



The Impact of Public Spending on Employment A Standard Study of the Case of Algeria (1990-2017)

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Received: 25/03/2021

Accepted: 25/06/2021

Published: 01/08/2021

Abstract :

This study aims to measure the effect of the relationship between the volume of governments pending and the volume of employment in Algeria during the period 1990-2017 by adopting the simultaneous integration model and correcting the error, through the application of standard modeling of the economic relation ship between government spending and employment by defining explained economic variables that combine these two factors, the two main ones (governments pending and volume of employment), in order to understand and explain the nature and quality of the relationship that binds them together, which would allow us to assess the ability and effectiveness of governments pending in improving the volume of employment and thus creating permanent and continuous job positions.

Key Words :Government spending; employment size; employment; growth rate ;unemployment

JEL Classification : E62, E24.

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Introduction:

Public spending is considered one of the most important factors affecting economic performance. Public spending is the main tool of the state in achieving economic and social goals. Therefore, the efficiency of its allocation reflects a positive effect towards providing the financial resources necessary for economic growth. Among the goals that the state seeks to achieve through the spending policy The year stimulated growth and new job creation.

Research goal:

The study aims to shed light on the theoretical side of public expenditures and the labor market and to clarify the effectiveness of public spending in improving the employment index, considering public expenditures as one of the basic components of the Algerian economy and an important tool that the state relies on to achieve its goals.

In light of the foregoing, the problem can be formulated as follows: **What is the impact of the public spending policy on the volume of employment in Algeria?**



Study hypotheses:

- Expansion in government spending leads to an increase in the volume of employment.
- The causal relationship between the employment rate, government spending, and the rate of economic growth is one-way.

The importance of the topic: the importance of the topic lies in the following:

- The importance of government spending in economic and social terms, and the position it occupies in the Algerian economy.
- Reliance on government spending policy in order to create job opportunities, increase employment and reduce unemployment, especially with the efforts made by the state through spending programs and approved employment policies.

Study Objectives: This study aims to shed light on the following points:

- Knowing the extent to which government spending contributes to achieving economic policy goals, among which is the achievement of full employment.
- Attempting to determine the nature of the relationship between the two variables of government spending and employment in Algeria.

Research Methodology: In completing this research, we relied on the descriptive and analytical approach in the theoretical side in which we dealt with the theoretical proposition of the relationship of government spending to employment, and on the practical side, we relied on the statistical programs Excel, Eviews9.0.

In order to determine the quantitative effect of public spending on the volume of employment, we try to do a theoretical presentation of the relationship of government spending to employment, then we do the standard study of the effect of public expenditures on improving the employment index during the period (1990-2017).

I. The theoretical presentation of the relationship of public spending to employment:

In theory, public spending is the main driver through which the government can create jobs with which to absorb and mitigate unemployment severity, This means that the relationship between public spending and employment is a direct one. The higher the government's public spending, the higher the employment rate, Fiscal policy in general and its various mechanisms (including public spending policy) are considered one of the most effective ways and tools to address underuse or deflationary gaps, because it is a long-term strategic policy and government projects have been generating jobs for consecutive years, and the repercussions of fiscal policy are stronger than the multiplier of monetary policy and therefore are more influential on the outcomes of economic activity than national output, labor and others.

1. Classical school view of the relationship between public spending and employment (Auerbach & Fldstein, 2005, p. 3):

Classical economists imagine that the economy can only be in the case of full use, in which the greatest production and exploitation of the factors of production are ideal, and unemployment is lacking (Hawtrey, 1925, pp. 89-93) ,That is, their



economy can provide jobs for every unemployed who wants to work, this optimistic vision that characterizes the classical view of employment is accompanied by another, more important and strange, belief that the classical economy balances when it is fully employed without state intervention (the hidden hand), thus neglecting the role of government in balancing and influencing the output of economic activity. They believe that expansionist fiscal policies will only affect the State budget, and that expansionist monetary policy does not increase production and operation, but rather to higher prices (Dome, 2004, pp. 41-118).

2. Keynes' vision of the relationship between public spending and employment (Frankber Bemauke, 2001, p. 440):

In Keynes' view, unemployment does not contradict the balance (Fosu, 2019, pp. 113-115). Macroeconomic equilibrium maybe achieved, accompanied by unemployment in the labor component. This unemployment may be overwhelming, but through its structural policies, mainly in expansionary fiscal policy, the government can contain underutilization through the effective role and the extreme impact of fiscal policy complications (double spending and tax multiplier) on outputs from increased production and job creation, thus creating a expelled relationship between public spending and employment, the more the government increases its government expenditures, the more it creates additional jobs and thus reduces the number of unemployed and the lower the unemployment rate (Labaronne, 1999, p. 29).

3. Monetary economists and the relationship of public expenditure to employment (Frerdman, 1971, p. 14) :

The leaders of this school, including Milton Friedman, believe that monetary policy is most effective in achieving economic stability (Damodar NEPRAM, 2021, pp. 764-765), countering the phenomena of inflation and unemployment and jobs creation. They believe that excessive expansionist fiscal policies cost the public treasury a high cost of budget deficits and economic problems caused by public debt (Cvecic, 2018, p. 2076).

II. impact of public spending on the volume of employment in Algeria between (1990-2017):

The standard study of the impact of government spending on employment in Algeria.

1. Description of the standard model (building the standard model):

In order for us to know the relationship between the variables of the studied phenomenon, it is necessary to determine the dependent variable and the various external variables that explain the studied standard phenomenon and the statistics of the studied variables.

1.1. Dependent variable:

Operating rate (in percentages), and we denote it by the symbol EMP

The statistical data of which were available from the indicators of economic development and downloaded directly from the World Bank website, as well as the



statistical compilation of the National Bureau of Statistics for the period from 1990 to 2017.

1.2. Explained variables:

Some variables have been identified that can explain the standard phenomenon (public expenditures) (Loizides, 2005, p. 142), whose statistical data are available from economic development indicators and downloaded directly from the World Bank website, as well as the statistical compilation of the National Bureau of Statistics as well as official international and national bodies (Ministry of Finance). As for economic growth, its data were provided from the National Bureau of Statistics. These variables depend on a time series of annual data for the Algerian economy during the period from 1990 to 2017.

The explained variables can be summarized as follows:

Government spending (public expenditures in percentage of GDP), denoted by the symbol DEP.

Economic growth (GDP in percentile), and we denote it by the symbol CROI.

The model has been based on the Keynesian theory, which relies on the public spending policy to stimulate aggregate demand and increase employment, as public spending is a part of aggregate demand and thus it affects effective demand, which in turn contributes to raising employment levels and combating unemployment. According to the Keynesian theory, the low level of Employment is related to the level of aggregate demand.

Through what was presented and its conformity with the Keynesian theory, we adopted the following model:

$$EMP = f(DEP, CROI)$$

Thus, the linear model can be written in the following mathematical form:

$$EMP_i = C_0 + C_1 \times dep_i + C_2 \times Croi_i + \varepsilon_i.$$

Where C_0 , C_1 , C_2 express the parameters of the model.

ε The error value is expressed in interpreting the operating rate.

2. Study of time series stability.

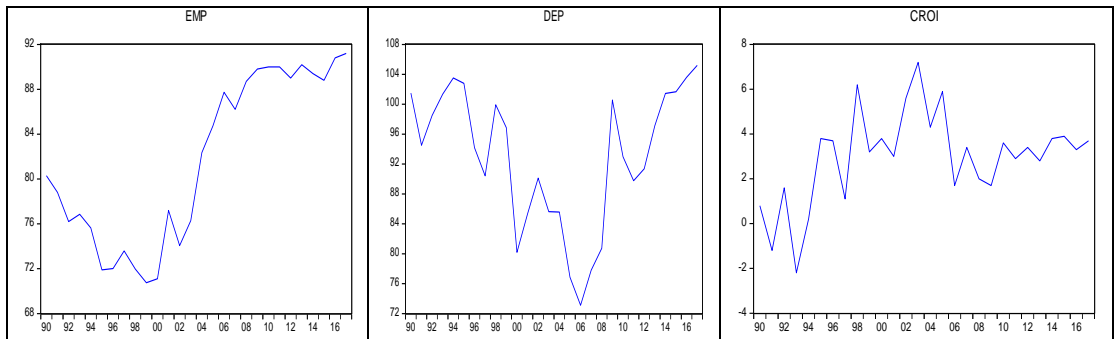
Before studying any model, stability is considered a necessary condition, and to study it, one can rely on the following:

2.1. The graph:

Based on Eviews9.0 software, to draw strings (EMP, DEP, CROI).



Figure (1): Graphical representation of time series (EMP, DEP, CROI).



Source: Prepared by the researcher based on the output of Eviews9.0

It is evident from the above drawing that the time series is somewhat unstable, as it shows the general trend and fluctuation, and this can be examined and confirmed by relying on several other tests, including KPSS.

2.2. KPSS Test:

It is a test that works to know the stability of the chain or not. It is based on two models, and its outputs on the strings are as follows:

a. Series CROI:

Table (1): Summarize the output of the CROI series using Eviews9.0 program.

Croi	Skew values	AtLevel		At First Difference	
			CROI		d(CROI)
With Constant	0.4630	t-Statistic	0.5593	t-Statistic	0.1204
With Constant & Trend	0.1860	t-Statistic	0.2474	t-Statistic	0.1369

Source: Prepared by the researcher based on the output of Eviews9.0

It is evident from the table that the LM statistic is greater than the critical values at the level of significance (5%): that is, we reject the null hypothesis (H_0), that is, the CROI series is not stable at the level, while when making the first differences it is revealed through the second and third models that LM is less than Critical values, and therefore the series is integrated in the first order i.e. $CROI = I(1)$.

b. Series DEP: The parameters of the KPSS series DEP test are illustrated as follows:

Table (2): Summarize the outputs of the DEP series using Eviews9.0.

DEP	AtLevel		At First Difference	
		DEP		d(DEP)
With Constant	t-Statistic	0.1655	t-Statistic	0.2809
	Prob.	n0	Prob.	n0
With Constant & Trend	t-Statistic	0.1621	t-Statistic	0.5000

Source: Prepared by the researcher based on the output of Eviews9.0

It is evident from the above table that the LM statistic is greater than the critical values at the level of significance (5%). Therefore, the alternative hypothesis (H_1)



can be accepted, according to which the DEP series is not stable at the level, while when making the initial differences it appears that the LM of both models is less than the critical values. Therefore, the DEP series is integrated in the first order, $DEP = I(1)$.

c. **Series EMP:** The parameters of the EMP Series KPSS test are illustrated as follows:

Table (3): Summarize the outputs of the EMP series using Eviews9.0.

EMP	Skew values	AtLevel		At First Difference	
			EMP		d(EMP)
With Constant	0.4630	t-Statistic	0.5186	t-Statistic	0.2955
With Constant & Trend	0.1860	t-Statistic	0.2125	t-Statistic	0.1689

Source: Prepared by the researcher based on the output of Eviews9.0

It is evident from the above table that the LM statistic is greater than the critical values at the level of significance (5%). Therefore, the alternative hypothesis (H_1) can be accepted, according to which the EMP series is not stable at the level, while when making the initial differences it appears that the LM of both models is less than the values Critical, therefore, the EMP chain is an integral class $IMP = I(1)$.

3. Study the causal relationship between employment rate, economic growth and government spending:

After confirming the stability of the strings under study (EMP, Economic Growth Rate, CROI, and Governmental Spending DEP), we can perform the ANGEL-Granger causality test, where we will test the following hypotheses:

For the form $EMP = f(croi)$.

H_0 : null hypothesis: the growth rates do not cause an impact on the employment rate at the 5% level of significance.

H_1 : Alternative hypothesis: the growth rates cause an effect on the employment rate at the 5% level of significance.

For the form $EMP = f(dep)$

H_0 : null hypothesis: government spending has no effect on employment rate at the 5% level of significance.

H_1 : Alternative hypothesis: government spending has an effect on the employment rate at the 5% level of significance.

3.1. Study the causal trend between employment rate, economic growth and government spending:

Table (4): shows the causal trend between employment rate, economic growth and government spending, using Eviews9.0 program.

Null Hypothesis:	Obs	F-Statistic	Prob.
DEMP does not Granger Cause DCROI	25	0.38588	0.6848
DCROI does not Granger Cause DEM		0.45858	0.6387
DEMP does not Granger Cause DDEP	25	0.68230	0.5168
DDEP does not Granger Cause DEM		2.75835	0.0875

Source: Prepared by the researcher based on the output of Eviews9.0



Through the above table, it can be seen that:

Regarding the model: $EMP = f(croi)$

According to Granger's causation test, we note that the associated probability of the Fisher statistic is less than the critical levels (1%, 5%, 10%), and therefore we reject the null hypothesis H_0 and accept the alternative hypothesis H_1 , meaning that there is a causal relationship between the two studied series (emp, croi) in One direction, that is, the explained variable causes the dependent variable, meaning that the rate of economic growth causes the employment rate, which is consistent with the theoretical proposition of the macroeconomic theory that confirms that there is a positive relationship between the two variables under study, as any increase in the levels of economic growth is reflected. Positively on employment rates, thanks to economic activity that depends on developing investment capabilities that would absorb the surplus of the labor force. This confirms the causal relationship between economic growth and the employment rate. From the above it is evident that there is a relationship between the economic growth rate and the employment rate in one direction. .

Regarding the model: $EMP = f(dep)$

We also note through our reading of the above table and according to Granger's causation test, we notice that the probability associated with the Fisher statistic is less than the critical levels (1%, 5%, 10%), and therefore we reject the null hypothesis H_0 and accept the alternative hypothesis H_1 , meaning that there is a causal relationship between The two studied chains are in one direction, that is, the explained variable causes the dependent variable, meaning that the rate of government spending causes the employment rate, which is in line with the Keynesian theoretical proposition that confirms the causal relationship between each of the public spending in the volume of employment or the employment rate, which depends on the policy Public spending in stimulating aggregate demand and increased employment.

From the above it is evident that there is a relationship between the rate of government spending and the rate of employment in one direction.

So the causal direction is from the change in government spending and economic growth causing the change in employment rates, according to the estimated model of the EMP variable in terms of DEP and CROI.

4. Estimating the model and evaluating its validity:

4.1. Model estimation:

As previously mentioned, the linear model can be written in the following mathematical form:

$$EMP_i = C_0 + C_1 \times dep_i + C_2 \times Croi_i + \varepsilon_i.$$

First: estimating the simultaneous integration model as tested by Engle and Granger.

The model will be estimated to explain the relationship between the variables, according to the (simultaneous) co-integration methodology, by determining the true relationship between the variables in the long run, as the time series under study may be unstable in the short run, but they will stabilize in the long run,



meaning there is a stable relationship between them. , Called the simultaneous integration relationship.

After making sure that the time series of the study model variables are stable of the same degree, we will estimate the model as follows:

4.2. Estimating the equation of the linear model using Eviews9.0:

The proxy model representing effective relationships in the operating rate will be estimated, and the model's features are clear.

According to the above table, it is clear that the results of estimating the linear model of the operating rate are as follows:

$$EMP = 84.0521352627 - 0.0238394095678 * DEP - 0.0698623894639 * CROI$$

(0.93-) (0.14-) (5.18)

$$R^2 = 0.70 \quad DW = 0.093 \quad F = 0.012$$

a. Examining the simultaneous complementarity relationship and estimating error correction models.

After proving the stability and integration of the strings under study of the same rank, we will test the simultaneous integration based on the remainder of the original equation obtained through eviews 9 outputs as follows:

$$EMP = 84.0521352627 - 0.0238394095678 * DEP - 0.0698623894639 * CROI$$

The results of the ADF test for residual E are shown in the following table:

Table (5): The results of the Dicky-Volare ADF test for residual E.

Unit Root Test Results Table (ADF)		
Null Hypothesis: the variable has a unit root		
	AtLevel	
		E
With Constant	t-Statistic	-4.7929
	Prob.	0.0007
With Constant & Trend	t-Statistic	-4.8830
	Prob.	0.0031
Without Constant & Trend	t-Statistic	-4.6779
	Prob.	0.0000

Source: Researcher preparation based on Eviews9.0 output

When comparing the calculated value with the scheduled value at the level of 5% significance, we find that: It means rejecting the hypothesis H0, and from it we point out that the e series is stable at the level, meaning that all the critical possibilities are less than 0.05.

So the previous strings are synchronously integrated and thus we can estimate the error correction model or the dynamic equation according to the ANGEL - GRNGER two-stage method.

a.1. The first stage: we estimate the relationship in the long run

$$EMP = 84.0521352627 - 0.0238394095678 * DEP - 0.0698623894639 * CROI$$

(0.0) (0.0073) (0.0049)

$$R^2 = 0.7009 \quad sig(f) = 0.012 \quad DW = 0.093$$



In continuation of the model estimation stage in the long run, we obtain the following residual equation:

$$E = EMP - 84.0521352627 + 0.0238394095678 * DEP + 0.0698623894639 * CROI$$

a.2. The second stage: estimating the relationship in the short term:

$$DEMP = 0.45371295 + 0.019047713 * DDEP - 0.57857720 * DCROI - 0.025937143 * E(-1)$$

$$\begin{array}{cccc} (0.000) & (0.000) & (0.0043) & (0.0027) \\ R^2 = 0.6055 & & \text{sig (f)} = 0.0357 & DW = 1.65 \end{array}$$

It appears clearly that the coefficient of e is the coefficient of the error correction model is negative and it is significantly different from zero at a level where $\text{pro} = 0.0220 < 0.05$ and therefore the equation is acceptable. Therefore, there is a long-term relationship between the independent variables included in the model and the dependent variable.

5. Economic and statistical evaluation.

5.1. Economic explanation:

The moral will be referred to in the long and short term, and its statement will follow as follows:

a. In the long term:

a.1. Spending factor α_1 : With regard to the public expenditure coefficient (DEP), we notice through the estimated equation that its sign is negative, and this means that there is an inverse relationship between this variable and operating rates, as increasing government spending by one unit would reduce the volume of employed labor by 0.023 units, which is inconsistent with the theory. Economic.

a.2. Growth factor α_2 : As for the growth factor (CROI), we notice through the estimated equation that its sign is negative, and this means that there is an inverse relationship between this variable and employment rates, as increasing economic growth by one unit would reduce the volume of employed labor by 0.069 units, which is inconsistent with the economic theory that An increase in the GDP would increase economic activity, which would lead to an increase in the volume of labor force employment.

b. In the short term:

b.1. Spending factor α_1 : With regard to the public expenditures coefficient (DEP), we notice through the estimated equation that its sign is negative, and this means that there is an inverse relationship between this variable and operating rates, as increasing government spending by one unit would reduce the volume of employed labor by one unit, which is also inconsistent with the theory. Economic.

b.2. Growth factor α_2 : As for the growth factor (CROI), we notice through the estimated equation that its sign is negative, and this means that there is an inverse relationship between this variable and operating rates, where economic growth in one unit would reduce the volume of employed labor by 0.57 units, which is inconsistent with the economic theory which sees That an increase in the GDP



would increase economic activity, which would lead to an increase in the volume of labor force employment.

5.2. Statistical Interpretation:

Both the total and partial significance are dealt with as follows:

a. The overall moral: It was found through the output of the standard Eviews9.0 program. The simultaneous integration model in the long term is significant as a whole, and this is shown by the significance of the Fisher F_t value, which reached $\text{pro}(f) = 0.012 < 0.05$, and on the other hand the determination coefficient reached $R^2 = 0.7009$, which indicates that the explanatory variables in total have an effect on the interpretation of the dependent variable by a percentage 70%.

It also appears that the error correction model was also significant, as the degree of interpretation of the dependent variable by the explanatory variables in the short term reached 60.55%, and the probability value of the Fisher coefficient was 0.0357, which is less than 5%.

b. Partial moral: It is evident from the outputs shown in the two equations (long-term and short-term) that all transactions were significant at a 95% confidence level, where their probability values did not exceed 0.05, and it is clear through the following:

b.1. Coefficients of the explanatory variables in the long term:

$\text{Pro}(\alpha_3) = (0.0049) < 0.05$ $\text{Pro}(\alpha_2) = (0.0073) < 0.05$ $\text{Pro}(\alpha_1) = (0.000) < 0.05$

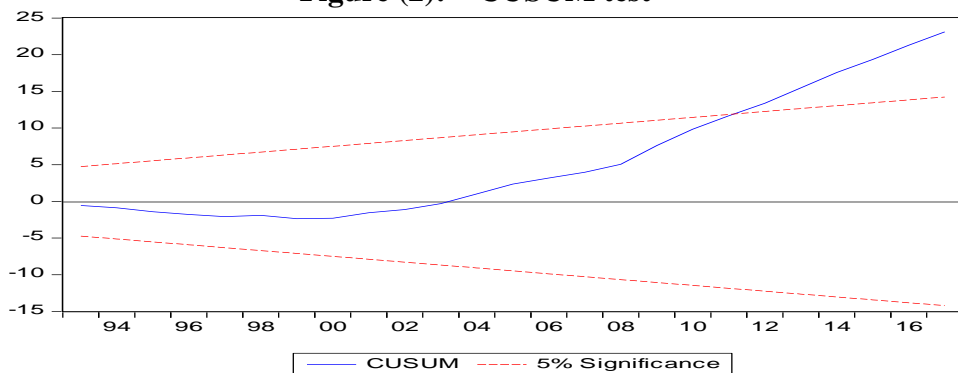
b.2. Transactions of the explanatory variables in the short term:

$\text{Pro}(\alpha_4) = (0.0220) < 0.05$ $\text{Pro}(\alpha_3) = (0.0044) < 0.05$ $\text{Pro}(\alpha_2) = (0.0447) < 0.05$ $\text{Pro}(\alpha_1) = (0.0075) < 0.05$

6. Model stability test:

To test the stability of the model parameters in the long and short term due to some structural changes that may affect the model, we use the following two tests, the first relates to the cumulative sum of the recurrent residues (cusum) as well as the cumulative sum of the squares of recurrent residues (cusum of squares). The results are shown in the following figure:

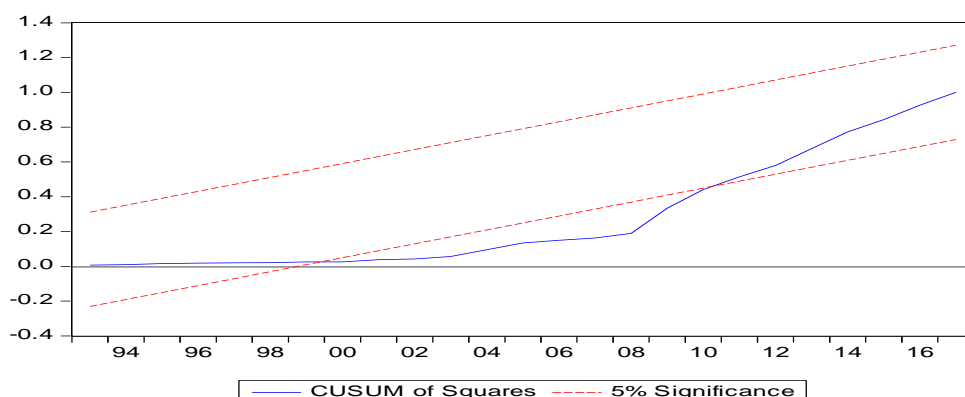
Figure (2): « CUSUM test »



Source: Authors , using Eviews9.0



Figure (3): « CUSUM of Squares test »



Source: Authors , using Eviews9.0

The graph of both tests shows the stability of the model within the boundaries of the critical region, except that through the curve of the cumulative sum of the recurring residues (cusum) we notice the departure of the curve from the lines of the critical region from the year 2000, but it quickly re-enters the stability region in 2008, and this is what Confirms by the second curve related to the recurrent residual squares.

Conclusion:

Public spending policy is one of the most important economic policies that have clear implications for the economy, especially for developing countries such as Algeria. The latter seeks to achieve a number of objectives, the most important of which are to stimulate economic growth, raise employment and reduce unemployment.

In this context, our study focused on the extent to which the policy of government spending affects the size of employment in Algeria and how it works to raise the level of growth and employment. And until this effect is realized.

Through this study, we tried to study the extent to which there was a common complementarity between the rate of government expenditure and the volume of employment in Algeria during the period. (1990- 2017) Using the two-phase Engle-Granger joint integration test, especially for small samples, the standard study showed a long-term equilibrium relationship (Remote) Between variables (expenditure and employment) as well as with all other variables (economic growth) explained by the standard phenomenon considered

Test Validity of hypotheses:

Rejection of the first hypothesis: The standard study showed the inverse relationship between employment rates and government expenditure rates, as the expansion of government spending does not contribute to the increase in actual employment in Algeria.

Acceptance of the second hypothesis: The Engle-Grangeroi causation test established the only trend relationship between the rate of operation, government expenditure and the rate of economic growth, so there is a causal relationship



between depo emp and croi and emp while there is no inverse causal relationship between emp and dep or between emp and croi, either with respect to our model estimation and testing of the simultaneous integration relationship as well as estimation of error models. So we found that there could be a long-term path between these variables and a long-term relationship between the independent variables in the model and the dependent variable.

In order to analyse the results obtained through this research, we have come up with a number of conclusions that can be summarized as follows:

✓ There is a causal relationship between the rate of government expenditure and the rate of employment, a causal relationship between the rate of economic growth and the rate of employment, while there is no inverse causal relationship between the rate of employment and the rate of government expenditure, and an inverse causal relationship between the rate of employment and the rate of economic growth. During the study period (1990-2017).

✓ There is a long-term equilibrium between the rate of government expenditure and the rate of employment, as well as the rate of economic growth and the rate of employment, showing the possibility of building the simultaneous complement model in the Engle-Granger test which is used in this study.

✓ There's a negative reverse relationship between the size of employment and the rate of government spending, which is contrary to economic theory.

✓ There is a negative reverse relationship between the size of employment and the rate of economic growth, which is contrary to economic theory, Increasing domestic output would increase economic activity and lead to greater labour employment.

According to this study, employment rates may be high, but their rise is not explained by the expansion of government spending (the high rate of government spending) and the high growth rate in Algeria, but by the combination of measures and programmes applied by the State to absorb surplus labour at different levels of efficiency.

Recommendations:

Through the findings, some of the recommendations that we consider appropriate to activate the policy of government spending to stimulate growth and raise the level of employment are as follows:

- Public budget revenues must be diversified, especially by raising tax revenues, which are the best means of ensuring continued public budget funding, so that public expenditures can be expanded and jobs created, whether in the government or other sectors.
- The productivity of operating expenses must be increased by reducing unnecessary expenditures, as well as the productivity of the labour force in the State sector, so that the wage expenses of employees are not dependent on the State budget.



- Emphasis is placed on monitoring and implementing public expenditures, especially with regard to assistance and subsidies for young people in the creation of employment positions for young people, Most of this aid doesn't go to the recipients.
- Ensure that processing expenditures are directed towards investment in infrastructure, providing situational work positions, as well as an environment conducive to the growth of the private sector, Which is very reliable in increasing employment.
- Attention is paid to sectors of the national economy that are highly labour-intensive, especially those in the agricultural and industrial sectors while providing all the necessary possibilities to achieve high levels of productivity.

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