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## AN ECONOMIC STUDY TO MEASURE THE IMPACT OF THE MAIN VARIABLES ON RURAL POVERTY IN IRAQ FOR THE PERIOD 1990-2019

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### ABSTRACT

The interconnected between the phenomena of structural changes and poverty comes from the fact that structural change in developing countries requires serious reversals in the paths of economic policies based on a package of economic directives different from those adopted by countries, and these changes often have undesirable economic effects that push many groups of members of society towards the poverty line or below it, so the research aimed to measure the impact of structural changes in rural poverty in Iraq for the period 1990-2019 by identifying the structural variables that affect rural poverty, and the relationship between the poverty index (average per capita income) was represented as a dependent variable and the factors determining it, which are each of the contribution of agricultural output to the gross domestic product, agricultural employment, agricultural land, the proportion of agricultural labor, total employment, mechanical technology, capital invested in agriculture as independent variables, and through that shows the inability of the agricultural sector in Iraq to accept growth and this made it difficult to complete the process of structural transformation towards adjusting the structure of the agricultural sector, which created the problem of poverty. therefore, the infrastructure must be developed in the countryside, the agricultural research centers should be further developed and supported, and agricultural reform suited mainly to regions that suffer from strong social contradictions, poverty and food insecurity.

**Keywords:** Rural poverty, structural changes, food insecurity, agricultural employment.

### Introduction

There is no country in the world completely free from poverty, so if there is a difference between countries, it lies in the capacity and degree of concentration, and therefore what is considered poverty may not be the same in other countries, and whatever the formulas and levels of poverty are, they represent an unacceptable human, social and moral description. Poverty does not find a locational dimension, but it is surrounded by a temporal dimension that extends deep with its historical formation in regional and Arab societies. Many economic doctrines and theories have focused on the phenomenon of poverty (Tlume, 2013). The phenomenon of poverty is one of the phenomena that aims to define the general features of any country's economies. It is a phenomenon that no country is free from, whether developed or developing, and it is a familiar and addressed issue in that it is an economic and social phenomenon, for all peoples, civilizations, societies, and all ages. Poverty varies from one country to another or from one economic system to another, and the difference lies in the degree of disparity in terms of the percentage that exists, as there is a big gap between the numbers of the poor in the rich developed countries than in the poor underdeveloped countries (Zaidan, 2014). The issue of poverty has taken a new turn since the beginning of the eighties, due to the occurrence of two developments, the first of which is the adoption of many developing countries' agrarian reform and structural adjustment programs, which negatively affected the conditions of the poor classes.

Second: represented in the great transformation in the literature of development from the concept of economic growth based on industrialization, capital formation and intensive investment in means of production to human development, as it is the basis and essence of the sustainable development process (Sultan, 2017). The general report of poverty was described it as: a condition that expresses the deficiency in the basic and necessary needs of the human being, and the most important of these needs (food, health care, education, housing, and the provision of material needs to face emergency matters or crises that the family or individual is exposed to) describing poverty as needs often known, but the extent to which these needs are quantified is difficult. Poverty can be measured by expressing the number of the poorer as a percentage of the population or by measuring the standard of living expressed in family income or average per capita expenditures. Income poverty is the measure used in the poverty alleviation strategy, as well as the individual's share of calories and protein that enables him to continue living. Extreme poverty: It is the state in which a person cannot dispose of his income in order to reach the satisfaction of food needs. Most of the poorer in the rural societies of Arab countries, including Iraq, suffer from poor access to productive assets (land, credit, technology, extension services, training, irrigation system, transportation and communications) which are the infrastructure for the production function in the rural society, which was reflected in the low agricultural returns and low income, which led to make small farmers get poorer than their poverty (Allen,

1995). In Iraq, the poverty rate is (20%) of the total population, and about (two million) Iraqi families live below the poverty line according to the foundations defined (one dollar per person) on the basis of purchasing power parity for the year 1985, and the poverty rate in rural areas in 2005 was about (55%) are both extreme and absolute poverty, and the standard of living has deteriorated significantly after the imposition of economic sanctions on Iraq. The poverty rate rose immediately after the imposition of sanctions to 20% (Kadawi, 2011).

Iraq has given priority to the countryside within the objectives of the plans, policies and strategies after 2003 to bring about the required change in order to bridge the gap between urban and rural and achieve rural development that accommodates all sectors in the countryside, but this priority is confronted by the challenges and problems that the Iraqi countryside suffers from and which are deeply rooted in it since the period pre 2003, represented by economic, social, institutional and environmental challenges, which together create a gap between urban and rural, in terms of the deprivation suffered by the countryside and to a degree of (58%) compared to (17%) in urban areas, and the rate of poverty in the countryside reaches (55%) compared to (13.5%) in urban areas (Ghazal, 2000). In addition to the high disparity between the percentages of educated people in urban and rural areas, the loss of the spatial competitive advantage of private sector investment, unemployment and internal migration arising from human and economic resource imbalances and the low percentage of the agricultural sector's contribution to the domestic product despite the existence of the agricultural initiative as well as difficulty using and indigenizing modern technologies, poor property distribution, and agrarian reform laws, in addition to the weak popular participation of the rural community and others (Al-Faris, 2012). The importance of research lies in the importance of the segment of rural dwellers and the importance of agriculture in moving the wheel of economic growth for what this sector provides in terms of food and raw materials and others, as the agricultural sector is the main engine of the productive and economic sectors. The research problem lies in the fact that the rural sector in Iraq suffers from the phenomenon of poverty and its negative effects, which is one of the main reasons for the underdevelopment of the agricultural sector, which leads to the vicious cycle of poverty, which calls for structural changes in the agricultural sector to reduce this phenomenon, despite the efforts that has been made to bridge the gap between urban and rural, and the attention given to the topic of rural development in the

development plans, as this gap has not been filled in Iraq in terms of the concentration of poverty and the poor in the countryside, the high unemployment rates compared to urban areas, the low rate of the agricultural sector's contribution to the gross domestic product, and the high rates of environmental pollution (Sultan, 2007). The research problem can be formulated with the following question: Can the policies and methods adopted by Iraq help to reduce poverty and achieve rural development?

The research started from the hypothesis that structural changes could lead to a reduction in the phenomenon of rural poverty in Iraq because it is the main indicator of trends in agricultural GDP growth, and that despite the strong problems and challenges facing the achievement of rural development in Iraq, but a national program to achieve sustainable rural development with goals and options that are an integral part of the system of economic development interactions that would support the path of sustainable rural development in Iraq. The research aims to identify the nature of rural poverty and its theoretical and practical requirements, diagnose the problems that exacerbate the gap between urban and rural, and thus deepen the severity of structural imbalances that cause rural poverty and study the impact of the main variables affecting rural poverty in Iraq for the period 1990 -2019.

**Materials and Methods**

The econometric model has been described for the relationship between the poverty index (average per capita income) as dependent variable and the other variables as independent variables, namely:

- X1 Contribution of agricultural output to GDP
- X2 agricultural employment
- X3 farm lands
- X4 ratio of agricultural employment / total employment
- X5 mechanical technology
- X6 capital used in agriculture

Then, the model was estimated according to the method of multiple linear regression using the ordinary least squares method (OLS), followed by the interpretation of the values of the estimated parameters and tested statistically, economically and econometrically, and to govern the benefit in explaining the behavior of these variables and their impact on rural poverty in Iraq. The results obtained in explaining the relationship between the explained variables (x1, x2, ....., X6) and the dependent variable y (poverty index) showed that the most reliable model for data compatibility in Iraq is the double logarithmic model, and for the study the multiple linear regression method was used.

**Unit Root Tests**

**1. Augmented Dicky Fuller Test (ADF):**

**Table 1 :** Results of Augmented Dicky Fuller test (ADF) for unit root

Time series	Level			First difference		
	constant	Constant with trend	without	constant	Constant with trend	Without
LY	3.9125-	-3.8328	0.0143	-5.8658	-5.9070	-5.7701
LX1	-3.0067	-2.8987	0.4910	-5.6811	-5.5330	-5.8184
LX2	-4.2172	-4.8422	0.0785	-4.2463	-4.3707	-4.3472
LX3	-4.3213	-2.1492	1.8628	-6.3181	-4.1519	-5.3392
LX4	-2.4191	-3.5896	-1.0037	-6.8012	-4.3970	-6.5007
LX5	-3.8564	-3.1346	0.6862	-3.4550	-3.8930	-3.3592
LX6	-2.6875	-2.6132	0.3135	-4.8343	-4.7563	-4.9418
Critical value 1%	-3.7240	4.3743-	2.6607-	3.7378-	-4.3943	-2.6645
Critical value 5%	-2.9862	3.6032-	1.9550-	2.9918-	-3.6121	-1.9556
Critical value 10%	-2.6326	3.2380-	1.6090-	2.6355-	3.2430-	-1.6087

Source: Work of researchers based on the statistical program (Eviwse.10).

Table 1 shows the results of the ADF test for the study variables according to the three formulas (constant, constant and trend and without). From the table it is possible to notice the stationary of most of the variables, as the calculated Tau value was greater than its corresponding critical values at levels of significance (1%), (5%) and (10%) (Verbeek, 2004)

(Clark, and Mirza 2006). Therefore, the null hypothesis cannot be rejected, that is, all chains are non-stationary at their levels except for the time series of the dependent variable, which has proven its stationary at the general level (Sims, and Watson 2016).

**2. Kwiatkowski-Phillips-Schmidt-Shin Test (KPSS)**

**Table 2 :** Results of Kwiatkowski-Phillips-Schmidt-Shin Test (KPSS) for unit root

Time series	Level constant	First difference		
		Constant with trend	constant	Constant with trend
LY	0.2497	0.0606	0.1901	0.11000
LX1	0.0768	0.0758	0.0761	0.06500
LX2	0.3819	0.0658	0.5000	0.50000
LX3	0.6832	0.17712	0.2037	0.11989
LX4	0.6245	0.10649	0.16810	0.15405
LX5	0.4895	0.14293	0.3830	0.12212
LX6	0.0604	0.06024	0.0856	0.06741
Critical value 1%	0.73900	0.21600	0.73900	0.21600
Critical value 5%	0.64300	0.14600	0.64300	0.14600
Critical value 10%	0.34700	0.11900	0.34700	0.11900

Source: Work of researchers based on the statistical program (Eviwse.10).

When performing the KPSS test of the unit root for the variables included in the model according to the level (constant, constant and trend), it became clear that it is not stable at the level and stable in its first difference, as shown in table (2) as the results indicate that the estimated values of the statistic (LM) is smaller than the table value of the test at a significant level (1%), (5%) and (10%), which means that it is not possible to reject the null hypothesis ( $H_0: \beta = 0$ ), due

to the absence of the unit root for the levels of the series (stability of the series time) (Salisu, 2015).

Thus, Unit Root Tests for time series of all variables have shown that these chains have the same degree of integration, which means that the chains of these variables move together through time and that there is a long-term equilibrium relationship known as the regression of co-integration.

**Table 3 :** Determining number of lags.

Lag	LogL	LR	FPE	AC	SC	HQ
0	-235.2810	N.A	0.000227	14.31065	14.669769	14.43313
1	-37.350096	291.0736*	9.52e-08	6.432409	9.664702*	7.534714*
2	42.72921	80.08017	7.34e-08*	5.486517*	11.59196	7.568647

\*:Number of lag length, Source: outputs of E-views 10 program.

**Cointegration test using the boundary approach**

According to the Bound Test approach, we compute the (F) statistic through the (Bound Test), where the null hypothesis  $B_0 = B_1 = B_2 = 0$  is tested that says there is no co-integration between the model variables (there is no long-term equilibrium relationship) against the alternative hypothesis  $B_0 \neq B_1 \neq B_2 \neq 0$  in the existence of a long-term co-integration relationship between the levels of the model variables. Here, the estimated (F) statistic is compared with the tabular values proposed by Pesaran *et al.*, 2001, not the normal value of F, which is two tabular values, representing the value of the upper bound in the case that the variables of the model are integral of degree I (1), the value of the minimum in the case of the integration is of degree zero I (0). If the calculated value of (F) is greater than the minimum critical value, then we reject the null hypothesis, that is, we reject the hypothesis that there is no long-term equilibrium relationship, and we accept the alternative hypothesis that there is a co-integration relationship between the study variables, but if the computed value is less than the minimum critical values, we accept the alternative assumption that

there is no equilibrium relationship in the long run(Sims, and Watson 2016).

**Table 4 :** Results of the co integration test using the boundary test

F-Statistics	32.399	
Critical Value bounds		
Significance	I(0) Bounds (Lower bounds)	I(1) Bounds (upper bounds)
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Source: Work of researchers based on the statistical program (Eviwse.10).

The model has passed all econometric tests such as being free from autocorrelation by using the (LM) test with a probability value (0.8749), and from which we can accept the null hypothesis that the model does not suffer from the self-correlation problem. By using Jarque-Bera Test (JB) with a probability value (0.388006), which is greater than (0.05), from which we accept the null hypothesis, meaning that the

residuals of the model has a normal distribution as shown in figure (1), while the Breusch-Pagan-Godfrey test and the ARCH test showed the absence of heteroscedasticity problem using a (0.5087, 0.2664) probability value respectively for two decelerations. Also, the results of the Ramsey RESET Test indicate the rejection of the hypothesis that there is an error in determining the model.

**Mathematical Model**

$$LnY = \beta_0 + \beta_1 LnX_1 + \beta_2 LnX_2 + \beta_3 LnX_3 + \beta_4 LnX_4 + \beta_5 LnX_5 + \beta_6 LnX_6 + e_i$$

By placing the following equation in the ECM model, we obtain the following equation (Mahmoud, 2013) (Ashour, 2016):

$$\Delta LnY = \alpha_0 + \alpha_1 LnX_1 + \alpha_2 LnX_2 + \alpha_3 LnX_3 + \alpha_4 LnX_4 + \alpha_5 LnX_5 + \alpha_6 LnX_6 + \sum_{i=0}^m \beta_1 \Delta LnX_1 + \sum_{i=0}^m \beta_2 \Delta LnX_2 + \sum_{i=0}^m \beta_3 \Delta LnX_3 + \sum_{i=0}^m \beta_4 \Delta LnX_4 + \sum_{i=0}^m \beta_5 \Delta LnX_5 + \sum_{i=0}^m \beta_6 \Delta LnX_6 + e_i$$

Where:  $\alpha_0$  the constant or displacement,  $e_i$  the random term,  $\alpha_1 \dots \alpha_6$  long-term coefficients,  $\beta_1 \dots \beta_6$  short-term coefficients.

**Estimation of the unrestricted error correction model**

This step involves estimating the short and long-run equilibrium parameters of the error correction model.

**Table 5 :** The results of the short-term and long-term estimations

Short-run Coefficients				
Variable	Coefficient	Std.Error	t-statistic	Pro Value
$\Delta LnX_1$	-0.330730	0.794233	- 0.042146	0.9670
$\Delta LnX_2$	14.13473	4.229233	3.342146	0.0030
$\Delta LnX_3$	-0.444887	0.608862	-0.730121	0.4740
$\Delta LnX_4$	2.947842	2.138130	1.378615	0.1830
$\Delta LnX_5$	0.395932	0.815857	0.584855	0.6330
$\Delta LnX_6$	0.726717	0.309730	2.35272	0.0290
ECM	-0.281011	0.097132	-2.893087	0.0016
C	-105.292701	30.959267	-3.40171	0.0038
Long-run Coefficients				
Variable	Coefficient	Std.Error	t-statistic	Pro Value
LnX1	- 0.469542	0.203751	- 2.304483	0.0651
LnX2	11.155573	2.229233	3.112140	0.0030
LnX3	-0.610973	0.301748	-2.024776	0.0611
LnX4	0.249245	0.113035	2.205037	0.0696
LnX 5	0.166113	0.117299	-1.416149	0.2065
LnX6	-2.023257	0.500249	- 4.044502	0.0000
R-Square	0.870025	Mean dependent Var	0.053203	
Adjusted R-Squared	0.8314033	S.D. dependent Var	0.865513	
S.E.of regression	0.204757	Akaike info criterion	-0.102489	
Sum Squared resid	0.754658	Schwarz Criterion	0.238796	
Log Likelihood	8.281117	Hannan-Quinn criter	-0.007831	
F-Statistic	22.47100	Durbin-Watson Stat	2.138541	Prob(F-Statistic) 0.000000

Statistical tests showed that the calculated value of (t) is greater than its tabular value, as the significance of (x2 agricultural labor and x6 stable capital in agriculture) was proved at a significant level of (0.05), and the significance of each of (x1 : the contribution of agricultural output to the GDP, x3: farm land, x4: farm labor and x5: mechanical technology was not confirmed at the same level of significance. The value of R<sup>2</sup> indicated that (87%) of the changes in the poverty index (average income y) are explained by the changes occurring in the independent variables in the equation and (13%) of them are explained by other factors that may be explained by the random variable ui. From the F test, the significance of the function was confirmed in proving the argument for the relationship between the dependent variable and the independent variables, and it was also ensured that the model was free from the Auto-correlation problem, as the calculated D.W value was 2.13, which is greater than dl and less than du. As for the theoretical tests, the variable of the agricultural output contribution to the gross domestic product X1 indicated that it has a negative and insignificant effect on the average per capita income, and then an increase of 1% of this variable leads to a decrease in the average per capita income by a

percentage Up to 33%, this decrease is attributed to the problems that this sector suffers from the deterioration in the exploitation of all arable lands, land reclamation, the establishment of integrated irrigation and drainage projects, the introduction of mechanization and the use of improved seeds, fertilizers and pesticides in order to raise production and productivity in this sector. The fact that Iraq is an agricultural country in terms of the natural resources it possesses and the importance of the agricultural sector in building its economy, but its contribution to the GDP is not commensurate with the size of those resources on the one hand and the importance of the agricultural sector on the other hand, as for the variable of agricultural employment x2, it was positive and significance, and then the an increase of 1% of this variable leads to an increase in the average per capita income by 141%, as the development of rural areas and the creation of good ones that accommodate large numbers of the population and the resettlement of some of it is one of the important means in combating poverty by encouraging individuals to work in agriculture on their farms, working for farmers, and teaching them some trades that increase their income. Therefore, rural development comes at the forefront of the priorities that must be paid attention to

and directed towards it, limiting migration from the countryside to the city and distributing the population to The largest possible space and creating job opportunities commensurate with the conditions of activities and their data. The sign of the agricultural area variable x3 indicates that it has a negative and insignificant effect on the average per capita income, and therefore an increase of 1% of this variable will lead to a decrease in the average per capita income by up to 4.4%, the decline in agricultural holdings for the rural poor requires redistribution of agricultural land through agrarian reform policies despite the lack of attempts in this area. FAO and International Monetary Fund have made recommendations to encourage agricultural reform, improve the fertility of agricultural lands and limit the fragmentation of agricultural holdings by merging and distributing them, lands in order to cultivate them and make them economically sustainable holdings. As for the variable of the ratio of agricultural employment to total employment X4, it was positive and not significant, and then an increase of 1% from this variable would lead to an increase in the average per capita income by 294.7% and this increase is high, which means that the population increase workers are pushed out of the agricultural sector at a rate that increases the rate of population increase itself, meaning that the surplus supply of agricultural labor pushes them out of the sector. While the mechanical technology variable x5 indicates the positive and non-significant effect, as an increase of 1% of this variable leads to an increase in the average per capita income by up to 39.5% and this is in agreement with the economic theory as the increase in the use of technology mechanism necessarily leads to an increase in the average per capita income, while the invested capital variable x6 was positive and significant, and then an increase of 1% from this variable leads to an increase in the average per capita income by a rate of 72.6. The results of the study indicate the inability of the agricultural sector to accept rapid growth, which made it difficult to complete the process of structural transformation towards modifying the structure of the agricultural sector, which created the problem of poverty as it faced many challenges and obstacles to its development, and much of the agricultural resources and capacities are still not fully exploited, and the exploited from them are not optimally utilized, as the self-sufficiency of many strategic agricultural food commodities is very low, and the agricultural sector in Iraq suffers from damage in providing many of the necessary requirements for production and the inadequate infrastructure and institutions needed to eradicate poverty in the countryside. Individuals who live in rural areas below the poverty line constitute (60-65%), which is a high percentage. The study recommended the necessity to stimulate and expand all fields, that is, to motivate those who are able to work in the agricultural sector, construction and reconstruction, establish adequate agricultural reform mainly in areas experiencing strong social contradictions of poverty and food insecurity as a means to encourage wider and sustainable access to and control over land, water and natural resources and increasing the amount of investment in human

capital (education, health, food) and adopting an integrated approach that includes enhancing social welfare, developing the infrastructure, increasing and developing agricultural research centers and supporting them and encouraging and supporting agri-food industries, which would enable them to create an infrastructure capable of investment and .

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