

The effect of some macroeconomic variables on the structure of total employment in Iraq for the period (1990-2017).

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Abstract

The research aimed to analyze some factors affecting the Iraqi total employment structure during the period 1990-2017 using the ARDL method of joint integration to study the impact of GDP, total investments, total wages and technological development on the volume of total employment, One of its results was that the volume of total employment was not affected by the increase in the gross domestic product, as its increase is not reflected in the increase in employment, but rather means an increase in the import rates of goods and services imported from abroad produced by foreign labor, not local, and this is due to the nature of the Iraqi economy, the research recommended that the government should put in place an effective system for developing local technological capabilities and create a solid ground for workers' wages by maintaining their minimum wages to ensure the protection of the low-paid category.

.Keywords: labor force, number of lag period, gross domestic product

Introduction

The human labor element is one of the most important elements of production, as its role extends in organizing, mixing and directing productive resources with the aim of obtaining the largest possible return. Accordingly, the skill and quantitative level of employment has become one of the general determinants of development, and that human resource development is the backbone of progress, whether in rural or urban areas. We can review some studies that focused on the human resource as a major element in the development of various sectors, as in the study (kangashariu, 2001) on the nature of the

relationship between employment and the outcome in Finland, where the results of the study showed that there is a rise in Finnish unemployment rates from (3%) to (16%) approximately during the first three years since 1992, and the growth in the annual rate of GDP was (4.5%). In a study conducted by (Khalil et al., 2001) entitled (An analytical study of employment in Egypt and predicting its size and characteristics), he explained that agricultural activity prevailed in Egypt until 1996, followed by the services sector in absorbing the labourforce and then the industry sector, and in another study conducted by (gutierrez , 2002) studying

the productivity of agricultural work for a different group of countries in the world for the period (1980-1993), and one of its results is that the productivity of agricultural work grows faster whenever the rate of agricultural investment is high. In addition, the geographical factors represented in the liberalization of trade between different countries have an impact on the growth of agricultural labor productivity. (Khalifa, 2003) conducted an economic study of the labor market in Egypt using the general equilibrium model, the results of which are that the increase in national product and investments by one billion pounds leads to an increase in agricultural wages by (146), (245) million pounds, respectively. The study (Onaran, 2008) focused on estimating the labor demand equation using cross-sectional time series data for manufacturing industries in the countries of Central and Eastern Europe in order to test the impact of domestic factors (wages and outcome) and international factors (exports, imports and foreign direct investment) on employment during the period of expansion or the restoration of economic activity and that both foreign direct investment and international trade do not prevent the deficit of available jobs in the manufacturing industries, as international factors had a positive impact on employment in rare cases, in addition to the predominance of non-significant effects of these factors and the presence of negative effects on them in some cases. As studied by all (Hassan et al., 2018), (Hassan, 1993), (Hussain, 2015), (Shaltout, 2009) and (Mousa, 2019) topics related to the research topic. The research problem lies in the main challenge facing the Iraqi economy in creating job opportunities with remunerative wages and addressing the repercussions of the advantages of technological change on workers' wages, given that their wages are linked to a slow

dynamic with low growth in productivity to ensure that it is of general benefit to all. The research aimed to analyze some of the factors affecting the structure of Iraqi employment during the period 1990-2017, assuming that there is a long-term equilibrium relationship between some economic variables that have a direct or indirect impact on the structure of employment in Iraq.

Materials and working methods

The impact of GDP, total investments, total wages, and technological development on the volume of total employment was studied based on the quantitative method to reach the results by following the multivariate co-integration method and Autoregressive Distributed Lag Model (ARDL). It was possible to formulate the following standard model for the regression equation

$$LnL = b_0 + b_1LnGDP + b_2LnI + b_3LnW + b_4LnTC + ei$$

Since:

LnL = the natural logarithm of the volume of total employment for the period (1990 - 2017).

$LnGDP$ = the natural logarithm of GDP for the period (1990-2017).

LnI = the natural logarithm of the volume of total investments for the period (1990 - 2017).

LnW = the natural logarithm of total wages for the period (1990-2017).

$LnTC$ = natural logarithm of technological development for the period (1990 - 2017).

All applied studies that use time series data assume that these series are characterized by stationary, and in the absence of stability, the regression we obtain between time series variables or between time series

variables for each variable independently is often spurious (8) In other words, each independent variable must take a period of time (called the lagged gap) until its effect appears on the dependent variable, and that is related to psychological, technological and legal factors.

Table (1) shows the results of the stationary test for the studied economic variables. The PP (Phillips-Perron) test for stationary was adopted, and the following is a presentation of the obtained results:

Table (1) The results of the stationary test for the studied economic variables						
UNIT ROOT TEST RESULTS TABLE (PP)						
Null Hypothesis: the variable has a unit root						
	<u>At Level</u>					
	Variables	LNGDP	LNL	LNI	LNTC	LNW
With Constant	t-Statistic	-3.4731	-0.9079	-1.8521	-2.1621	-3.4487
	Prob.	0.0169	0.7700	0.3486	0.2237	0.0179
		**	n0	n0	n0	**
With Constant & Trend	t-Statistic	-1.4493	-1.8220	-0.2504	-2.1001	-1.4116
	Prob.	0.8220	0.6659	0.9881	0.5227	0.8342
		n0	n0	n0	n0	n0
Without Constant & Trend	t-Statistic	1.7074	2.8672	2.4048	0.6551	2.2714
	Prob.	0.9756	0.9982	0.9947	0.8515	0.9927
		n0	n0	n0	n0	n0
	<u>At First Difference</u>					
	Variables	d(LNGDP)	d(LNL)	d(LNI)	d(LNP)	d(LNW)
With Constant	t-Statistic	-3.4925	-4.7969	-6.7487	-6.4875	-2.8816
	Prob.	0.0165	0.0007	0.0000	0.0000	0.0612
		**	***	***	***	*
With Constant & Trend	t-Statistic	-5.0051	-4.7527	-9.6361	-6.3527	-4.0815
	Prob.	0.0023	0.0041	0.0000	0.0001	0.0182
		***	***	***	***	**
Without	t-Statistic	-2.6601	-3.6944	-5.1676	-6.4824	-2.0415

Constant & Trend	<i>Prob.</i>	0.0099	0.0007	0.0000	0.0000	0.0415
		***	***	***	***	**
Notes:						
a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant						
b: Lag Length based on SIC						
c: Probability based on MacKinnon (1996) one-sided p-values.						

Source: Prepared by the researcher based on Eviews.10

The model was estimated using ARDL method with one lag for the dependent variable and one lag for the independent variables with the presence of the constant, which represents the short-term equation to get the results shown in Table (2)

Table (2) Results of model estimation using ARDL method

Dependent Variable: LNL Method: ARDL Date: 06/29/20 Time: 18:30 Sample (adjusted): 1991 2017 Included observations: 27 after adjustments Maximum dependent lags: 1 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (1 lag, automatic): LNGDP LNI LNW LNTC Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(1, 1, 0, 1, 0)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNL(-1)	0.265397	0.143293	1.852132	0.0796
LNGDP	0.002954	0.051048	0.057863	0.9545
LNGDP(-1)	-0.118284	0.048903	-2.418721	0.0258
LNI	0.043413	0.020499	2.117811	0.0476
LNW	-0.018441	0.068185	-0.270456	0.7897
LNW(-1)	0.237084	0.071417	3.319726	0.0036
LNTC	-0.274871	0.143238	-1.918978	0.0701
C	5.292728	1.090578	4.853141	0.0001
R-squared	0.985072	Mean dependent var	8.909210	
Adjusted R-squared	0.979573	S.D. dependent var	0.370078	
S.E. of regression	0.052893	Akaike info criterion	-2.799903	
Sum squared resid	0.053155	Schwarz criterion	-2.415951	
Log likelihood	45.79869	Hannan-Quinn criter.	-2.685734	
F-statistic	179.1169	Durbin-Watson stat	2.217863	
Prob(F-statistic)	0.000000			

Source: Prepared by the researcher based on Eviews.10

The value of the fixed term is (5.292), which represents the value of the dependent variable when the value of the independent variables is zero. The

interpretation of the fixed limit varies according to the relationship between the variables. Here, as long as the dependent variable represents the number of employments, it means that the number of workers at the total level in an absence of economic activity.

As for the coefficients of the independent variables, they represent partial elasticities as long as the function is a double logarithmic, as the value of the GDP coefficient is about (0.002), which means that if the GDP changes by 1%, the total employment volume will change in the same direction by (0.002) when the rest of the variables are at the average, and the parameter came in the short term with a positive sign to express the direct relationship between the gross domestic product and the volume of total employment, as the increase in the domestic product is an indicator of the increase in national income and that the increase in this income leads to an increase in the volume of employment, but it did not prove the significance of the coefficient, meaning The increase in GDP has no effect on the volume of employment in the short term.

As for the parameter of total investments, it came with a positive sign to reflect the direct relationship between total investments and the volume of employment, which is identical to the economic theory that assumes a direct relationship between the volume of investments and employment, and its value was equal to (0.043), which means that an increase of 1% on the investment will lead to an increase of (0.043) next to employment. It should be noted that the rate of change in investments, which is explained by 1%, did not lead to an increase in the volume of employment with the same percentage, i.e., less than 1% (0.043), which is a low percentage. The

effect on the volume of employment, meaning that the investment projects were not successful in attracting labor towards them.

The value of the parameter total wages was (0.018) and it came with a negative sign to reflect an inverse relationship between wages and employment in the short term and this is in contrary to of the logic of economic theory, while the model showed that wages for the previous year $\text{LnW}(-1)$ came with a positive and significant sign at the 1% level, which means that the effect of Wages require a full year in order for its effect to be reflected on the volume of employment, in other words, employment in the current year is affected by wages in the previous year and is not affected by wages in the current year and this will be proven in the long-term function.

As for the parameter of technological development, it came with a negative sign to reflect an inverse relationship between technological progress and employment, and it was significant at the level of 10%, which means that every change in technological progress by 1% will lead to the exit of (0,274) workers from the labor market, where they will be replaced by machines and advanced equipment's .Technological development has led to the layoff of large numbers of workers, especially unskilled ones, and here it should be emphasized the importance of developing the technical and scientific capabilities of workers in a way that mitigates the impact of this variable (technological development) on the volume of employment, and statistics indicate that countries that have made great strides in introducing Modern technologies have created big unemployment.

The model proved that it is significant as a whole, according to the F statistic,

which amounted to (179.116), which is greater than the tabular value of F at the 1% level, and this means that the model as a whole is significant.

Then the long-term equation was estimated as the value of the error correction factor

shown in Table (3) is about (-0.734), which is significant at the 1% level, and this means that 73% of the fluctuations and deviations in the short term will be corrected within one year.

Table (3) The long-term equation using the ARDL model

ARDL Cointegrating And Long Run Form				
Dependent Variable: LNL				
Selected Model: ARDL(1, 1, 0, 1, 0)				
Date: 06/29/20 Time: 18:34				
Sample: 1990 2017				
Included observations: 27				
Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGDP)	0.002954	0.051048	0.057863	0.9545
D(LNI)	0.043413	0.020499	2.117811	0.0476
D(LNW)	-0.018441	0.068185	-0.270456	0.7897
D(LNTC)	-0.274871	0.143238	-1.918978	0.0701
CointEq(-1)	-0.734603	0.143293	-5.126587	0.0001
Cointeq = LNL - (-0.1570*LNGDP + 0.0591*LNI + 0.2976*LNW -0.3742 *LNTC + 7.2049)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP	-0.156996	0.037009	-4.242095	0.0004
LNI	0.059097	0.027142	2.177291	0.0423
LNW	0.297635	0.049012	6.072731	0.0000
LNTC	-0.374176	0.194068	-1.928065	0.0689
C	7.204882	0.345175	20.873100	0.0000

Source: Prepared by the researcher based on Eviews.10

The results of the long-term equation showed that the GDP came with a negative sign, which is contrary to the logic of economic theory, and its value was equal to (0.156), which means that an increase of 1% in GDP leads to a decrease in employment by (0.156), which is significant at the level of 1% in the long term and this is due to the nature of the Iraqi economy, as the Iraqi economy is a rentier economy that depends on the export of oil and the import of most goods and services from abroad. This means that the increase in the GDP is not reflected in the increase in employment due to the nature of this system, but the increase in the domestic product means an increase in the import rates of the goods and services

imported from abroad produced by foreign labor and not local, so the sign appeared negative and moral.

The value of the long-term investment coefficient was (0.059) and it was positive and significant at the 5% level, which is identical to the economic theory. This means that an increase in investment projects by 1% leads to an increase in employment rates of employment by (0.059).

As for the total wages, it appeared negative to us in the short term and insignificant, but in the long term, which here represents one year, it came with a positive sign and it is significant at the level of 1%, which proves the direct relationship between

wages and the volume of employment in the long term, which is identical to the economic theory and it confirms the result we have reached in the short term that the effect of wages appears after one year on the volume of employment, and the value of wages is (0.297), which means if wages increase by 1%, the volume of employment increases by (0.297).

As for the parameter of technological progress, it came with a negative sign and a significant level of 10%, which means that in the long term, the more technological development increases by 1%, the volume of employment decreases by (0.374), and the error correction coefficient led to correcting the significance of this coefficient until the balance between employment and technological development was returned, which led to a decrease in the significance of this coefficient..

In order to verify the existence of a joint integration between the variables in the model, the common limits test methodology (Bond Test) was used, the results of which are shown in Table (4), as the F-statistical value reached (5.166), which is higher than the upper limit of the critical limits at the 1% level, which means the existence of a long-term equilibrium relationship between the variables included in the model and the dependent variable.

Table (4) Bonds Test

ARDL Bounds Test		
Date: 05/10/20 Time: 21:11		
Sample: 1991 2017		
Included observations: 27		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	k
F-statistic	5.166353	4
Critical Value Bounds		
Significance	10 Bound	11 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Prepared by the researcher using Eviews.10 program.

To ensure that the model is free from the problem of self-correlation of random errors, the LM test was relied on. the test showed that the significance of χ^2

amounted to (0.210), which is higher than 0.05, which means that the null hypothesis is accepted, which says that the residuals

are free of serial correlation and the test is shown in Table (5)

Table (5) LM . Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.108430	Prob. F(1,18)	0.3064
Obs*R-squared	1.566199	Prob. Chi-Square(1)	0.2108

Source: Prepared by the researcher using Eviews.10 program.

Also, the model does not suffer from the problem of instability of variance, as the value of 2χ (0.108) is greater than 0.05, which means that the residuals have a stable and homogeneous variance and there is no hetero problem, as shown in Table (6).

Table (5) heteroskedasticity . Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	2.098464	Prob. F(7,19)	0.0943
Obs*R-squared	11.77259	Prob. Chi-Square(7)	0.1083
Scaled explained SS	6.646342	Prob. Chi-Square(7)	0.4666

Source: Prepared by the researcher using Eviews.10 program.

Since the value of Jarque-Bera (1.33) and with a significant level (0.513) is greater than 1%, this means that the random

variable is distributed normally, as shown in Figure (7).

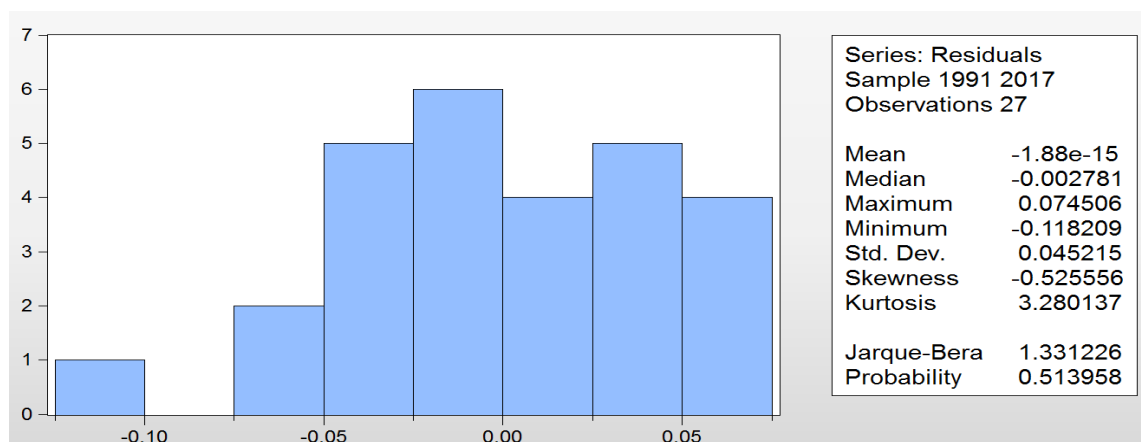


Figure (7) The test for the normal distribution of regression residuals

Source: Prepared by the researcher using Eviews.10 program.

According to Pesaran and Pesaran (1997), the step that follows the estimation of the model formula is to test the structural stability of the short- and long-term coefficients, that is, the data used in this research are free from the presence of any structural changes in them over time, and to achieve this two tests are used: cumulative sum of recursive residual (CUSUM) and cumulative sum of square recursive residual (CUSUMSQ).

The structural stability of the coefficients estimated in UECM format for the ARDL

model is achieved if the graph of each CUSUM and CUSUMSQ statistic falls within the critical limits at a level of significance of 5%, and then these coefficients are unstable if the graph of the statistics of the two mentioned tests moves outside the limits at this level (4). Whether the parameters are stable over the period of time studied or unstable, that is, do they have structural stability or not, through Figures (8) and (9).

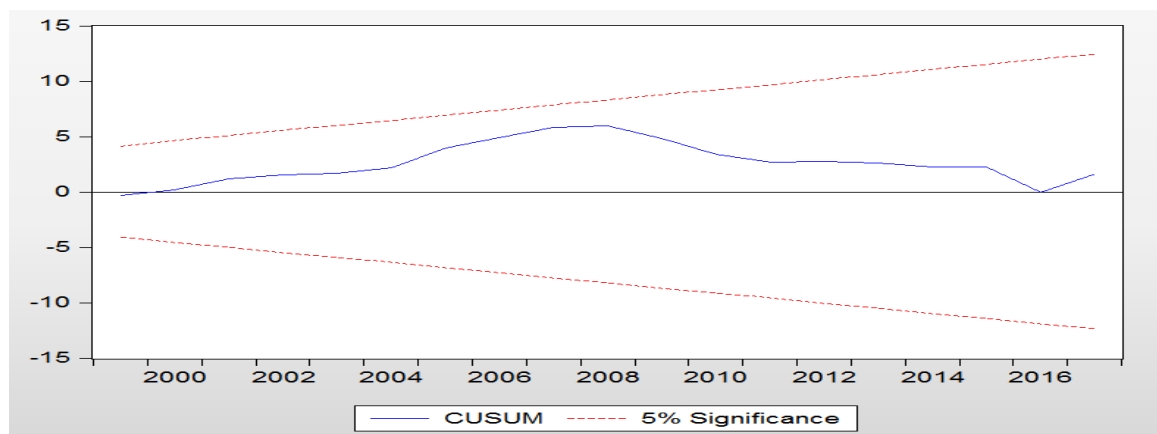
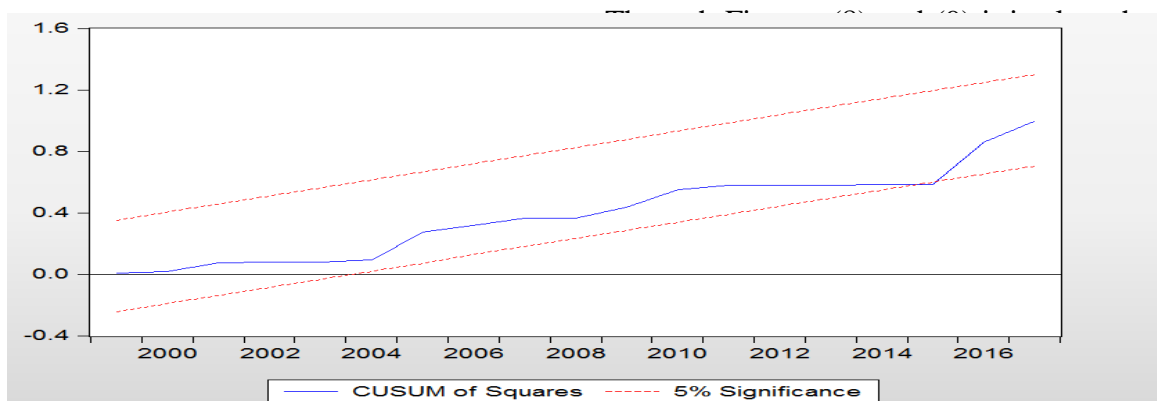


Figure (8) Cumulative sum of residuals CUSUM.

Source: Prepared by the researcher using Eviews.10 program.



CUSUMSQ residuals.

Source: Prepared by the researcher using Eviews.10 program.

Source: Prepared by the researcher using Eviews.10 program

this period, and finally it can be said that the parameters have no indicative structural change during the studied period.

Conclusion: The research reached a set of results and recommendations, which can be summarized as follows:

- The volume of total employment was not affected by the increase in GDP. This is what was shown by the GDP parameter, as it appeared with an insignificant effect in the short term. The results of the long-term equation also showed that GDP came with a negative sign, which is contrary to the logic of economic theory, and this is due to the nature of The Iraqi economy, as the increase in the GDP is not reflected in the increase in employment due to the nature of this system, but the increase in the domestic product means an increase in the import rates of goods and services imported from abroad produced by foreign labor and not local.

- The investment projects did not contribute to attracting employment in general, and this is evident through the weak impact of total investments on total employment, and this was explained by the low percentage of the total investments parameter, which is about (0.06).

- The research showed that technological development has a negative impact on the volume of employment, which is identical to reality, as its parameter appeared with a negative sign and a significant level of 10%, and this means that in the long term, the more technological development increased by 1%, the volume of employment decreased by (0.374), as the greater the technological progress, the greater the replacement Mechanization and machinery replace labor.

- The research proved that there is a positive relationship between workers' wages and the volume of employment, which is a result that is identical to the economic theory, as wages tend to rise whenever the volume of employment is small and vice versa, and this is confirmed by its high significant parameter.

Search recommends

- That the state put an effective system for developing local technological capabilities by developing the capabilities of the largest number of workers in line with the rapid technological development in the world.

- That the state works to guarantee a minimum wage for workers and protect the low-paid category, and thus the recovery of their living standards.

- Ensuring the employment of a high percentage of local workers in investment projects that the state contracts with companies entering Iraq, especially oil companies.

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