital) on the economic level.

Fifth: The open (I-O) Model

In the open model, the sum of each column in the technical transaction matrix must be less than the correct one, as each column represents the partial input cost paid to produce what is worth one monetary unit of a commodity. In the event that the total exceeds one monetary unit, this means that the production of that commodity has no economic justification. Accordingly, the sum of each column in the matrix of technical transactions must be less than the correct one, i.e. meaning:

$\sum_{i=1}^{n} \quad aij < 1$

Since the value of the product is a monetary unit, it must be fully absorbed as payments for all production elements, and the amount in which the total of the column is less than one monetary unit should represent the payment to the initial entry for the open sector. Thus, the value of the initial inputs used to produce one unit of commodity (j) is assumed to be:

$$\left(1 - \sum_{i=1}^{n} \quad aij\right)$$

The general formula for extracting sectoral output according to the user model produced in a closed economy is:

$$Xi = (I - A)^{-1} * FD$$

whereas:

Xi: Sector outputs , I: The matrix represents the unit =[1 0 0 0 1 0 0 0 1]

A: The interconnection or technical coefficients matrix (aij), (I-A): represents the UNITIV matrix.

$(I-A)^{-1}$: The inverse of the matrix represents the LONITIV ,

FD: The column represents the final request.

The general formula used to extract sectoral output in an open economy is:

$$Xi = (I - A)^{-1} * (F_i - M_i)$$

whereas: $(I-A)^{-1}$: Represents the inverse of the LONETIVE array,

(F) :It represents the demand for sectoral production by the domestic and abroad sectors. and surely: $(F = C_i + E_i)$, Note that (Ci) represents domestic demand represented by public and private consumption and investment, i.e. private consumption spending plus government and investment spending, while (Ei) represents external demand for domestic sector production represented by demand for exports or domestic production prepared for export.

Where (F-M) or the so-called net demand or total final request is calculated as follows:

$$F_1 - M_1 = (C_1 + E_1) - M_1 \quad ; \quad F_2 - M_2 = (C_2 + E_2) - M_2$$

Thus, for the rest of the sectors, note that (Mi): imports represent the level of each sector.

***Sixthly: Input-Output Multiplier*:**

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There is no doubt that the changes to the final demand (Fd) by one unit will have an impact of a certain amount on each of the sectors 'production and on the total production. The user's schedule of production can be used for this purpose. To illustrate this, we take the following example:

Assuming that the technical coefficients matrix (aij) and the final demand vector (FD) for sector products in a simplified economy are made up of two sectors:

$$aij = [0.2\ 0.1\ 0.3\ 0.4\ ]$$

$$Fd = [100\ 50\ ]$$

In order to know the effect of changing (FD) on the feudal output, it is necessary to apply the inverse formula of UNITIF matrix (I - A) -1 to obtain the sectoral outputs as follows:

$$X_i = (I - A)^{-1}.Fd$$

$$(I - A) = [1\ 0\ 0\ 1\ ] - [0.2\ 0.1\ 0.3\ 0.4\ ] = [0.8\ -0.1\ -0.3\ 0.6\ ]$$

$$|I - A| = (0.8)(0.6) - (-0.3)(-0.1) = 0.45$$

$$adj(I - A) = [0.6\ 0.1\ 0.3\ 0.8\ ]$$

$$\therefore X_i = \frac{1}{0.45}[0.6\ 0.1\ 0.3\ 0.8\ ][100\ 50\ ] = [1.33\ 0.22\ 0.67\ 1.78\ ][100\ 50\ ] = 144\ 156$$

$$\therefore X_1 = 144 \quad , \quad X_2 = 156$$

Assuming that the final demand for the production of sector (X_2) increased by one monetary unit, that is, it (FD) became (51) instead of (50), and by applying the same previous mechanism, then it will become:

$X_1 = 144.22 \quad , \quad X_2 = 157.78$

From this we conclude that the increase in final demand (FD) for sector production (X2) led to an increase in total production of the two sectors. My agencies:

$$\Delta X_1 = (X_1 - X_1^-) = 144.22 - 144 = 0.22$$

$$\Delta X_2 = (X_2 - X_2^-) = 157.78 - 156 = 1.78$$

which means:

$$\sum \Delta X_i = \Delta X_1 + \Delta X_2 = 0.22 - 1.78 = 2$$

The explanation is that increasing the final demand for the sector (X_2) by one unit will result in an increase in the total production of the sector (X_1) by (0.22) and this is the amount of the multiplier for the first sector, because the multiplier is defined as the amount of change in income or production when the demand changes Final or final consumption by a certain amount. If we denote the multiplier with the symbol (M), then the multiplier in the first sector is (M_1), and since the change in this multiplier came as a result of changing demand in the second sector, we have to symbolize it with the symbol (M_{12}) i.e. (how much the output of the first sector doubles when the demand for the products of the second sector changes), i.e., which is:

$$M_{12} = \frac{\Delta X_1}{\Delta D_2} = \frac{0.22}{51 - 50} = \frac{0.22}{1} = 0.22$$

The multiplier in the second sector becomes:

$$M_{22} = \frac{\Delta X_2}{\Delta D_2} = \frac{1.78}{51 - 50} = \frac{1.78}{1} = 1.78$$

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When referring to matrix $(I-A)^{-1}$, we find that the multiplier (M_{12}) represents the value of element (C_{12}) in this matrix, and that the

multiplier (M_{22}) represents the value of element (C_{22}) in

matrix $(I-A)^{-1}$.

We conclude from this that the increase in final demand (FD) for sector production (X_2) led to an increase in the total output of the two sectors by (2) units.

Returning to matrix $(I-A)^{-1}$we find that the increase for the two sectors (2) represents the sum of the elements of the second column in the matrix. This means that the sector multiplier (X_2) for the economy as a whole is equal to the sum of the elements of the second column in matrix $(I-A)^{-1}$or the so-called matrix (Cij), as well as the sector multiplier (X_1) represents the sum of the elements of the first column in matrix $(I-A)^{-1}$. That is:

$$Mj = C_1j + C_2j + \cdots + C_nj$$

which means: $Mj = \sum_{i=1}^{n} \quad Cij$

It is the same as the law of backlinks indirectly by adding columns in matrix $(I-A)^{-1}$ to get the multiplier of the sector in question. Through this, we note that when increasing sector output (X_1), for example, by (ΔX_1), this results in an increase in the total production of the two sectors by:

$$\Delta X = \Delta X_1 + \Delta X_2$$

That is: $(\Delta X = \sum_{i=1}^{n} \quad CXj)$

In other words: $\Delta X = \Delta X_1 + \Delta X_2 = \Delta X_1 \sum_{i=1}^{n} \quad aij$

Whereas, (aij) represents the element in the row and column in Matrix $(I-A)^{-1}$ in calculating multiples, either for any particular sector or for sectors of the economy as a whole.

Seventh: Matrix of Technical Transactions in the Iraqi Economy:

There is a clear decline in the tables of inputs and outputs in the Iraqi economy, despite its great importance in knowing domestic and external demand, as well as what is available at the level of the local economy as inputs in different industries and sectors. At the level of the tables of inputs and outputs or the so-called technical transactions matrix, the Iraqi Ministry of Planning issued the last technical transaction matrix before 2003 which is the 1988 matrix and after that the Ministry of Planning was unable to issue any matrix until 2010 in which the last technical transaction matrix was issued as in Table (2) and after This matrix has not yet released any other matrix. This decline in interest in these important tables led to a decline in research and studies in this field. We have used sectoral growth coefficients to obtain the technical transaction matrix for the year 2018. Table (3) of the technical transaction matrix for the year 2010. There is great importance for calculating the multiplier at the sectoral level in the Iraqi economy, as there is little interest in calculating the multiplier even at the macroeconomic level, as represented The multiplier of public spending, investment and foreign trade. As for the sectors level, there is no study or research at the level of economics by calculating sectoral multiples. As the multiples that we are calculating in this research give us a clear picture of the extent of the increase in sectoral output when government spending, private spending and investment, as well as exports and imports increase by one unit, i.e. in other words, how much or sectoral output increases in response to the estimate of spending or foreign trade This is on the one hand, and on the other hand, the complications will show us how much the sectors respond to the needs of local demand by the other sectors on the goods and services provided by these sectors, that is, they explain to us what is

the sectoral cross-cutting between the sectors of the economy. That is, it clarifies what the sector provides to the other sectors of intermediate goods for the purpose of completing the production process. In the event that these requirements are not available, the economy will turn to the foreign trade sector to dispose of its products and provide the local shortage in production requirements as well as finished goods and services.

Table 2: Technical Transaction Matrix (DBL Direct Matrix Link Matrix) for 2010

Aij 2010	Agriculture, forestry and fishing	Mining and quarries	Manufacturing industry	Electricity and water	building and Construction	Transport and storage	Wholesale and retail trade, hotels and the like	Money and insurance	Service sectors
Agriculture, forestry and fishing	0.8700	0	0.0605	0	0	0.0006	0	0	0
Mining and quarries	0	0	0.6311	0.3850	0.0572	0	0	0	0
Manufacturing industry	0.0645	0.1065	0.0584	0.3674	0.2981	0.3963	0.1866	0.0095	0.0666
Electricity and water	0.0069	0.0541	0.0551	0.0120	0.0040	0.0026	0.0671	0.0212	0.0042
building and Construction	0	0.0072	0.0009	0.0042	0.0011	0.0036	0.1024	0.0158	0.0051
Transport and storage	0.1101	0.1207	0.0215	0.0056	0.0641	0.0007	0.1138	0.0060	0.0085
Wholesale and retail trade, hotels and the like	0.1712	0.2120	0.0506	0.0037	0.0000	0.1161	0.0371	0.0030	0.0769
Money and insurance	0.0001	0.0033	0.0002	0	0.0160	0.0001	0.0440	0.0741	0
Service sectors	0.0002	0.0202	0.0027	0.0035	0.0477	0.0042	0.1357	0.0252	0.0289
DBL	1.2230	0.5241	0.8808	0.7815	0.4882	0.5243	0.6866	0.1548	0.1901
Rank	1	6	2	3	7	5	4	9	8

Source: From the work of researchers using the Matrix of Technical Transactions Issued by the Iraqi Ministry of Planning and the National Accounts Department for the year (2010)

Table 3: Technical Transactions Matrix (DBL Direct Matrix Link Matrix) 2018

Aij 2018	Agriculture, forestry and fishing	Mining and quarries	Manufacturing industry	Electricity and water	building and Construction	Transport and storage	Wholesale and retail trade, hotels and the like	Money and insurance	Service sectors
Agriculture, forestry and fishing	-0.0046	0	-0.0003	0	0	0	0	0	0
Mining and quarries	0	0	0.0371	0.0227	0.0034	0	0	0	0
Manufacturing industry	-0.0036	-0.0059	-0.0032	-0.0204	-0.0165	-0.0220	-0.0103	-0.0005	-0.0037
Electricity and water	0.0004	0.0031	0.0031	0.0007	0.0002	0.0001	0.0038	0.0012	0.0002
building and Construction	0	-0.0003	0	-0.0002	0	-0.0001	-0.0042	-0.0006	-0.0002
Transport and storage	0.0049	0.0053	0.0009	0.0002	0.0028	0	0.0050	0.0003	0.0004
Wholesale and retail trade, hotels and the like	0.0059	0.0073	0.0017	0.0001	0	0.0040	0.0013	0.0001	0.0026
Money and insurance	0	0	0	0	0.0002	0	0.0005	0.0009	0
Service sectors	0	0.0004	0.0001	0.0001	0.0009	0.0001	0.0027	0.0005	0.0006
DBL	0.0030	0.0099	0.0394	0.0032	-0.0090	-0.0179	-0.0012	0.0018	-0.0001
Rank	4	2	1	3	8	9	7	5	6

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Source: From the work of researchers using the Matrix of Technical Transactions Issued by the Iraqi Ministry of Planning / National Accounts Department for the year (2010)

Eighth: Calculating sectoral multiples in the Iraqi economy

We will rely on the calculation of sectoral multiples at the sectoral level in the Iraqi economy on a matrix called the matrix of multiples or what we have previously called in our research with this matrix (Cij). As our calculation of this matrix gives us multiples at the level of each sector with other sectors represented by the value of each of the elements of the matrix (Cij), as the value of element (C_{12}) for example in the matrix (Cij) for the year 2010 Table (4) amounted to (0.189) and it represents The value of the simple multiplier, which indicates by the amount of the multiplier of the first sector multiplied when the demand for the products of the second sector changes. While the interpretation of Element (C_{39}) for example for the same year, which is (0.159), it represents the value of the simple multiplier between the two sectors and is interpreted to the extent that the output of the third sector (the manufacturing industry) is doubled in response to changing demand for the products of the ninth sector (services) or the amount of the response of the industrial sector as a result of a change Demand in the services sector. This interpretation applies to all elements of the matrix (Cij), whether for (2010) or for (2018), as all elements of the two matrices shown in Table (4) and Table (5) represent simple multiples between sectors that clarify the sectoral response between different sectors as a result Affected by the request. In this idea, the calculation of the multiplier using (I-O) tables does not differ from the computation of the multiplier in the known way, as the idea of the multiplier is based on the response of income or output to spending changes, which in turn leads to changes in demand, whether in the form of government or private consumer spending or investment spending or External demand represented by the demand for local goods (exports) or represented by the domestic demand for foreign goods (imports).

Table 4: The indirect back-link matrix (Cij multiplier matrix) for the year 2010

Cij 2010	Agriculture, forestry and fishing	Mining and quarries	Manufacturing industry	Electricity and water	building and Construction	Transport and storage	Wholesale and retail trade, hotels and the like	Money and insurance	Service sectors	Determ	Sectors respond to final demand
Agriculture, forestry and fishing	8.6585	0.1893	0.7240	0.3471	0.2529	0.3223	0.2410	0.0246	0.0744	0.0674	127.5338
Mining and quarries	1.4783	1.3056	1.0552	0.9075	0.4296	0.4687	0.3868	0.0463	0.1132		18.3815
Manufacturing industry	2.0676	0.4047	1.5538	0.7442	0.5421	0.6820	0.5160	0.0527	0.1594		22.0657
Electricity and water	0.4139	0.1228	0.1847	1.1302	0.0746	0.0930	0.1391	0.0310	0.0298		15.7771
building and Construction	0.2465	0.0507	0.0619	0.0480	1.0268	0.0441	0.1336	0.0205	0.0207		14.2429
Transport and storage	1.4468	0.2351	0.3021	0.2123	0.1810	1.1503	0.2367	0.0207	0.0514		16.0757
Wholesale and retail trade, hotels and the like	2.1789	0.3782	0.4880	0.3368	0.1975	0.3409	1.2383	0.0261	0.1369		17.3821
Money and insurance	0.1150	0.0237	0.0285	0.0203	0.0288	0.0190	0.0627	1.0818	0.0073		15.0595
Service sectors	0.3655	0.0857	0.1003	0.0760	0.0903	0.0673	0.1923	0.0340	1.0532		14.6347
IDBL	16.9711	2.7959	4.4986	3.8223	2.8237	3.1876	3.1465	1.3376	1.6464		
Rank	1	7	2	3	6	4	5	9	8		

Table 5: Indirect Backlit Matrix (Cij Complication Matrix) 2018

Cij 2018	Agriculture, forestry and fishing	Mining and quarries	Manufacturing industry	Electricity and water	building and Construction	Transport and storage	Wholesale and retail trade, hotels and the like	Money and insurance	Service sectors	Determ	Sectors respond to final demand
Agriculture, forestry and fishing	0.9954	0.0000	-0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0047	-0.0092
Mining and quarries	-0.0001	0.9998	0.0371	0.0219	0.0028	-0.0008	-0.0003	0.0000	-0.0001		-0.0048
Manufacturing industry	-0.0037	-0.0061	0.9964	-0.0205	-0.0166	-0.0219	-0.0105	-0.0005	-0.0037		-0.0082
Electricity and water	0.0004	0.0031	0.0032	1.0007	0.0002	0.0001	0.0038	0.0012	0.0002		-0.0040
building and Construction	0.0000	-0.0003	-0.0001	-0.0002	1.0000	-0.0002	-0.0042	-0.0006	-0.0002		-0.0047
Transport and storage	0.0049	0.0054	0.0012	0.0003	0.0028	1.0000	0.0050	0.0003	0.0004		-0.0046
Wholesale and retail trade, hotels and the like	0.0059	0.0073	0.0020	0.0003	0.0000	0.0040	1.0013	0.0001	0.0026		-0.0034
Money and insurance	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0005	1.0009	0.0000		-0.0038
Service sectors	0.0000	0.0004	0.0001	0.0001	0.0009	0.0001	0.0027	0.0005	1.0006		-0.0041
IDBL	1.0027	1.0096	1.0396	1.0026	0.9903	0.9813	0.9983	1.0017	0.9998		
Rank	3	2	1	4	8	9	7	5	6		

Ninth: A Mathematical Interpretation of Matrix (I-O) for 2010 and 2018

From the observation of the matrices (Cij) for the years (2010) and (2018) as in tables (3 and 4), respectively, we notice that there is a significant decline in all elements of the matrix 2018 compared to the elements of the matrix of 2010, meaning that there is a significant decline in the level of minor complications, which is A clear indication of the decline in the performance of the Iraqi economy in all levels and activities, as there is no sectoral response to the needs of demand in different sectors, but there is a clear decline in the level of this response. This decline comes as a result of several reasons, the most important of which are: (excessive dependence on the oil sector, the decline in the output of basic sectors such as agriculture and industry as a result of excessive and unplanned dependence on imports, lack of proper planning for project implementation, administrative and financial corruption that led to the loss and waste of most annual budgets). These and other reasons that helped to deteriorate the performance of sectors and the increase in the volume of current expenditures at the expense of the size of investment spending, and the community became totally dependent on what it receives from the government and not on what it produces or accomplishes for itself and the economy. Thus, the productivity of individuals decreased at the level of all sectors, and the productivity of the worker and employee became zero, rather it became negative as a result of disguised unemployment and the presence of large numbers of employees to accomplish a specific job, enough for one person to complete it. All these factors, in addition to the factor that is familiar with consumer manifestations harmful to the economy, as society and the merchant have become encouraged to import and reject any local product, which led to the closure of most of the existing factories and the transformation of most lands to abandoned lands and the salinity levels in them have increased. Thus, the economy became an importer of most agricultural commodities and all industrial goods. From the note of Table (6), which shows the results of (I-O) for the year 2018 and its comparison with the year 2010, we notice that there is a decline at the level of simple complications (Cij) all as well as all the associations, whether direct or indirect as well as forward and backward and that there is a significant decline at the level of Sectors. In order to know the extent of the decline and development taking place during that period, we expressed that by placing shares that express the increase or decrease that occurs for the variable, and we focused on the demand side because the

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multiplier is related to the demand side. When looking at the direction of shares, we notice that there is a relationship between public spending, domestic demand, and final and double demand for each sector, as there is a clear effect of public spending on both Fi and Fi-Mi, as well as the value of Mj, as in all sectors that have experienced An increase in the value of (Ci) also witnessed an increase in the value of (Fi) and (Fi-Mi). This is evident when comparing the matrix (I-O) for the years (2010) and (2018) as in tables (6) and (7), respectively, as well as The multiplier took the largest value and the largest arrangement compared to the sectors that witnessed a decrease in the value of public spending (Ci), as these two sectors (the construction sector and the transportation sector) were ranked last (eighth and the next) in terms of value of the multiplier. This analysis came regardless of the general trend of declining multiples of all sectors for the year (2018) compared to (2010).

Table 6: value of sectoral multiples and their relationship to the trends of the variadles and the same correlations as shown by the 2018 matrix compared to the 2010 matrix

Table (6) Value of sectoral multiples and their relationship to the trends of the variables and the same correlations as shown by the 2018 matrix compared to the 2010 matrix

Sectors	Public expenditure Ci	Exports Ei	Imports Mi	Demand for local goods Fi(Ci-Ei)	Net final demand (Demand - external) Fi-Mi	Total demand Xi	Direct back links DBL	Direct forward links DFL	Indirect forward links IDFL	Sectoral multiples Mj	Rank of Mj
Agriculture, forestry and fishing	1,654,885	2,081	-222,497	1,656,966	1,879,462	-34,332,732	-1.22	-0.95	-9.93	1.0027	1
Mining and quarries	451,939	9,224,836	623,668	9,676,775	9,053,107	-28,863,523	-0.51	-0.33	-1.72	1.0096	7
Manufacturing industry	2,460,056	-107	-353,964	2,459,950	2,813,914	-45,120,561	-0.84	-1.16	-4.54	1.0396	2
Electricity and water	2,103,568	1,124	90,550	2,104,692	2,014,142	-10,053,197	-0.78	-0.70	-3.02	1.0026	3
building and Construction	-1,103,180	1,814	-620,309	-1,101,366	-481,056	-5,982,658	-0.50	-0.56	-2.69	0.9903	6
Transport and storage	-484,484	18,620	94,591	-465,864	-560,455	-24,656,520	-0.54	-0.72	-4.03	0.9813	4
Wholesale and retail trade, hotels and the like	2,403,505	27,309	348,686	2,430,815	2,082,129	-37,005,679	-0.69	-0.80	-4.19	0.9983	5
Money and insurance	1,896,119	15,887	-543,858	1,912,006	2,455,864	-99,668	-0.15	-1.01	-5.00	1.0017	9
Service sectors	9,135,202	24,997	-677,292	9,160,199	9,837,492	423,106	-0.19	-0.38	-1.69	0.9998	8

As for foreign trade, represented by the value of exports and imports for each sector, we note through table (6) that there is no relationship with the increase and decrease in the value of exports and imports of sectors with a value of the multiplier, i.e. in other words, the foreign trade multiplier, which is part of the sector multiplier (Mj) Its role is weak in the Iraqi economy, and this comes for several reasons, including:

1-The effects of the multiplier appear abroad more than the domestic in most sectors, because the imports are greater than the exports, which means that the value of the multiplier of imports is greater than the value of the

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multiplier of exports and that this is reflected in the exporting countries more than Iraq, and this seems clear from the fact that the multiplier of imports is negative The fact that the imports represent an element of leakage from the national income stream, and since the imports are greater than exports, this means that the elements of leakage are greater than the elements of addition in the Iraqi economy, as the general formula for complications clarifies this:

$$\text{Export multiplier } M_E = \frac{1}{1-B+M_1}$$

$$\text{Multiplier of imports } M_M = \frac{-1}{1-B+M_1}$$

Since imports are greater than exports in all sectors except oil, the negative multiplier for imports is greater than the positive multiplier effect of exports.

2- Imports in the Iraqi economy have become a manifestation of extravagance, as most of them come to cover consumer demand and not to cover investment demand that contributes to developing and strengthening the local economy.

3- Exports are mostly intermediate goods and not finished goods, which means that their value is very low, as exports are mostly intermediate and low-value goods, unlike imports that are mostly high-value final goods.

Table 7: The productive user table (I-O) in the Iraqi economy in the presence of foreign trade for the year 2010

IOM 2010	Agriculture, forestry and fishing	Mining and quarries	Manufacturing industry	Electricity and water	building and Construction	Transport and storage	Wholesale and retail trade, hotels and the like	Money and insurance	Service sectors
Agriculture, forestry and fishing	33,179,225.3238	0.0000	2,997,739.7187	0.0000	0.0000	16,354.7850	0.0000	0.0000	0.0000
Mining and quarries	0.0000	0.0000	31,283,189.7309	6,390,711.1429	569,641.6755	0.0000	0.0000	0.0000	0.0000
Manufacturing industry	2,460,638.7040	12,058,123.7221	2,892,927.7351	6,098,600.5558	2,966,300.7689	11,116,328.2611	7,725,487.8587	23,940.1360	1,652,493.2608
Electricity and water	264,821.7572	6,131,339.3374	2,729,077.2192	199,195.9306	39,817.9989	73,080.7297	2,777,876.6847	53,633.3482	104,874.9235
building and Const.	151.4095	819,161.6129	43,215.6107	69,833.6380	11,031.4306	101,455.2017	4,239,665.5215	39,785.6880	125,394.8798
Transport and storage	4,198,656.5320	13,663,891.1318	1,063,481.7517	92,582.6821	637,427.4885	19,173.6083	4,713,226.9655	15,116.4769	210,311.6841
Wholesale and retail trade, hotels and the like	6,527,811.0447	24,014,380.9587	2,510,559.3028	61,858.4509	0.0000	3,256,538.3590	1,534,903.3100	7,668.6556	1,907,352.3683
Money and insurance	5,331.3699	379,154.5772	8,883.0436	0.0000	159,023.4360	2,876.6022	1,821,475.4070	187,150.1018	0.0000
Service sectors	7,220.3660	2,289,604.4437	132,854.5429	58,318.1098	474,781.3307	118,796.1541	5,618,517.8025	63,625.4485	716,379.4473
Uj	46,643,856.5071	59,355,655.7838	43,661,928.6557	12,971,100.5102	4,858,024.1291	14,704,603.7011	28,431,153.5500	390,919.8550	4,716,806.5639
Vj	-8,505,435.0312	53,896,146.7509	5,908,627.3619	3,627,619.7772	5,092,321.3315	13,343,389.7043	12,977,289.1797	2,133,998.1208	20,099,317.0117
Xj	38,138,421.4759	113,251,802.5347	49,570,556.0176	16,598,720.2874	9,950,345.4605	28,047,993.4054	41,408,442.7296	2,524,917.9757	24,816,123.5755

	Public expenditure	Exports	Imports			Total demand	
wi	(Ci)	(Ei)	(Mi)	F1=C+E	F-M	GDP (xi)	wi+(f-m)
36,193,319.8274	3,217,599.2000	2,956.3036	1,275,453.8552	3,220,555.5036	1,945,101.6485	38,138,421.4759	38,138,421.4759
38,243,542.5493	16,087,996.0000	61,175,438.9854	2,255,175.0000	77,263,434.9854	75,008,259.9854	113,251,802.5347	113,251,802.5347
46,994,841.0024	3,217,599.2000	1,491.2442	643,375.4290	3,219,090.4442	2,575,715.0152	49,570,556.0176	49,570,556.0176
12,373,717.9295	4,504,638.8800	649.6598	280,286.1819	4,505,288.5398	4,225,002.3579	16,598,720.2874	16,598,720.2874
5,449,694.9929	6,435,198.4000	4,494.3985	1,939,042.3308	6,439,692.7985	4,500,650.4676	9,950,345.4605	9,950,345.4605
24,613,868.3209	5,148,158.7200	18,984.6596	1,733,018.2952	5,167,143.3796	3,434,125.0844	28,047,993.4054	28,047,993.4054
39,821,072.4500	3,861,119.0400	23,342.7730	2,297,091.5334	3,884,461.8130	1,587,370.2796	41,408,442.7296	41,408,442.7296
2,563,894.5377	2,574,079.3600	25,984.7225	2,639,040.6445	2,600,064.0825	-38,976.5620	2,524,917.9757	2,524,917.9757
9,480,097.6455	19,305,595.2000	36,546.9509	4,006,116.2209	19,342,142.1509	15,336,025.9300	24,816,123.5755	24,816,123.5755
215,734,049.2557						324,307,323.4624	
108,573,274.2067							
324,307,323.4624					GNP=	432,880,597.6690	

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Table 8:

IOM 2018	Agriculture, forestry and fishing	Mining and quarries	Manufacturing industry	Electricity and water	building and Construction	Transport and storage	Wholesale and retail trade, hotels and the like	Money and insurance	Service sectors
Agriculture, forestry and fishing	-17,446.3338	0	-1,418.0678	0	0	-10.4207	0	0	0
Mining and quarries	0	0	165,253.1637	148,293.4445	13,366.0786	0	0	0	0
Manufacturing industry	-13,613.8248	-498,171.0015	-14,399.0894	-133,340.3661	-65,580.7123	-74,526.3275	-45,543.2618	-1,274.9627	-93,184.4709
Electricity and water	1,500.1596	259,361.5308	13,908.0027	4,459.2664	901.3467	501.6522	16,767.2824	2,924.5379	6,055.1792
building and Const.	-0.6151	-24,849.5382	-157.9385	-1,121.1046	-179.0782	-499.4278	-18,351.8493	-1,555.7784	-5,191.9879
Transport and storage	18,512.8964	449,888.4224	4,218.5112	1,613.2175	11,231.1299	102.4434	22,143.6030	641.5834	9,451.4614
Wholesale and retail trade, hotels and the like	22,424.9616	616,030.0967	7,758.8928	839.7738	0.0000	13,556.1505	5,618.3794	253.5840	66,783.1048
Money and insurance	6.1695	3,276.3533	9.2477	0	735.3563	4.0337	2,245.9353	2,084.6667	0
Service sectors	14.2070	33,641.0702	235.1714	453.4668	3,733.0621	283.2444	11,779.6019	1,205.0702	14,366.7191
Uj	11,397.6204	839,176.9338	175,407.8938	21,197.6983	-35,792.8170	-60,588.6518	-5,340.3089	4,278.7013	-1,719.9943
Vj	3,794,291.6052	83,549,102.3330	4,274,587.2167	6,524,325.4183	4,003,479.8180	3,452,062.3618	4,408,104.3957	2,420,970.8110	25,240,949.3286
Xj	3,805,689.2256	84,388,279.2668	4,449,995.1105	6,545,523.1167	3,967,687.0009	3,391,473.7100	4,402,764.0867	2,425,249.5123	25,239,229.3343

	Public expenditure	Exports	Imports			Total demand	
wi	(Ci)	(Ei)	(Mi)	F1=C+E	F-M	GDP (xi)	wi+(f-m)
-18,874.8223	4,872,484.0574	5,037.2997	1,052,957.3092	4,877,521.3571	3,824,564.0480	3,805,689.2256	3,805,689.2256
326,912.6868	16,539,935.0800	70,400,274.6000	2,878,843.1000	86,940,209.6800	84,061,366.5800	84,388,279.2668	84,388,279.2668
-939,634.0170	5,677,655.6863	1,384.5294	289,411.0883	5,679,040.2157	5,389,629.1274	4,449,995.1105	4,449,995.1105
306,378.9581	6,608,206.4167	1,774.0640	370,836.3222	6,609,980.4808	6,239,144.1586	6,545,523.1167	6,545,523.1167
-51,907.3180	5,332,018.3936	6,308.7576	1,318,732.8323	5,338,327.1512	4,019,594.3190	3,967,687.0009	3,967,687.0009
517,803.2686	4,663,674.7935	37,605.0459	1,827,609.3980	4,701,279.8394	2,873,670.4414	3,391,473.7100	3,391,473.7100
733,264.9438	6,264,624.4389	50,651.9717	2,645,777.2676	6,315,276.4106	3,669,499.1430	4,402,764.0867	4,402,764.0867
8,361.7626	4,470,198.3509	41,871.9043	2,095,182.5055	4,512,070.2552	2,416,887.7497	2,425,249.5123	2,425,249.5123
65,711.6131	28,440,797.2826	61,544.1821	3,328,823.7436	28,502,341.4648	25,173,517.7212	25,239,229.3343	25,239,229.3343
948,017.0757						138,615,890.3638	
137,667,873.2882							
138,615,890.3638					GNP=	276,283,763.6520	

The multiples values that we are dealing with represent the sum of multiples of public expenditures and multiples of foreign trade, since the model used contains public expenditures represented (government and private consumer spending as well as investment spending) in addition to exports and imports as variables affecting total demand. Since the total demand values decreased in 2018 compared to 2010 in all sectors, which in turn led to lower values of sectoral multiples in all sectors as well. This, in turn, led to a decrease in the total aggregate demand at the level of the economy as a whole by (-57.25), which was reflected in the decrease in the gross national product (GNP) by (-36.17%) in 2018 compared to 2010. From here we note the extent of the decline in the level of Sectional demand and aggregate demand, which is reflected in the sectoral and aggregate value added, and then on (GNP).

The rationale for this decline in the 2018 matrix data compared to the 2010 matrix is due to two main factors:

The first: represented by the decline in oil prices globally from 2014 to 2018, and of course, aggregate demand is affected at the level of all activities and sectors in the Iraqi economy.

The second: weak sectoral interlinkages between economic sectors, which represents the stumbling block for any potential development and any economic development, as the weakness of these interconnections leads to dependence on abroad to finance demand, which leads to the development of exporting economies and the decline of the importing economy. As the spending multiplier shows its effects on the national income positively, but the negative impact of the foreign trade multiplier (the import multiplier) prevents these effects from continuing on the local economic reality. According to the opinion of researchers, this factor appears to be the closest to explaining this decline, and that the spending multiplier is effective at the level of all sectors and that the foreign trade multiplier is less effective because of the large volume of imports compared to exports, which limits the effectiveness of the spending multiplier. And the best evidence that the reason lies in sectoral interconnections is the level of the sector's response to the needs of the final request or to the requirements of the final request, as all sectors retreated their response to the final request and were considered negative in the year 2018 as shown in

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Table (5) Compared to the year 2010 as in Table (4), as this sectoral response was extracted according to the following formula:

$$R.Si = \frac{Cij}{|I - A|} - 1 \quad for \ i = j$$

For example, the first sector response: $R.S_1 = \frac{C_{11}}{|I-A|} - 1$

while the second sector responds: $R.S_2 = \frac{C_{22}}{|I-A|} - 1$

and so on to the rest of the sectors

The Appendices

(Appendix 1-A)

Bij 2010	Agriculture, forestry and fishing	Mining and quarries	Manufacturing industry	Electricity and water	building and Construction	Transport and storage	Wholesale and retail trade, hotels and the like	Money and insurance	Service sectors	DFL	Rank
Agriculture, forestry and fishing	0.8700	0.0000	0.0786	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.9490	5
Mining and quarries	0.0000	0.0000	0.2762	0.0564	0.0050	0.0000	0.0000	0.0000	0.0000	0.3377	9
Manufacturing industry	0.0496	0.2433	0.0584	0.1230	0.0598	0.2243	0.1558	0.0005	0.0333	0.9480	1
Electricity and water	0.0160	0.3694	0.1644	0.0120	0.0024	0.0044	0.1674	0.0032	0.0063	0.7455	2
building and Construction	0.0000	0.0823	0.0043	0.0070	0.0011	0.0102	0.4261	0.0040	0.0126	0.5477	7
Transport and storage	0.1497	0.4872	0.0379	0.0033	0.0227	0.0007	0.1680	0.0005	0.0075	0.8776	4
Wholesale and retail trade, hotels and the like	0.1576	0.5799	0.0606	0.0015	0.0000	0.0786	0.0371	0.0002	0.0461	0.9617	3
Money and insurance	0.0021	0.1502	0.0035	0.0000	0.0630	0.0011	0.7214	0.0741	0.0000	1.0154	8
Service sectors	0.0003	0.0923	0.0054	0.0024	0.0191	0.0048	0.2264	0.0026	0.0289	0.3820	6

(Appendix 2-A)

Bij 2018	Agriculture, forestry and fishing	Mining and quarries	Manufacturing industry	Electricity and water	building and Construction	Transport and storage	Wholesale and retail trade, hotels and the like	Money and insurance	Service sectors	DFL	Rank
Agriculture, forestry and fishing	-0.0046	0	-0.0004	0	0	0	0	0	0	-0.0050	7
Mining and quarries	0	0	0.0020	0.0018	0.0002	0	0	0	0	0.0039	6
Manufacturing industry	-0.0031	-0.1119	-0.0032	-0.0300	-0.0147	-0.0167	-0.0102	-0.0003	-0.0209	-0.2112	9
Electricity and water	0.0002	0.0396	0.0021	0.0007	0.0001	0.0001	0.0026	0.0004	0.0009	0.0468	1
building and Construction	0	-0.0063	0	-0.0003	0	-0.0001	-0.0046	-0.0004	-0.0013	-0.0131	8
Transport and storage	0.0055	0.1327	0.0012	0.0005	0.0033	0	0.0065	0.0002	0.0028	0.1527	3
Wholesale and retail trade, hotels and the like	0.0051	0.1399	0.0018	0.0002	0	0.0031	0.0013	0.0001	0.0152	0.1665	2
Money and insurance	0	0.0014	0	0	0.0003	0	0.0009	0.0009	0	0.0034	5
Service sectors	0	0.0013	0	0	0.0001	0	0.0005	0	0.0006	0.0026	4

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(Appendix 1-b)

Oij 2010	Agriculture, forestry and fishing	Mining and quarries	Manufacturing industry	Electricity and water	building and Construction	Transport and storage	Wholesale and retail trade, hotels and the like	Money and insurance	Service sectors	IDFL	Rank
Agriculture, forestry and fishing	8.6585	0.5621	0.9410	0.1511	0.0660	0.2370	0.2617	0.0016	0.0484	10.9274	3
Mining and quarries	0.4978	1.3056	0.4619	0.1330	0.0377	0.1161	0.1414	0.0010	0.0248	2.7195	8
Manufacturing industry	1.5908	0.9247	1.5538	0.2492	0.1088	0.3859	0.4310	0.0027	0.0798	5.3267	1
Electricity and water	0.9509	0.8379	0.5516	1.1302	0.0447	0.1572	0.3469	0.0047	0.0445	4.0687	2
building and Construction	0.9449	0.5776	0.3081	0.0800	1.0268	0.1244	0.5559	0.0052	0.0518	3.6747	6
Transport and storage	1.9673	0.9491	0.5340	0.1256	0.0642	1.1503	0.3495	0.0019	0.0454	5.1873	5
Wholesale and retail trade, hotels and the like	2.0069	1.0343	0.5842	0.1350	0.0475	0.2309	1.2383	0.0016	0.0821	5.3607	4
Money and insurance	1.7369	1.0629	0.5598	0.1336	0.1136	0.2106	1.0282	1.0818	0.0720	5.9994	9
Service sectors	0.5617	0.3913	0.2004	0.0508	0.0362	0.0761	0.3208	0.0035	1.0532	2.6941	7

(Appendix 2-b)

Oij 2018	Agriculture, forestry and fishing	Mining and quarries	Manufacturing industry	Electricity and water	building and Construction	Transport and storage	Wholesale and retail trade, hotels and the like	Money and insurance	Service sectors	IDFL	Rank
Agriculture, forestry and fishing	0.9954	0	-0.0004	0	0	0	0	0	0	0.9951	7
Mining and quarries	0	1	0.0020	0.0017	0.0001	0	0	0	0	1.0035	6
Manufacturing industry	-0.0032	-0.1163	0.9964	-0.0301	-0.0148	-0.0167	-0.0103	-0.0003	-0.0211	0.7836	9
Electricity and water	0.0002	0.0398	0.0022	1.0007	0.0001	0.0000	0.0025	0.0004	0.0009	1.0470	1
building and Construction	0	-0.0069	0	-0.0003	1	-0.0001	-0.0046	-0.0004	-0.0014	0.9861	8
Transport and storage	0.0055	0.1334	0.0015	0.0007	0.0033	1	0.0065	0.0002	0.0029	1.1539	3
Wholesale and retail trade, hotels and the like	0.0051	0.1403	0.0020	0.0004	0	0.0030	1.0013	0.0001	0.0152	1.1674	2
Money and insurance	0	0.0015	0	0	0.0003	0	0.0009	1.0009	0	1.0036	5
Service sectors	0	0.0014	0	0	0.0001	0	0.0005	0	1.0006	1.0027	4

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8. Forward bonds are shown in Appendix (1) for direct bonds and Appendix (2) for indirect forward bonds.
9. The sectoral data for exports and imports were obtained by relying on: Central Bank of Iraq, General Directorate of Statistics and Research, various publications for several years (2004-2019).
10. Iraqi Ministry of Planning, Central Agency for Statistics and Information Technology, Annual Statistical Bulletin, Multiple Issues.
11. Sectoral response refers to the amount of increase in sector output when the final demand for products in that sector increases by one unit.
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