



Structural Changes in Iraqi Agricultural Sector and their Relationship with other Economic Sectors During the Period (1990 – 2015)

Nagham R. Mohammed¹

Bassam H. Al-Badri²

College of Agriculture / University of Al-Qadisiyah¹ , College of Agriculture / University of Baghdad²

Submission Track

Received : 26/11/2017

Final Revision : 2/1/2018

Keywords

GDP, Structural Changes in Iraqi Economy, Agricultural Domestic Product

Corresponding

Nagham_mohmd@yahoo.com

Abstract

The purpose of this research is to analyze the changes of the agricultural sector of the GDP and ratio of the agricultural employment , the total employment .In addition to the relation of the agricultural sector with other sectors in the economy of Iraq . It appears that economic growth ,measured as a growth rate in the real per- capita GDP , and population growth cause a decrease in both. The contribution of the agricultural sector to the GDP and the agricultural employment measured in absolute terms and as a ratio to the total .

Introduction

Agricultural section had been many changes during the period 1990 to 2015. Most important . them was increasing in agricultural Product , but agricultural output fluctuation is not suitable with the importance of this sector since its contribution in the gross domestic product was poor. Ratio of agricultural workers to total workers decreased due to trend agricultural employee to search for work in other sectors and the most important of this is the general sector that represented in joining military forces and services sector. These changes are some of the changes that had been occurred throughout 1990 to 2015.

problem of Study

Role and importance of agricultural sector in gross domestic product (GDP) is to benefit the other economic sectors , which negatively affected on self-sufficiency ratio and food security in Iraq.

Aims of the research

This research aims to analyze the structural changes in the agricultural sector via:

- 1- Studying the relation between agricultural section contribution in to GDP and agricultural workers with each of

economic growth and population growth and in terral flow the production factors.

- 2- Studying the structural relationship between agricultural sector and other economic sectors based on the regression approach . Regression approach is used to analyze the relation between this sector and the others. Inputs and outputs method are not used since there are not enough information about the inputs and the outputs tables, which could widely measure the changes from a year to another, which they may be not represcut the long run relationship .

Importance of the study

The importance on this study comes from the importance of the agricultural sector since it is the third importance sector after the oil and mining and services sector ones in GDP, and it obsession a high percentage of total labors.

Study hypothesis

This research assumes that the agricultural sector losses in favor of other economic sectors (oil and mining and services) of its contribution ratio in GDP and agricultural employment



Agricultural sector in the Iraqi economy

Table 1. Contribution percentage of each economic sector in GDP during (1990 – 2015) using fixed price of the year of (1988 = 100) million dinars.

Years	Ag	%	TI	%	O&M	%	SER	%	OTHERS	%	TOTAL
1990	3447.8	19.8	1414.5	8.1	3061.5	18	2553.2	14.7	6859.2	39.5	17336.2
1991	2877.2	25.9	538.5	4.8	2925.6	26.3	1288.9	11.6	3457.0	31.1	11087.2
1992	3531.9	24.3	550.0	3.7	4339.9	29.9	924.2	6.3	5146.8	35.5	14492.8
1993	3492.4	18.7	1323.2	7.1	3468.9	18.6	545.9	2.9	9803.3	52.6	18633.7
1994	3741.0	19.4	1376.6	7.1	4311.1	22.4	325.9	1.6	9485.0	49.2	19239.6
1995	4188.2	21.3	1601.9	8.1	4933.6	25.1	185.4	0.9	8708.8	44.3	19617.9
1996	4498.3	20.5	1672.3	0.7	5458.0	2.4	265.3	0.1	9943.8	4.5	21837.7
1997	4133.8	15.6	1708.7	6.4	12670.3	47.9	4049.4	15.3	3886.1	14.6	26448.3
1998	4475.1	12.5	1732.5	4.8	20956.3	58.8	4080.5	11.4	4374.1	12.2	35618.5
1999	5188.3	12.3	1830.2	4.3	25323.7	60.4	4112.0	9.8	5443.9	12.9	38198.1
2000	4589.0	10.7	1748.3	4.1	25900.2	60.9	4143.9	9.7	6125.0	14.4	42506.4
2001	4644.0	10.6	1909.4	4.3	25700.7	59.0	4176.1	9.6	7061.8	16.2	43492.0
2002	5432.6	13.4	1740.4	4.2	22122.9	54.6	4208.8	10.3	7000.9	17.2	40505.6
2003	3850.3	14.1	1243.9	4.5	13930.0	51.2	4241.9	15.6	3894.6	14.3	27160.7
2004	4521.8	10.8	966.6	2.3	19837.5	47.4	5289.0	12.6	11199.1	26.7	41814.0
2005	5939.6	13.6	956.0	2.1	18397.5	42.1	5901.4	13.5	12467.3	28.5	43661.8
2006	6195.9	12.8	1056.4	2.1	19409.4	40.3	8590.3	17.8	12839.4	26.6	48091.4
2007	4479.7	9.3	1122.4	2.3	20178.6	42.2	9115.6	19.0	12852.4	26.9	47748.7
2008	4244.0	8.0	1167.3	2.2	23460.6	44.5	9501.4	18.0	14273.4	27.1	52646.7
2009	4488.2	7.8	1316.0	2.3	23995.5	42.2	10238	18.0	16814.7	29.5	56852.4
2010	6231.4	9.9	1406.2	2.2	24019.6	38.3	10734.0	38.3	20322.1	32.4	62713.3
2011	8808.6	5.0	3879.9	2.2	116184.4	66.4	27882.2	1.7	18075.7	10.3	174830.8
2012	9990.7	4.9	4221.5	2.0	130064.4	64.2	36527.8	15.9	21506.7	10.6	202311.1
2013	10742.4	0.75	7288.0	5.1	1267505.0	89.4	43242.5	18.0	22143.2	1.5	1416513.1
2014	12682.0	6.4	4930.1	2.5	116940.1	59.8	40336	20.6	20611.2	10.5	195499.4
2015	9105.0	9.4	3915.8	4.0	61626.9	64.0	45967.4	47.8	21510.7	22.3	96158.4

Source: Ministry of Planning Organization / Central Statistical organization / National Accounts Department / GDP bulletins / .

2011- 2015: Annual economic report of Iraqi Central Bank.

Where:

Agric : Agriculture

TI: Transforms industries

O & M: Oil and Mining

Serr: Services

Agricultural Sector is very important in any Country Including Iraq due to its role in food security . Table (2) shows the differences in economic sectors contribution in GDP although the oil and mining sectors controlling the highest percentage in GDP forming. Agricultural sector has a great importance since it provides the essential commodities for consumption. Nevertheless, this sector does not meet the requirement of the Iraqi markets. There are fluctuations in the agricultural sector contribution. Contribution of this section in 2013 was (0.75%) according to the statistics of

Ministry of Planning. This because: weakness in agricultural services, lacking of modern techniques, weak rangeland and fodders, and bad veterinary services, which led to a nutritional gap that mostly solves by importing a huge county of food goods and crops yields from the Arab states and the other countries of the world. The highest contribution percentage took place on 1991, which reached about (25%). This due to the encouragement of the previous government to this sector during imposed sanctions on Iraq by then. These percentages were continued decreased after



2013 to reaches about (9.4%) on 2014 because of neglecting this economic sector , tending of farmers to other careers other than the agricultural one.

Manufacturing sector has a great importance in economies of the advanced countries, but the Iraqi economy still suffers of sharp weakness in this section although available capabilities are existed to get this sector developed. Transformative sector contributes about (4.0%) in 2015, which is a little contribution comparing to the importance of this sector. This is the cause of Iraqi poverty to infrastructure that supports these sorts industries in general.

Oil and mining sectors have a huge importance contributing GDP of Iraq as compared to other economic sectors. Their contribute are about (89.4%) in 2013, which is very high compared to the agricultural sector. This represents the big role of oil in the Iraqi economy as the biggest contributor in forming the GDP and the Iraqi exports. Generally, the Iraqi economy have been under gone some structural

imbalances affected its economic sectors. These sectors controls popped up through occupying the biggest part of the GDP, which had led to growth decline in other economic sectors like agriculture, manufacturing, and other sectors.

Services sector comes after oil and mining sector according to the criteria of the relative importance of economic sectors. It contributes about (18%) in 2013. This percentage had been increased reaching about (47%) in 2015. Other sectors of electric, transportation, water, and structure sections had been contributed about (15%) in 2013, which is a high percentage as compared to the contribution of agricultural section. This led to reduction in the active role of agricultural section in the process of economic and social developments. Contribution percentage of these sectors increased to reach about (22%) in 2015.

Table 2. represents the growth average of agricultural domestic product and gross domestic product and its percentage in this GDP.

Table 2. Growth rates of ADP and GDP during the period of (1990 – 2015)

Year	ADP million dollar	Growth rate (%)of ADP	GDP million dollar	Growth rate (%)of GDP
1990	16467	-	81198	-
1991	19853	20.5	76968	- 5.2
1992	27448	38.2	81870	6.3
1993	28821	5.0	85577	4.5
1994	27047	- 6.1	85896	0.3
1995	26432	- 2.2	86912	1.1
1996	26826	1.4	86559	- 0.4
1997	26465	- 1.3	87479	1.0
1998	28495	7.6	79530	- 9.0
1999	26822	- 5.8	81616	2.6
2000	26848	0.09	83544	2.3
2001	26296	- 2.0	81038	- 2.9
2002	25010	- 4.8	81849	1.0
2003	2006	- 91.9	10631	- 8.7
2004	2347	16.9	25700	141.7
2005	2940	25.2	31719	23.4
2006	2643	- 10.1	28709	- 9.4
2007	2791	5.5	30214	5.2
2008	2680	- 3.9	29085	- 3.7
2009	2704	0.8	29336	0.8
2010	2725	0.7	29545	0.7
2011	2910	6.7	32120	8.7
2012	3011	3.4	37710	17.4



2013	3118	3.5	40131	6.4
2014	3215	3.1	44220	10.1
2015	3331	3.6	47254	6.8

Source: Agricultural domestic product and gross domestic product during period of (1990 – 2010), Al-Jabari and Mahasan M. Mahmmod, (2013).

2013 – 2015: Central Statistic Organization / GDP bulletins.

Growth rates of the researchers based on agricultural domestic product and gross domestic production.

ADP: Agricultural domestic product .

GDP: Gross domestic product .

Agricultural domestic product increased in different ranges. Growth average increased in 2005 to be become (25.2%), which due to the cancelation of economic sanctions that were imposed on Iraq since 1990 till 2003. Afterward, these growth averages were fluctuated during the time series to become in the lower levels in 2010, which had a growth rate of (0.7%). This contribution of agriculture is very low and not enough to meet the growing needs of food. The weakened local production is because the problems that the domestic economy suffers of such as: lacking of developed agriculture equipment, spread of (epidemics, diseased, and pests) without control it, and dumping local markets with imported goods from international markets to solving food gap. These reasons and others are the cause of neglecting the Iraqi agricultural economic sector (2).

GDP was increased, growth rate was (141.7%) in 2004, which is the highest percentage during

time series, and then decreased to (0.7%) in 2010. This refers to an existing inability that was one of the consequences of the world financial crisis that financial markets faced by then. This crisis led to clear effect on oil prices and it's declined since the Iraqi economy relies mostly on oil exports. This percentage was improved because oil price rose again in 2014. Therefore, oil sector contribution increased in forming the GDP, which led to rising in growth rate once again to reaches about (10.1%) in 2014. Oil price declined in 2015 and negatively affected growth of the GDP by reaching just (6.8%). The dependence of Iraq almost completely on oil exports in forming GDP, makes GDP a hostage to high fluctuations of oil price. With this in mind, other economic sectors have to be given an important role especially the agricultural one in order to accelerating economic growth and doing a diversity of sources of income .

Table 3. Growth rate in agricultural employment and gross employment in Iraq for the period of (1990 – 2015).

Year	Agricultural employment growth rate %	Gross employment growth rate %
1990	9.9	23.2
1991	10.9	23.9
1992	11.1	24.2
1993	11.3	24.8
1994	12.5	25.1
1995	12.9	25.6
1996	13.9	26.2
1997	15.4	27.5
1998	17.4	29.3
1999	20.2	30.2
2000	22.4	31.5
2001	24.1	33.7
2002	26.7	35.4
2003	28.1	36.1
2004	26.8	33.8



2005	17.9	29.4
2006	17.5	29.4
2007	16.3	28.7
2008	15.3	27.5
2009	15.0	27.1
2010	12.2	25.9
2011	12.0	25.0
2012	11.9	24.8
2013	11.6	24.9
2014	11.0	24.1
2015	11.6	24.6

Source: Ministry of Planning / Central Statistic Organization / different years.

Table (3), shows the fluctuations of growth rates averages of agricultural labors during (1990 – 2015) due to tending to agricultural workers to quit and reaching for work in other fields. This led to increases in unemployment averages in this sector in reverse with the total worker average that rose because agricultural workers worked for other economic sectors. Unemployment was increased in this sector because of imposed economic sanctions on Iraq by the United Nation (Security Council). These sanctions stopped the Iraqi oil exports worldwide, which led to absence of oil resources that forming the backbone in financing the investments and providing opportunities to unemployed workers. Oil exports were limited just to program of oil for food and medicine since 1996.

Research methodology and theoretical framework

Structural changes in the agricultural sector

Pattern of economic development is known for its economic and social regular changes, which is associated with growth in real income as a measure of growth. Structural changes can be defined as changes that accompany economic growth measured by the growth rate of real income. Hence, some structural changes in the agricultural sector can be summarized as follows:

1- The agricultural sector's contribution to GDP has been declined. This is due to the growth of other economic sectors faster than the agricultural one. Especially since development models are mostly concentrated on the industrial sector as a leader sector. However, the contribution of the agricultural sector to GDP may increase in the second phase of economic growth.

2- Decreased agricultural employment as compared with the total employment due to the tending of agricultural labor to other sectors.

3- Changed pattern of agriculture from purposeful cultivation of self-sufficiency and non-market oriented to specialized agriculture oriented to marketing and foreign trade. Therefore, production methods would be changed to increase the use of modern agricultural machinery. Thus, agricultural production technology would vary at a rate that increases capital to labor. This change would also be reflected in the volatility of agricultural exports (3).

Despite the importance of this subject, the comprehensive economic studies that tried to go into it are rare and almost none in Iraq. What are found of them, are not descriptive studies based on descriptive statistical analysis and does not promote to the level of deep economic analysis. This study is based on the (Cheuery-Syrguin model) of structural changes, which explains the structural changes in an economy by per capita income, population and net internal inflows. This model is used in economic literature for this purpose, which provides a long-term analysis. On the other hand, Inputs - Outputs model is used for short-term analysis. Information leakage imposes its uses and does not permit the uses of the input-output model. Real per capita income rate is generally used as a measure of economic growth, which is the main limitation of structural changes in the agricultural sector, particularly. As one of the important demand factors that cause structural changes, any increase in per capita income leads to an increase in overall demand for agricultural goods and services in general. This



would affect domestic investment and thus on agricultural production and agricultural employment. Population size reflects on economies impact, Boad wag. Population size increases would increase the overall demand for all goods and services, particularly locally produced goods including agricultural products and commodities. This leads to production expansion to cover demand increase that resulting of population increases. Composition of production changing would be done as a result towards demand changing of agricultural commodities, which allowing economies of scale to be exploited. This creates many employment opportunities that are an attraction for the workforce towards the most active economic sectors. Population size affects Sapply, population increase leads to increased labor in the long term, which helps decrease wage rates and then production costs, which affect the sectorial composition of GDP,(4).Net flow is one of the production factors, which can be measured by the difference between imports and exports. It is one of the limitations of structural changes that affect offers. Importation is the main source of capital. Therefore, the sectorial distribution of capital, which is reflected in the commodity and sector composition of imports, is reflected in the sectorial distribution work power. Capital flows affect market size because they represent external demand to domestic production, Boad wag (p. 18). Hence, it is possible to reform the structural changes in the agricultural sector as a statistical equation in the following double logarithmic format:

$$\text{LN AGQ} = \ln B_0 + B_1 \ln y + B_2 \ln \text{pop} + B_3 \ln F \dots \dots (1)$$

$$\text{LN AGE} = a_0 + a_1 \ln y + a_2 \ln \text{pop} + a_3 \ln F \dots \dots (2)$$

Where:

AGQ: the contribution of the agricultural sector (agricultural output) to GDP.

AGE: the ratio of agricultural employment to total employment.

Y: the per capita of GDP.

F: the flow of productive resources measured by (imports - exports).

Pop: the population .

Each of agricultural contribution output to GDP and the percentage of agricultural labor to total employment measure the major structural changes in the agricultural sector as a dependent variable that reflects the pattern of economic development in general and agricultural economic development in particular. The unbalanced development pattern, which focuses on non-agricultural sector as a leader sector (often the industrial sector), is reflected as a negative signs for each of factors a_1 and B_1 . The unbalanced development pattern also predicts a negative signs for the factor a_2 , B_2 . Treatments of a_3 and B_3 may take both negative and positive signs. The replacement of labor by capital reduces the proportion of agricultural labor and increases agricultural production. However, these increases may be greater than growth rate in other sectors where B_3 is positive and agricultural growth sector is lower than the growth rate in other sectors and where B_3 is negative.

The structural relationship between the agricultural sector and other sectors

The economic sectors of an economy are linked to each other through the dependence of these sectors on one another either directly or indirectly through the dependence of these sectors on similar goods or services as raw materials for the production process in each of these sectors. It can be said that the agricultural sector is linked to other economic sectors through direct dependence on them by its needs of energy and capital investments. Other economic sectors rely directly on agriculture to obtain production inputs as raw materials for the food and clothing industries. The indirect relationship between the economic sectors is based on the following:

1- The demand of agricultural products depends positively on generated incomes of agricultural production and other sectors of the economy. Demand is one of the important limitations of making structural change in the agricultural sector, as mentioned above. Production increase in other economic sectors leads to demand increase for agricultural products as a result, which changes agricultural production in a suitable manner for changing demand (5).



2- Dependence of agricultural projects on the sources of the available finance in the economy in general. Since the agricultural production projects need long-term loans in general and commercial banks would not do this because farmers cannot provide adequate guarantees, (6), the government is intervening to orient some financial resources into the agricultural sector through some policies that support the agricultural sector, such as the agricultural initiative. This affects other sectors as well as the agricultural one by influencing the implicit price of capital (interest rate).

3- Agricultural price support policies, whether by setting product prices or by subsidizing the prices of used raw materials in the agricultural sector, would affect relative prices and then on the agricultural and non-agricultural demands. This affects the production in all economic sectors, (7).

In order to test the relationship between the agricultural sector and others, the following equations (3) and (4) are used:

$$AGO = a_0 + a_1 IMQ + a_2SERQ \dots\dots\dots(1)$$

$$AGE = b_0 + b_1 INQ + b_2SERQ \dots\dots\dots(2)$$

Where:

AGO: is the contribution of agricultural output in GDP.

INQ: is the contribution of industrial output in GDP.

SERQ: is the contribution of service sector output in GDP.

AGE: is the contribution of agricultural labor to total employment.

Equation (3) shows the pattern of economic growth. Focusing on industry as a leading sector in the unbalanced development model will be reflected by a negative sign of the industrial sector contribution coefficient. Slower growth in the agricultural sector would be affected rather than the industrial one (Transmission log). The same is with the contribution of the service sector. Equation (4) refers to the flow of labor among economic sectors. Negative sign of contribution coefficient of the industrial sector and the service sector in GDP indicates the flow of agricultural labor to other sectors. The positive sign of these coefficients reflects the increase in agricultural employment (demand for employment in the agricultural sector). It is orient to contribution of other sectors and this indicates a decline in the agricultural sector(3).

Econometrical analysis and Results discussion

Structural changes in the Iraqi agricultural sector.

In order to identify the structural changes in the agricultural sector, it is possible to estimate the equations (1) and (2) by using the Ordinary least squares method relying on the official data as in Table (4)

Table 4. The elasticities of structural changes in the agricultural sector

F %	D.W	R ²	(ln F)	(lnpop) coefficient	(lnY)coeffi cient	Fixed (B ₀)	Dependent variable
88.4 2	1.59	92.3	*0.082 (3.82)	-*1.149 (-4.92)	-**0.173 (-2.50)	-3.671 (-1.93)	Ln AGO
11.2 7	1.03	60.6	0.006 (0.35)	**0.78 (-2.41)	* -0.21 (-3.92)	4.64 (3.03)	Ln AGE

Source: of researcher’s preparation according to the tables1 and 3

Note: numbers between parentheses are t-values.

* Significant at(1%) confidence level.

** Significant at(5%)connivance level.

1- Most of the estimated parameters were statistically significant at both of (1%) and (5%) confidence levels except for (LN pop) and (LN F) in the following equation. Therefore, changes in the contribution of the agricultural sector to the gross output and percentage of agricultural employment to total

employment determine per capita of the real gross domestic product (prices of 1988) and population. Productive resources flow impact was not significant in making structural changes in the agricultural sector.

2- All estimated parameters were negative, except for the flow of productive resources (F),



which reflecting the trend of structural changes in the agricultural sector that accompanied economic growth in Iraq. These changes are summarized by the low contribution of agriculture to GDP and the low rate of agricultural employment; this may not mean a decline in agricultural production.

3- The elasticity of agricultural employment ratio to per capita real GDP (y) was low (0.21). Agriculture contribution elasticity to GDP for the same variable (y) was (0.17). Increase of real per capita income by (1%) would be followed by a decline in agricultural labor ratio by (0.21%) and agricultural contribution in GDP decreases by (0.17%) as well. Population increases by 1% would be followed by a decrease in both of agriculture contribution in GDP by(1.14%)and percentage of agricultural employment by (0.78%).That is it; increase in population drives workers out of the agricultural sector due to supply excess in agricultural labor.

4- Coefficient of limitation of the agricultural sector contribution in GDP was high (92.3%). This indicates that only (8%) of the changes in the contribution of this agricultural sector,

which are explained by the mentioned changes as limitation of structural changes. This can be considered as structural changes. The relatively low coefficient of (60%) indicates that (40%) of the changes in the contribution of agricultural labor to total employment are limitations to structural changes despite the decline in agricultural labor size.

Population increases and economic growth were associated with a decline in both agriculture contribution to GDP and agricultural employment percentage to total employment. This reflects the huge focus on oil and mining sector as a leading sector in the Iraqi economy.

Relationship between the agricultural sector and other sectors

To clarify the relationship of the agricultural sector with other sectors, which is resulted from the pattern of Rolloved economic development, equations (3) and (4) can be estimated using the Ording feast squares method depending on the available statistical data. Table (5) shows these two estimated equations as following:

Table (5): Relationship between the agricultural sector and other sectors

F %	D_W	R ²	Variable coefficient (SERQ)	Variable coefficient (INQ)	Fixed term	Dependent variable
38.1	0.415	0.87	**1.342 (7.805)	-0.146 (-0.834)	28053.64	AGQ
1.06	0.273	0.29	-0.0005 (-1.311)	- 0.00058 (-0.131)	12.051	AGE

Source: by researcher's according to the tables(1) and (3).

Note: numbers between parentheses are t-values.

** Significant at (5%) Confidence level.

1- It is noted from table (5) that all of the estimated parameters differ statistically from zero with a (1%) significant level . One of the industrial contributing sector factors is negative, which is indicating that the focus on the industrial sector took place at neglecting agricultural sector. In terms of contribution to GDP, increasing in GDP by (1%) would be followed by a decrease in the contribution of the agricultural sector by (0.14%). This was done by a reduction in the agricultural employment percentage by (0.00058%).

This means that, the relationship between the contribution of the industrial sector and the contribution of the agricultural sector to GDP is inversed. Focusing on industrial sector as a leading sector explains this. Moreover, growth in the industrial sector accompanied with a slowdown (lagged) in the agricultural sector in the experiments (Transmission Lag). Table (5) shows a positive relationship with the services sector. The each contribution of the services sector to GDP increased by (1%) followed by an increase in the contribution



of the agricultural sector by (1.34%) , but percentage of agricultural employment decreases in by (0.0005%). This may also be in line with development pattern in developing countries.

- 2- Coefficient of limitation was (87%) in the equation of the contribution of the agricultural sector in the gross output, and (29%) in the equation of the percentage of agricultural employment. This reflects the deletion of some sectors such as the construction sector to reduce the possibility of a multi-collegiality problem additional to other periodic factors.

It is possible to summarize the structural changes in the agricultural sector that coupled with growth of economic and population by a decline in the agricultural employment percentage to total employment, and slowdown in contribution of the agricultural sector in GDP in a benefit of the industrial sector. This is consistent with Iraq's non-existent growth policy. It is also consistent with the low contribution of the agricultural sector to GDP with agricultural production growth. This growth rate was positively correlated with the rate of growth of the added value of the industrial sector as shown in the following equation.

$$GA = 0.18 + 0.189 * GI \dots \dots (5)$$

(2.01)

$$R^2 = 0.17 \quad D-W = 2.51 \quad F = 3.61$$

Where:

* Significant at(5%) confidence level.

GA: Growth rate in the agricultural sector

GI: Growth rate in the industrial sector

Although determination coefficient decreases ($R^2 = 0.17$), the estimated positive coefficient (growth coefficient of industrial production) that is significantly differ from zero, which is in line with the prevailing growth pattern in developing countries. Services sector had benefited of the drop in agricultural employment. According to equation (6), employment percentage coefficient of the service sector (SER) is negative and significantly differs from zero at (5%) significant level, while percentage of industrial labor has non-significant negative sign. This refers to that the self-demobilized agricultural labor may be merged into the service sector not in the industrial sector.

$$AGE = 0.511 - 0.319 INE - 0.852 SER$$

(0.811) * (7.220)

$$R^2 = 0.89 \quad D-W = 0.51 \quad F = 81.70$$

Where: * Significant at(1%) confidence level.

AGE: Agricultural Employment ration

INE: Industrial Employment ration

SER: Services employment ratio

The estimated function included statistical and stander problems and the most distinguished one is self- correlation that categorized of the first a positive self-correlation .

$$D.W < dL$$

$$0.273 < 1.22$$

This demand required problem solving by interring the imaginary variable that takes 2 values (0.1) years from (2004 – 2015) showed (0) value after problem solving . the following results is gotten .

Dependent Variable	Fixed	Variable coefficient INQ	Variable coefficient SERQ	W Imaginary variable	D.W	R ²	F
AGE	11.370	1.74 (0.38)	- 3.48 (-0.61)	0.85 (0.59)	0.29	0.99	0.809

Significant at 1% **

Numbers between parentheses are t-values .

After this treatment , the estimated function roll by self-correlation issue.

Drin Watson value come by inconclusive decision area as following :-

$$dL < D.W < du$$

$$1.22 < 0.29 < 1.55$$



Conclusions

- 1- Research hypothesis has been proven.
- 2- Structural changes in the agricultural sector differ as the contribution of the agriculture sector to the GDP decreases, and as declines in contribution of agricultural labor to total employment, as well.
- 3- Excess supply of agricultural labor is not used in the agricultural sector, but is used in other sectors, especially oil and mining and services.
- 4- Negative relationship between contributions of agricultural sector to the GDP with the contribution of the industrial sector was identified, while it was positive with the services sector.

Recommendations

- 1- Giving a great attention to the agricultural sector especially agricultural manpower rehabilitation and training fields.
- 2- Encouraging the investment in the agricultural sector, especially direct foreign investment in fields of land reclamation and new irrigation techniques.
- 3- Infrastructure rehabilitation of the agricultural sector, especially land reclamation projects.
- 4- Directing agricultural initiative loans towards projects that increase the

contribution of agricultural Product to GDP.

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التغيرات الهيكلية في القطاع الزراعي في العراق وعلاقته مع القطاعات الاقتصادية الأخرى للمدة (2015 -1990)

باسم حازم البديري²

نغم رحمن محمد¹

كلية الزراعة / جامعة القادسية¹ ، كلية الزراعة / جامعة بغداد²

الخلاصة

تهدف هذه الدراسة إلى تحليل التغيرات في مساهمة القطاع الزراعي في الناتج المحلي الإجمالي ونسبة العمالة الزراعية إلى العمالة الكلية ، بالإضافة إلى تحليل العلاقة بين القطاع الزراعي وبين القطاعات الأخرى في الاقتصاد العراقي . حيث تبين أنه نتيجة للنمو الاقتصادي مقاساً بالناتج المحلي الحقيقي على مستوى الفرد والنمو السكاني تناقصت مساهمة القطاع الزراعي في الناتج المحلي الإجمالي كما تناقصت العمالة الزراعية كنسبة من العمالة الكلية . وقد أتضح اعتماد قطاع النفط والتعدين كقطاع رائد ، حيث كشفت الدراسة عن العلاقة السالبة بين مساهمة القطاع الصناعي في الناتج المحلي الإجمالي وكل من مساهمة القطاع الزراعي في الناتج المحلي الإجمالي ونسبة العمالة الزراعية . أما قطاع الخدمات فكانت علاقته موجبة مع القطاع الزراعي سواء كانت على مستوى المساهمة في الناتج المحلي الإجمالي ونسبة العمالة الزراعية .

الكلمات المفتاحية : الناتج المحلي الزراعي ، التغيرات الهيكلية في الاقتصاد العراقي ، العمالة الزراعية