

## ***Dynamic Effect of Government Expenditure on Unemployment in Algeria: A Structural Vector Autoregressive Approach 1970-2018***

التأثير الديناميكي للإنفاق الحكومي على البطالة في الجزائر: مقارنة متجه الانحدار الذاتي الهيكلي 2018-1970

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### **Abstract:**

*This study investigates the effect of fiscal policy shocks on unemployment in Algeria, using Structural Vector Autoregressive (SVAR) methodology over the period 1970-2018. The results indicate that one shock in public spending with 1% will have a significant and positive effect on unemployment rate this shock will generate a decline in unemployment rates, however, the response to government revenue was negative and slight, while those impacts are asymmetric the effect of public spending shock is stronger than revenue shock, therefore this asymmetry appears in recession period. The study suggests that government should re-orientate their expenditure in order to encourage job creation and responding to the needs of the labor market.*

**Keywords:** Unemployment; Fiscal Policy; Government Expenditure; SVAR.

**Jel Classification Codes :** J6 ; J64 ; J68 ; E6.

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## Introduction:

Despite several years of sustained growth, the unemployment rate in Algeria remains high compared to other emerging economies. In addition, growth performance in the last years was accompanied by a significant reduction in the overall unemployment rate (José Gijón, et al 2012). Unemployment in Algeria has economic and social effects which can engender many problems. The Algerian economy was affected by the external crises in 1982 due to the sharp decline in oil prices and the devaluation of the US dollar that led to a deficit in the budget balance and a deficit of trade balance, that's why Algeria has adopted an expansionary fiscal policy in order to achieve the economic recovery as it is considered the pillar of economic growth. From the data of surveys done by the National Office of Statistics (ONS) in 2018, it exists a persistent gap, between the youth unemployment (16-24 years) and adult unemployment (25-60 years), where young people unemployment rate' is estimated at 26.4% and for adults 8.6% (Manel., Driouche., & Mohammed 2019). Although the Algerian economy has recorded years of positive growth, especially over the last decade, but the unemployment rate remains slightly high compared to other emerging economies.

Algeria, like some oil exporting countries, considers government expenditure that derived from oil revenue as the main source of financing physical and social infrastructures, therefore fiscal policy aims to carry out growth programs, in particular employment generation. In this regard, our problematic is represented as follows: What is the impact of the fiscal policy on unemployment rates in Algeria?

We propose the following hypotheses:

- The government expenditure has a positive impact on unemployment, which is generated by a decline in unemployment rates, the public spending is the variable which transmits government revenues, particularly for the labor factor.
- The effect of public revenue is economically positive on unemployment rate.

In this paper we will try to analyze the impact of fiscal policy in particular government expenditure to fight against unemployment, for this reason, we will apply structural vector autoregressive (SVAR) in order to determine the feedback of unemployment rate to fiscal policy shocks. Firstly, we will present the theoretical relationship between public spending and labor level. Then, we will expose the evolution of government expenditure and the unemployment rate 'changes in Algeria. Next, we will illustrate some previous research and studies that dealt with our subject. In addition, we'll define the econometric model used in this study (SVAR). Finally, we'll discuss the results obtained.

## I. The impact of public spending on labor level:

The challenge of government expenditure depending on the changes in the economic cycle, in periods of boom, the government reduce its spending because of private expenditure increase, either in times of recession, private expenditure decrease, which imposes the intervention of government with a compensatory fiscal policy in this case it increases its spending, in addition Dewett and Navalur (2012) noted that in depression phase, fiscal policy should increase demand which translates to improve output. The phenomenon of unemployment can be avoided through a policy of government spending, while growing unemployment decreases the demand effective, which affects negatively the desire of the producer and prevents the expanding production due to low prices, it can also lead to shut down some production plans which enters the economy in a vicious circle of unemployment and the decline in aggregate demand, hence, the expansionist policy of government spending may achieve economic recovery, either through economic subsidies intended for producers this contributes to employment of available resources. The policy of the government expenditure has an important role to fight unemployment within the circumstantial or structural policies.

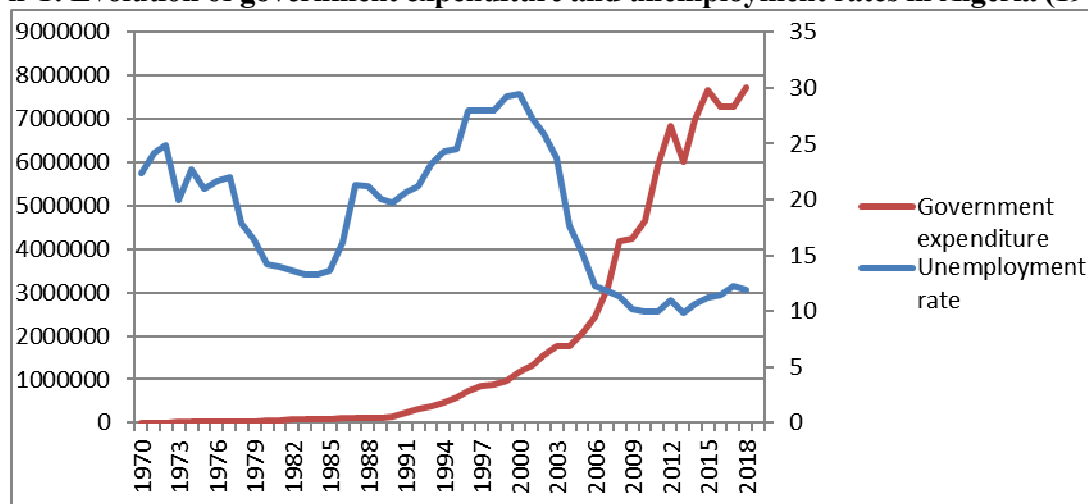
Theoretically, public spending is the main source of creating jobs; it can absorb a part of unemployment and reduces its severity. This means that the relationship between public spending and unemployment is indirect; therefore, the increase of public spending leads to a decrease in unemployment. Fiscal policy and its various mechanisms (including public expenditure in particular) are one of the most effective ways and tools to address economic recession or

deflationary gaps, because it is a strategic policy that has a major impact on the output of economic activity as well as labor. Besides, Obayori (2016) and Anthonio & Ilian (1998) found that fiscal policy had an opposite trend with unemployment.

## **II. Evolution of government expenditure and fluctuations of the unemployment rate in Algeria:**

According to data from the National Statistical Office (ONS), the volume of public expenditure increased by about five times in 1988 compared to 1973, due to the reforms applied by the government, Agricultural Revolution Program, they constituted projects through which the government sought to strengthen investment in the infrastructure of the industrial and agricultural sectors. These policies had a positive impact on the Algerian economy and labor market. Which collapsed unemployment rates from a ceiling of 24% in the early seventies to 8% in 1987. Because of the black decade and the difficult conditions of security that exposure the country, public expenditure got some hiccups with slightly growth in particular between 1988 and 2000, while the performance of the Algerian labor market declined at alarming rates, unemployment rates rose sharply to 29.5% in 2000, after they turn on average around 13% between 1980-1985. The political stability of the early 2000s compared to the previous decades furthermore oil prices recovered, this enabled the government to underline development programs during this period. The rate of unemployment had gradually declined throughout these years, stabilizing in recent years within 10% & 11%. From the figure n°1 as below, we remark that the opposite tendency between unemployment rates and government expenditure appears clearly during the phase 2007-2018 (ONS 2019), engendered low values of unemployment rates against high rates of public expenditure.

**Figure n°1: Evolution of government expenditure and unemployment rates in Algeria (1970-2018)**



Source: Ministry of Finance, ONS, CNES

## **III. Literature review:**

Attahir & Abubakar (2016), examined the impact of fiscal policy shocks on economic growth and unemployment in Nigeria based on Keynesian theory, by adopting the Structural Vector Autoregression (SVAR) methodology over the period 1981-2015. The results of unit root test confirmed that: Real Gross Domestic Product, Unemployment Rate, Total Public Expenditure and Total Government Revenue are integrated of order one, Furthermore, Johansen Cointegration test showed that there was one relationship at the long run between variables. Findings of the SVAR model indicated that public expenditure shock and Government Revenue shock have a positive effect on output, although, the impact of government expenditure shock was greater than the revenue, this finding was not surprising because any increase in government revenue can generate an evolution in public spending and thus can propel output growth. While, the impact of revenue shock on unemployment was negative but short-lived, public expenditure shock have an insignificant positive effect on unemployment in Nigeria. This finding can be rationalized when public expenditure is distorted with unproductive expenditure like: salaries, overheads, debt

servicing which led hardly to employment generation. Finally, this study suggested that government has to restructure its spending pattern by giving more importance to productive expenditure.

Bülent , Mert and Ebru. (2013), employed vector error correction methodology to analyse annual series on the relevant variables for the period 2000:1-2012:4, the aim of this study was to examine the relationship among oil prices, real output growth and employment in Turkey. The results showed the presence of the long-run relationship between the variables, whereas at the short run, the causality test provides an evidence of bi-directional causality linkage between oil prices and GDP, then it existed a unidirectional causality from oil prices and output to employment. Although the long run causality findings confirmed that the oil prices and real output did not cause employment, employment and real output do not cause oil prices, but the oil price and employment cause output.

Anthanasios (2013) investigated the unemployment effects of fiscal policy in Greece using the SVAR methodology over quarterly data from 2000 to 2012. The results proved that the unemployment and growth effects can be more important if government purchases are reduced especially government consumption and to a lesser extent government investment. In the case of tax increase, output will deteriorate and the unemployment will evolve. The impact of fiscal policy on output and unemployment are more sizeable when considering recent year developments, they respond in a more persistent manner if we compared to pre-crisis years.

Monacelli et al. (2010) estimated the effects of fiscal policy on the labor market using US data. The findings of this paper confirmed that if government expenditure rose of 1 percent of GDP generated output and unemployment multipliers, respectively, of about 1.2 percent and 0.6 percentage points (at the peak), further, government spending shock led to increase in hours and employment significantly.

Ardagna (2007) investigated the effects of fiscal policy on economic activity, public finances, welfare, and income distribution in a dynamic general equilibrium model. It was shown that debt-financed increases of public employment, wages of public-sector employees, unemployment benefits, and labor taxes led to higher private-sector wages, lower employment, capital and output. However, capitalists always benefit when taxes increased on labor but in the other hand their welfare decreased when public spending rose.

Obayori (2016) studied the relationship between fiscal policy and unemployment in Nigeria, in particular this paper investigated the impact of government capital and recurrent expenditure on unemployment, using annual data from 1980 to 2013. The researcher applied the cointegration and ECM methods. The Johansen-Juselius cointegration employed in testing for long run equilibrium relationship among the variables suggested that cointegrating relationship was found among the variables. The ECM result revealed that Government Capital and Recurrent Expenditure had both significant and negative relationship with unemployment in Nigeria. The result confirmed the presence of long run relationship between fiscal policy and unemployment. As a consequence of this study, fiscal policy was effective in reducing unemployment rate in Nigeria, in addition; expansionary fiscal policy should be encouraged in order to boost the development process of the country and hence increase employment opportunities.

Gachari & Korir (2020) determined the effect of fiscal policy of government expenditure on unemployment in Kenya. A longitudinal research design was adopted where annual time series data was collected over the period 1986 - 2017 using a multiple regression in order to address the objective of this study. The variables used in the model (government expenditure and unemployment) were found to be jointly significant with the model explaining 74 percent of all the variations. From the analysis, the researchers concluded that the effect of fiscal policy in Kenya on unemployment was positive, but this finding was not significant. This means that fiscal policy did not contribute much as far as the employment situation in the country studied. Therefore, the government has to explore other means of employment creation that match Kenya's level of economic growth.

Dallari & Ribb (2020) examined the response of unemployment to monetary policy and government spending shocks in the peripheral Euro-area countries. By using the structural near-VAR methodology. The results showed that fiscal multipliers change across countries and the

results was consistent with the prediction of the standard New Keynesian model only in Italy and Greece. While, in Ireland, Portugal and Spain increases in government expenditure was recessionary. Therefore, Keynesian findings of fiscal policy seem to prevail in raised public-debt countries, whereas non-Keynesian outcomes seem to characterize high private-debt countries. Concerning the monetary policy shock, the researchers found that it played an important role, jointly with the other area-wide shocks, as a long-term driver of national unemployment.

#### IV. Data & Methodology:

The macroeconomic variables chosen in this study are: Gross Domestic Product (GDP) in order to measure the economic activity, the unemployment rate (UNEM), government revenue and government expenditure. We use annual data for the period 1970 to 2018.

We have a Vector Autoregressive model, VAR (p):

$$y_t = A_0 + A_1 y_{t-1} + \dots + A_p y_{t-p} + u_t$$

Where  $y_t = (y_{1t}, \dots, y_{kt})'$  is a  $(k \times 1)$  vector of dependent variables,  $A_0$  is a  $(k \times 1)$  vector of intercepts,  $A_i$  ( $i=1, \dots, p$ ) are  $(k \times k)$  coefficient matrices and  $u_t$  is a  $(k \times 1)$  white noise error vector with zero mean and covariance matrix  $\Sigma_u$ . To identify the structural innovations that reduce the impact of structural shocks, we can write the following structural form and we multiply the two parts of the equation above by the matrix  $A$ :

$$Ay_t = A_0^* + A_1^* y_{t-1} + \dots + A_p^* y_{t-p} + \varepsilon_t$$

Where  $\varepsilon_t$  is a vector  $(k \times 1)$  of structural perturbations with zero mean and covariance matrix  $\Sigma_\varepsilon$ . When we multiply this equation by the inverse of  $A$ , we will find the reduced form (which is the first equation).

Take:  $A \mu_t = \varepsilon_t \Rightarrow \mu_t = A^{-1} \varepsilon_t$ . This relation relates the perturbations of the reduced form  $\mu_t$  with the structural shocks  $\varepsilon_t$ . The identification of structural shocks is linked to the creation of the transition matrix where  $B$  is the restriction matrix. It is written as follows:  $S = A^{-1}B$ .

The SVAR model is identified to retrieve the structural shocks by using the recursive identification proposed by (Sims 1980) wherein the relationship  $\varepsilon_t = A \mu_t$  is presented as below:

$$\begin{pmatrix} \varepsilon_{GDP} \\ \varepsilon_{UNEM} \\ \varepsilon_{REVE} \\ \varepsilon_{EXP} \end{pmatrix} = \begin{pmatrix} 1 & b_{12} & b_{13} & b_{14} \\ b_{21} & 1 & b_{23} & b_{24} \\ 0 & 0 & 1 & 0 \\ 0 & 0 & b_{43} & 1 \end{pmatrix} \begin{pmatrix} \mu_{GDP} \\ \mu_{UNEM} \\ \mu_{REVE} \\ \mu_{EXP} \end{pmatrix}$$

The restrictions are stated as follows:

- The economic growth (GDP) is affected by all the variables. The impact of fiscal policy shocks has significant effects on the performance of economic activity, and low levels of unemployment rates prove the strong economic growth.
- The unemployment rate is affected by all the shocks that occur in all variables, thus all coefficients are not vanished.
- The structural shock of government revenue is not affected by any of the short-term variables and only reacts by its own shocks therefore:  $b_{31} = b_{32} = b_{34} = 0$ .
- The structural shock of government expenditure is influenced by public revenue so :  $b_{41} = b_{42} = 0$ .

#### V. Results & Discussion:

##### V.1. Unit root test:

**Table n°1: Unit root test**

| Variables | ADF             |                |                | Stationarity |
|-----------|-----------------|----------------|----------------|--------------|
|           | $\square$       | $\square$      | $\square$      |              |
| d(Lunem)  | <b>- 4.83*</b>  | <b>- 4.85*</b> | <b>- 4.78*</b> | I(1)         |
| d(Lrev)   | <b>- 3.74*</b>  | <b>- 5.70*</b> | <b>- 6.03*</b> | I(1)         |
| d(LGDP)   | <b>- 2.75**</b> | <b>- 5.10*</b> | <b>- 5.75*</b> | I(1)         |
| d(Lexp)   | <b>- 2.50**</b> | <b>- 4.38*</b> | <b>- 4.95*</b> | I(1)         |

$\square$  corresponds to the model without intercept & without trend,  $\square$  corresponds to the model which contains intercept,  $\square$  refers to a model with intercept & trend \*, \*\* and \*\*\* indicate significant at the 1%, 5% and 10% levels, respectively.

Source: Developed by the authors from Eviews 10

In the previous table we represent the results corresponding to the stationary tests carried out on the different series. The macroeconomic variables in Algeria are stationary in the first difference.

## V.2. Cointegration test:

Table n°2: Trace test

| hypothesized no, of Ce(s) | Eigenvalue | Trace Statistics | 0,05 critical value | prob   |
|---------------------------|------------|------------------|---------------------|--------|
| none*                     | 0.53       | 60.68            | 47.75               | 0.0020 |
| At most 1                 | 0.33       | <b>28.86</b>     | <b>29.79</b>        | 0.0637 |
| At most 2                 | 0.22       | 12.02            | 15.49               | 0.1552 |
| At most 3                 | 0.02       | 1.18             | 3.84                | 0.275  |

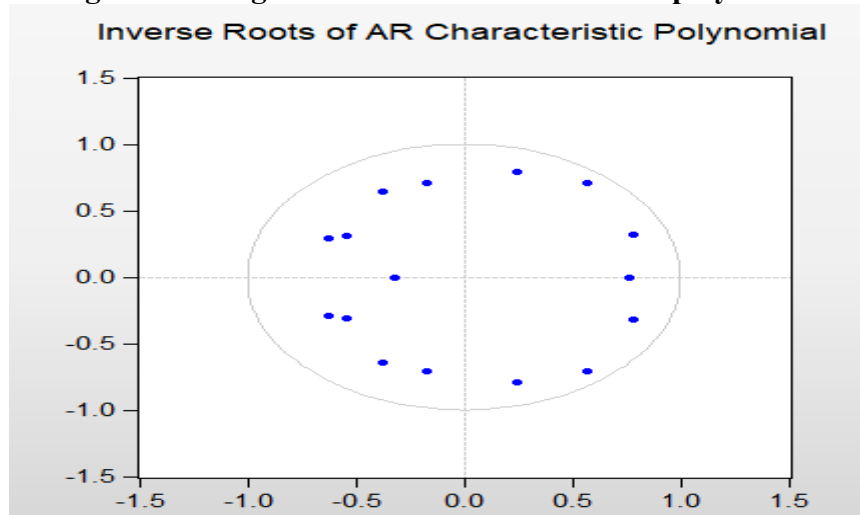
Source: Developed by the authors from Eviews 10

We know that LGDP, Lunemployment, Lgovernment revenue and Lgovernment expenditure are integrated of order 1. The Johansen Co-integration test has been applied and the results indicate that there are at least 1 co-integration vector, which means that there is a unit long relationship term between our variables. We remark that the trace statistic 28.86 is lower than the critical value 29,79.

## V.3. SVAR outputs:

The optimal lag of VAR is 4 according to AIC & SC criterion.

Figure n°2: Eigenvalues of the characteristic polynomial



Source: Developed by the authors from Eviews 10

All roots are located within the unit circle (ie, the model does not suffer from the problem of autocorrelation between errors), our VAR satisfies the stability condition.

The matrix  $A$  and  $B$  will help us to find the transition matrix  $S$ : this new matrix allows the creation of structural factors model, its variance and the statistics of each coefficient. The results are as follow:

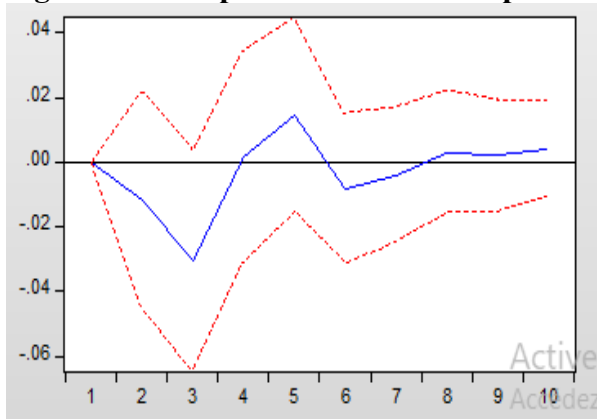
$$A = \begin{pmatrix} 1 & -1.139 & 0.130 & 0.626 \\ 0.442 & 1 & -0.356 & -0.653 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & -0.289 & 1 \end{pmatrix}$$

$$B = \begin{pmatrix} 0.111 & 0 & 0 & 0 \\ 0 & 0.072 & 0 & 0 \\ 0 & 0 & 0.012 & 0 \\ 0 & 0 & 0 & 0.087 \end{pmatrix}$$

$$S = \begin{pmatrix} 0.074 & 0.055 & 0.024 & 0.006 \\ -0.003 & 0.048 & 0.054 & 0.053 \\ -0 & 0 & 0.012 & 0 \\ 0.070 & 0.001 & 0.034 & 0.087 \end{pmatrix}$$

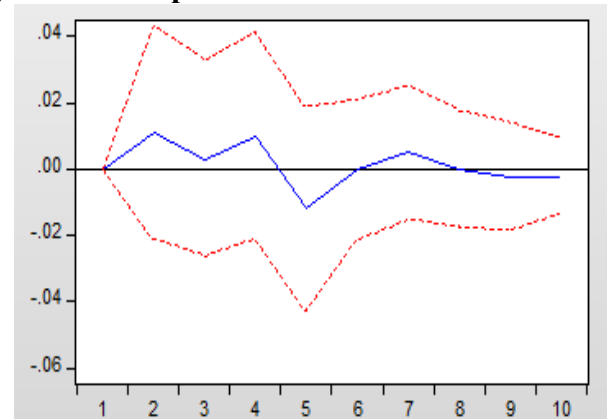
#### V.4. Impulse Response Function (IRF):

Figure n°3: Response of Unem to Exp



Source: Developed by the authors  
Views 10

Figure n°4: Response of Unem to Reve



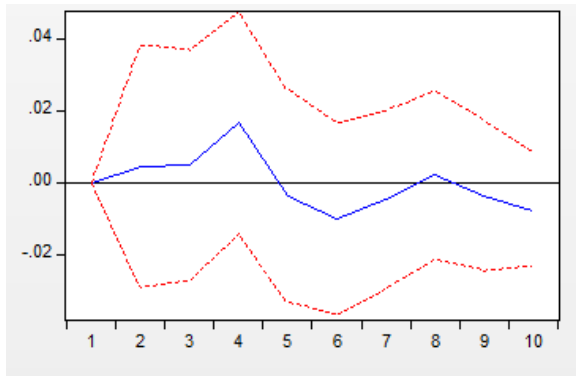
Source: Developed by the authors  
from Eviews 10

The Impulse Response Function in figure n°3 shows the response of unemployment to one-unit innovation in government expenditure. The IRF plot illustrates that one shock in public spending with 1% will have a significant and positive effect on unemployment rates (ie, showing a reduce in unemployment). This shock will generate a decline in unemployment rates and will continue for three years at this latter period it registers the lowest value which is -0.03% (see annexe n°1). All the positive percentages that come afterwards are close to 0; so, they are negligible values.

On the other hand, figure n°4 depicts the response of unemployment to shock in revenue. From the IRF plot, the response is negative and slight from the first period through the fourth period, after that it decreases and reaches its minimum value at the fifth year with -0.0011% (see annexe n°1), and finally the response vanishes during the remaining five years.

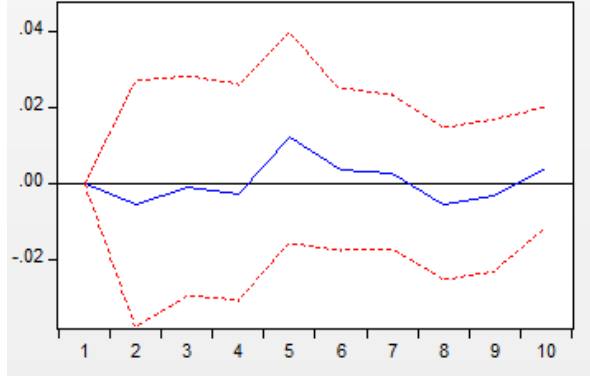
Response of unemployment rate to fiscal policy shocks are slight but asymmetric, while the effect of government expenditure shock is greater than the impact of public revenue shock. This points to the fact that an increase in public spending can reduce unemployment in the short run through hiring of more employees by the government or carrying out some projects that requires temporary employment of people. In Algeria, this asymmetry appears to be clear in the recession phase, in addition, the effect of public spending is stronger in the period of recession compared with boom period so a deficit-spending policy seems to be more efficient, as a consequence, fiscal policy shocks have a stronger impact on unemployment in times of economic stress than in times of expansion, and the procyclicality in fiscal policy reduces the effectiveness of fiscal actions in emerging and developing countries (Chibi, Benbouziane and Chekouri 2014).

**Figure n°5: Response of GDP to Exp**



Source: Developed by the authors  
Eviews 10

**Figure n°6: Response of GDP to Reve**



Source: Developed by the authors  
from Eviews 10

Figures n°5 & n°6 depict the response of output to shock in public spending and government revenue in Algeria. The IRF plot shows a non-response of output to shocks in public expenditure and government revenue in the first period, but afterwards, the response to expenditure became increasingly positive and reaching a maximum value in the fourth period 0.016% (see annexe n°2), after that this effect will be negative.

One shock in government revenues estimated at 1% have a positive effect on GDP in the short term with a multiplier of 0.01% during the fifth period. This effect decreases to be nonexistent.

#### V.5. Variance Decomposition:

**Table n°3: Variance Decomposition of Unemployment rate**

| Period | S.E    | DLGDP  | DLUNEM  | DLREVE | DLEXP  |
|--------|--------|--------|---------|--------|--------|
| 1      | 0.0959 | 4.4858 | 95.5141 | 0.0000 | 0.0000 |
| 2      | 0.1071 | 4.5254 | 93.1995 | 1.1030 | 1.1719 |
| 3      | 0.1209 | 4.0420 | 87.8260 | 0.9252 | 7.2066 |
| 4      | 0.1255 | 3.9468 | 87.9501 | 1.4984 | 6.7045 |
| 5      | 0.1276 | 3.9683 | 85.9417 | 2.3024 | 7.7874 |
| 6      | 0.1285 | 4.1305 | 85.5075 | 2.2698 | 8.0920 |
| 7      | 0.1290 | 4.1713 | 85.3025 | 2.3981 | 8.1278 |
| 8      | 0.1293 | 4.3909 | 85.0699 | 2.3881 | 8.1510 |
| 9      | 0.1300 | 4.4656 | 85.0535 | 2.3965 | 8.0841 |
| 10     | 0.1306 | 4.4475 | 85.0377 | 2.4032 | 8.1115 |

Source: Developed by the authors from Eviews 10

Table n°3. Presents the error variance decomposition of unemployment. From the result, almost all the movement in unemployment is influenced by shocks to its self in the first period by 95.5%. Going down to the fifth-period horizon, it reaches 85.9% and it stabilizes in this value until achieving the 10th period.

The contribution of revenue shocks to unemployment which stands at about 1 percent between the second and the fourth period after that it stabilizes at 2%. Shocks to government expenditure is influenced about 8 percent movements in unemployment. From the table above, government spending was found to exert more influence on unemployment rather than government revenue. These findings corroborate the result of the Impulse Response Function obtained.

**Table n°4: Variance Decomposition of GDP**

**Dynamic Effect of Government Expenditure on Unemployment in Algeria: A Structural Vector  
Autoregressive Approach 1970-2018**

| Period | S.E    | DLGDP    | DLUNEM  | DLREVE | DLEXP  |
|--------|--------|----------|---------|--------|--------|
| 1      | 0.0966 | 100.0000 | 0.0000  | 0.0000 | 0.0000 |
| 2      | 0.1046 | 88.3420  | 11.2173 | 0.2529 | 0.1876 |
| 3      | 0.1082 | 82.6454  | 16.7333 | 0.2393 | 0.3818 |
| 4      | 0.1105 | 80.9802  | 16.0661 | 0.2783 | 2.6751 |
| 5      | 0.1146 | 76.3503  | 19.6577 | 1.4101 | 2.5817 |
| 6      | 0.1165 | 74.2421  | 21.0639 | 1.4738 | 3.2200 |
| 7      | 0.1180 | 72.8830  | 22.3262 | 1.5019 | 3.2887 |
| 8      | 0.1197 | 71.5471  | 23.5589 | 1.6652 | 3.2286 |
| 9      | 0.1208 | 70.3026  | 24.7396 | 1.7012 | 3.2564 |
| 10     | 0.1224 | 68.4715  | 26.1998 | 1.7798 | 3.5487 |

**Source: Developed by the authors from Eviews 10**

Table 4 presents the variance decomposition of Output in Algeria. We notice that in the first period, movements in Output is attributed to itself alone (100%), but going down to the fifth-period horizon, shocks in unemployment accounted for about 19% percent of variations in Output, while shocks in government revenue and public spending accounted for about 1 percent and 3 percent respectively. From the variance decomposition result, it can be inferred that among the fiscal policy variables, government expenditure exerts more influence to movements in Output than revenue.

**Conclusion:**

Government shock was found to have a short-lived positive effect on unemployment in Algeria. So, an increase in public spending leads to a reduction in unemployment rate through the hiring of more employees by the government or carrying out some projects that require temporary employment of people.

The Algerian economy faces the challenge of social discontent, slow structural transformation, weak decentralization, low female labor force participation. The growing social grumbling resulting from tax hikes and high youth unemployment rates are significant risks in front of economic development. While it is necessary to rationalize inefficient and inequitable subsidies that are progressively emerging. In addition, Algerian government should re-orientate public expenditure in order to encourage job creation and responding to the needs of the labor market.

**Appendices:**

**Annexe n°1: Responses values of unemployment rate to government revenue and public spending**

| Response of DLUNEM: |                        |                        |
|---------------------|------------------------|------------------------|
| Period              | DLREVE                 | DLEXP                  |
| 1                   | 0.000000<br>(0.00000)  | 0.000000<br>(0.00000)  |
| 2                   | 0.011250<br>(0.01603)  | -0.011597<br>(0.01671) |
| 3                   | 0.002974<br>(0.01478)  | -0.030335<br>(0.01682) |
| 4                   | 0.010043<br>(0.01553)  | 0.001576<br>(0.01635)  |
| 5                   | -0.011785<br>(0.01533) | 0.014552<br>(0.01502)  |
| 6                   | -0.000159<br>(0.01065) | -0.008286<br>(0.01176) |
| 7                   | 0.004932<br>(0.01018)  | -0.004055<br>(0.01034) |
| 8                   | -0.000132<br>(0.00871) | 0.003108<br>(0.00944)  |
| 9                   | -0.002444<br>(0.00809) | 0.002043<br>(0.00864)  |
| 10                  | -0.002231<br>(0.00575) | 0.004195<br>(0.00739)  |

**Annexe n°2: Responses values of GDP to government revenue and public spending**

| Response of DLGDP: |                        |                        |
|--------------------|------------------------|------------------------|
| Period             | DLREVE                 | DLEXP                  |
| 1                  | 0.000000<br>(0.00000)  | 0.000000<br>(0.00000)  |
| 2                  | -0.005264<br>(0.01602) | 0.004534<br>(0.01678)  |
| 3                  | -0.000593<br>(0.01448) | 0.004920<br>(0.01607)  |
| 4                  | -0.002437<br>(0.01420) | 0.016791<br>(0.01537)  |
| 5                  | 0.012309<br>(0.01395)  | -0.003594<br>(0.01480) |
| 6                  | 0.003857<br>(0.01062)  | -0.009907<br>(0.01325) |
| 7                  | 0.002982<br>(0.01017)  | -0.004523<br>(0.01240) |
| 8                  | -0.005452<br>(0.01003) | 0.002262<br>(0.01171)  |
| 9                  | -0.003088<br>(0.00998) | -0.003514<br>(0.01054) |
| 10                 | 0.004307<br>(0.00777)  | -0.007536<br>(0.00785) |

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