

Measurement and Analysis the Impact of Public Expenditure on Inflation in Algeria for the Period 1994-2017

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قياس وتحليل أثر الانفاق العام على التضخم في الجزائر للفترة 1994-2017

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Abstract:

This study analyzes and measures the impact of spending on inflation in Algeria, using ECM and Granger Causality Model. We found that there is a causal relationship between spending and Inflation in Algeria, also we find there is a short and long run relationship that exists between the variables examined, the result indicated that increase of public expenditure by 1% led to increasing of inflation rates by 35%, also increase of operating expenses by 1% led to increasing of inflation rates by 28%, Therefore, it is better to adopt an effective fiscal policy, while rationalizing public spending and allocating it to the productive sectors that contribute to economic development, with the need to reduce imports and replace goods that can be produced locally to avoid imported inflation.

Keywords: Public expenditure; Investment expenditure; operating expense; Inflation, co-integration.

(JEL) Classification: E62; F62.

ملخص:

تهدف الدراسة الى تحليل وقياس أثر الانفاق العام على التضخم في الجزائر للفترة 1994-2017 باستعمال نموذج تصحيح الخطأ وسببية جرانجر، وقد توصلت الى وجود علاقة سببية بين الانفاق العام والتضخم في الجزائر، وأن هناك علاقة قصيرة و طويلة المدى بين المتغيرات التي تم فحصها، أين أوضحت النتائج أن زيادة الانفاق العام بنسبة 1% يؤدي الى ارتفاع معدلات التضخم بنسبة 35%، كذلك زيادة الانفاق الجاري بنسبة 1% يؤدي الى ارتفاع معدلات التضخم بنسبة 28%، لذلك من الافضل تبني سياسة مالية فعالة، مع ترشيد الإنفاق العام وتخصيصه للقطاعات الإنتاجية التي تساهم في التنمية الاقتصادية، مع ضرورة تقليص الاستيراد وإحلال السلع التي يمكن انتاجها محليا لتجنب التضخم المستورد.

الكلمات المفتاحية: انفاق عمومي، انفاق استثماري، انفاق جاري، تضخم، تكامل مشترك.

الترميز الاقتصادي (JEL): E62؛ F62.

I. Introduction:

The authorities use public spending as a tool of fiscal policy to ensure the stability of macroeconomic variables. It also affects many basic variables, including the general level of prices, as inflation is an economic problem and an internal imbalance that requires setting economic policies to limit its rise, whether in developed or developing countries. Algeria has pursued since 1990 to revive its economy by doubling the volume of spending in the context of pursuing ambitious development plans and programs, but at the same time it has suffered from inflation for long periods, and it has had to take several measures and means to limit its rise.

Economic theory has settled the causal relationships and their direction for most economic phenomena, but some relationships have not been resolved, such as the relationship between spending and inflation, as some studies indicate that there is a causal relationship that goes from spending to inflation, while other research proves the absence of a relationship. Also, other studies see that the relationship between public spending and inflation is reciprocal

Therefore, we wanted to analyze the implications of inflation rates when increasing public spending in Algeria by answering the following question:

What is the impact of government spending on inflation in Algeria during 1993-2017?

Depending on the results of the studies, whether theoretical or applied, we can determine the hypothesis of the research as follows:

- There is a positive, and significant impact of spending on inflation in Algeria.
- The excessive government expenditures lead to increased inflationary pressures.

1. Objective of study:

In this study we attempt to determine the effect of expenditures on inflation in Algeria, depending on ECM and Granger Causality Model.

2. Literature review:

The link between fiscal policy and public spending becomes apparent when the use of their instruments affects the volume of spending and inflation (Kamel, 2011).

There is a negative and positive effect of public spending on inflation. The government use spending policy to reduce inflationary pressures and stabilize of price. Also can used direct spending toward commodity support or to investment.

Also, spending may have a negative impact if cash transfers are directed to a specific group with the goal of raising its purchasing power. If the productive apparatus is inelastic, this will lead to higher commodity prices. Likewise, if there is competition in the public sector for the means of production, this contributes to rising costs, which raises commodity prices and affects purchasing power.

The mechanism of transmission of influence according to Keynes is through the rate of interest, so monetary excess causes a decrease in the rate of interest and an increase in investments and thus leads to an increase in inflation. (Ayab, 2010).

Also, the excessive spending leads to a negative wealth effect. Therefore the government spending policy Effective public, but this effectiveness is conditional on the strength of the crowding out effect, the power of the cash braking that is related to the tendency of the elasticity of prices, but in the case of using the money supply to finance government spending, this will lead to an increase

in the means of payment in the possession of individuals, and thus an increase in aggregate demand it creates uniforms the volume of production and the increase in inflation, and leads to increase in production and in level of prices (Ayab, 2010).

There are several researches that have found a positive link between public spending and inflation as the study of Ezirim, Muoghalu (2003).

Han, Mulligan (2006) found also a positive relationship, that government spending causes high inflation rates.

Ezirim, Muoghalu, Elike (2008) found That There is a bi-causal relationship in USA, Where inflation affects public spending decisions in a major way. Also, the growth of public spending exacerbates inflationary pressures in the country, so reducing public spending reduces inflation.

Olaiya, Nwosa, Amassoma(2012) found a one direction causality between growth, inflation, spending in the short run.

Study of Benelbar, Senoussi (2019) aimed to measure the impact of public expenditure on inflation rate in Algeria 1986-2016. Shown the presence of a negative impact of investment expenses and a positive impact of operating expenses respectively on inflation rates in Algeria.

Also, bolkour study in 2016, which attempted to analyze and measure the relationship in the long run of expenses and inflation, during the period 1970-2015, as it found that there is an integrative relationship between expenses and CPI in Algeria. As the increase in government spending leads to an increase in inflation rates by about 15 percent.

Hebita's study in 2015 found that there is a one-way causal relationship between equipment expenditures and the rate of inflation in Algeria during the period 1980-2013, where an increase in equipment expenditures by 1 percent leads to an increase in inflation by 0.71 percent.

II. Methods and Materials:

1. The reality of the policy of spending and inflation in Algeria:

During the period 1990-1999, public expenditures increased from 142400 M dinars in 1990 to 235200 M dinars in 1991, an increase of 65.1% in 1996 (589300 M dinars), an increase of 27.6% in 1998 (575739 M dinars) Resulted from the high price of oil (Maizi, 2008).

As for the inflation rate, it has also witnessed a significant increase, moved from 19.9% to 31.7% during 1990-1992, and it remained high during 1996 to (29%) and 1997 to (29.8%) despite its decline in 1993. In 1996, it declined to 18.7% and to 5.6% in 1997. (N. B. S, 2018).

During the period 2000-2005, public expenditure decreased from 21.1% to 3.8%, This helped stabilize inflation within acceptable limits between 1% - 3.5% in 2002-2007, it rising from 4.8% to 5.7% in 2008- 2009(Cherakrak, Gaham, 2019)

Starting in 2007, public spending increased by 37.7% in 2008 and 20% in 2009 due to an increase in the guaranteed minimum national basic wage and the raising of various grants.

But starting from 2012, the inflation rate witnessed a significant increase of 8.9% in 2011 (Amria, Yakoubi, 2016); also the expenditure known increased from 5855 to 7656 B in 2010-2015 after the Investment program 2015-2019.

On the other hand, the expenditures on equipment, (Draoussi, 2005), have witnessed an big evolution where by in 1990 they were estimated at 47.7 billion dinars, to rise in 1995 to 285 billion dinars, although they knew fluctuations During the period 1996-2000, but starting from the year 2001,

I witnessed a significant increase that was not previously experienced, where it moved from 357 to 3039 billion dinars between 2001-2015, and this is part of a set of development programs. As for the investment expenses, it went from 88.8 in 1990 to 2833 B dinars in 2010, to be equal 4617 B dinars in 2015 (Berber, 2017).

2. The econometric analysis of study:

We formulated a model for measured Impact of public spending on inflation in Algeria 1993-2017, we used the following variables inflation (CPI), public expenditures (TOT), operating expenses (GES), and investment expenditures (EQU) to estimate the following models:

$$CPI = \alpha + \beta TOT + \zeta_t$$

$$CPI = \alpha + \beta EQU + \zeta_t$$

$$CPI = \alpha + \beta GES + \zeta_t$$

Whereas:

CPI: Inflation (Consumer Price Index)

TOT: Public spending

EQU: Investment (capital) expenses

GES: Operating (current) expenses

A. The Stability Test

We test the stability of the study variables of public spending (TOT), operating expenses (EQU), and investment expenses (GES), and inflation rate (CPI), each variable separately, and for that we will use the Augmented Dickey-Fuller test, the following results were obtained (table1):

We found that the variables contain the unit root, In other words, at the general levels the variables unstable, but when taking the first differences, all variables are stable in their first differences, and we use the Philips-Perron test to confirm the results.

So, as indicated in Table 1, the variables were stationary in first difference, and that each of the variables is integrated to the same degree.

B. Granger Causality Tests:

In table 2 we find that the change in expenditure (public, investment, operating) causes a change in the rate of inflation, because Fisher F statistics (2.5E-8) (4.1E-12) (2.2E-7) are less than 5%. In other words, there is a causal relationship, but it is in one direction.

C. Co-integration Test:

By applying the co-integration test between the variables (inflation, public spending), the results in Table 3 indicate a refusal to impose nothingness, so there is no cointegration, but, the alternative hypothesis is accepted, which states the possibility of estimating the variables through the error correction model.

Where is it clear that the Trace Statistic (72.65) is bigger than the critical value(25.25) at (5%), and therefore rejected the null hypothesis that there is no vector for common integration.

As for the Trace Statistic (0.21) it is smaller than critical value (2.65), and therefore we accept the null hypothesis, so, there is a long-term relationship between the variables.

Also the maximum eigenvalue test showed that there is at most one vector for co-integration, because the maximum Eigenvalues value (73.65) is greater than the critical value (25.65) at (5%). So, there is vector for joint integration.

By applying co-integration test between the variables (inflation, investment expenditures, operating expenses), The results in Table 3 indicate a rejection of the null hypothesis, so there is no cointegration, but, the alternative hypothesis is accepted, which states the possibility of estimating the variables through the error correction model.

Where is that the Trace Statistic (63.14) (65.14) is bigger than the critical value (17.24) (16.45) at (5%), and therefore rejected the null hypothesis that there is no vector for cointegration.

As for the Trace Statistic (0.51) (1.54) it is less than the critical value (4.47) (4.54) at (5%), and therefore we do not reject the null hypothesis.

As for the results of maximum eigenvalues test, it also showed that there is at most one vector for co- integration, because the calculated value (67.47) (56.45)is greater than the critical value(16.47) (15.14) at (5%).

On the other hand, because the computed value of the extreme eigenvalues (0.01) (1.11) is smaller than the critical value (4.80) (3.24) at (5%), we accept the presence of at least one error-correcting vector.

In conclusion, we emphasize from the above the long-term relationship between the variables. Equation for estimating this relationship can be written as follows:

$$\text{CPI}=0.353481\text{DTOT}_{-1}-2.954512$$

$$(41.2301-)$$

$$\text{CPI}=0.155248\text{DEQU}_{-1}-6.548954$$

$$(50.0535-)$$

$$\text{CPI}=0.281645\text{DGES}_{-1}-0.547865$$

$$(21.8158-)$$

The equations confirm the positive and significant effect of spending

D. The Error Correction Model-ECM

The analysis of Table 3 shows the following:

- With regard to the ECM between inflation and public spending: the Adj. R-squared Equal (0,89), the F statistic(647.1245), we note that the LM Test was significant at 1%(0.4945), We find that there is a significant relationship between variables.
- With regard to the ECM between investment expenditures and inflation: we conclude that the parameter of the ECT is significant at 1% estimated at -0.521457; the Adj. R-squared is 0.92457, meaning that investment expenditures explain 92.45% of the changes in inflation.
- With regard to the ECM between inflation and operating expenses: we find the ECT reached (-0.402456), The Adj. R-squared is 0.43120, meaning that operating expenses explain 43.12% of the changes in inflation.

In total, there is a relationship between inflation and expenditures in Algeria.

III. Conclusion:

This study attempted to measure and analyze the effect of public spending on inflation in Algeria, using co-integration procedure, and causality tests, we conclude:

- ◆ The variables were Stationary in first difference.
- ◆ There is a short and long-term link between variables,
- ◆ When investment spending changes by unit, inflation changes by 15 %.
- ◆ when public spending changes by unit, inflation changes by 35 %.
- ◆ If operating expenses changes by unit, inflation changes by 28 %.
- ◆ Excessive public expenditures in Algeria after the year 2000 contributed greatly to creating inflationary pressures in the economy.
- ◆ As a result of the inflexibility of the production system in Algeria, the surplus demand is covered by imports, which creates other inflationary pressures

Recommendations :

- ◆ It is necessary to rationalize public spending and try to direct it towards productive sectors rather than consumer sectors.
- ◆ It is imperative to reduce dependence on oil as the most important source of financing.
- ◆ It is necessary to reduce imports and replace goods that can be produced locally, while trying to export goods that have a comparative advantage
- ◆ The need to reform the financial and banking systems
- ◆ The need to develop the financial market and activate its role in financing the economy.

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Appendix:

Table 1: Stability test

Augmented Dikey-Fuler						
1 st diff			Lev			
No Inter & tren	Inter & tren	Inter	No Inter & tren	Inter & tren	Inter	
-4.002***	-4.958**	-4.015***	4.415	-4.214	-4.120***	CPI
-3.548**	-2.114	-2.485**	2.758	-3.748	2.021	TOT
-2.682	-1.658	-1.547*	1.547	-1.475	1.112	EQU
-5.657***	-5.235***	-5.458***	1.854	-1.548	-0.987	GES
Phillips-Perron						
1 st diff			Lev			
No Int & tr	Int & tr	Int	No Int & tr	Int & tr	Int	
-4.879	-8.547	-5.658	4.547	-7.478	-5.748	CPI
-3.548	-4.547	-3.985	5.548	-3.634	1.987	TOT
-2.524	-3.958	-2.548	1.869	-1.549	0.885	EQU
-5.145	-5.547	-4.478	1.547	-1.014	0.658	GES

Table 2: Granger Causality test between public expenditure, investment expenditure, operating expenses and inflation

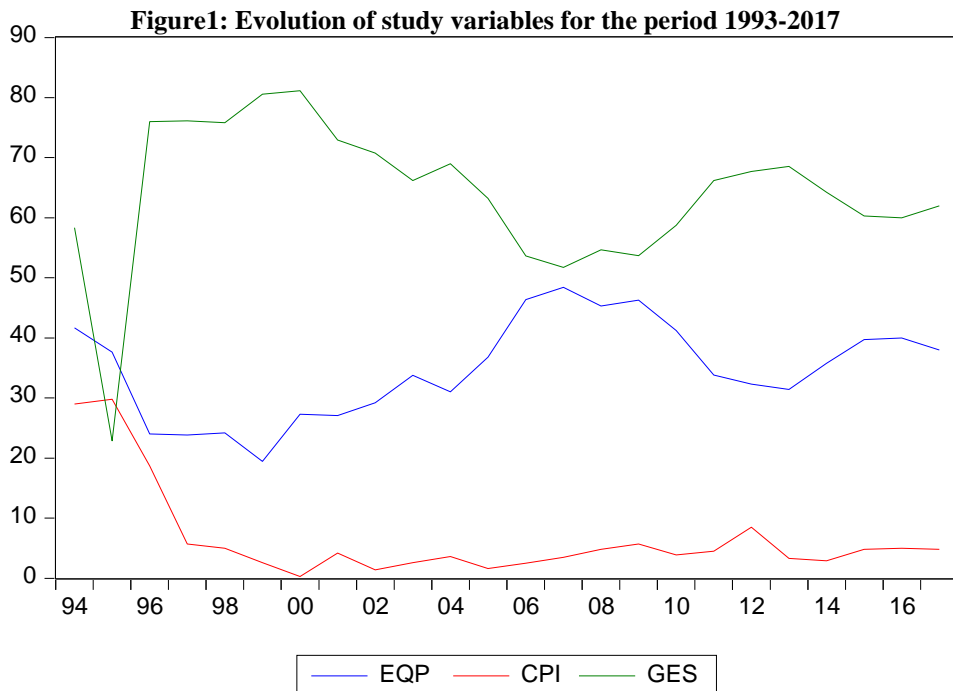
Null Hyp:	Obs	F	Pro
DTOT does not Granger Cause DCPI	22	310.583	2.5E-08
DCPI does not Granger Cause DTOT		1.2642	0.55786
DEQU does not Granger Cause DCPI	22	547.247	4.1E-12
DCPI does not Granger Cause DEQU		2.45715	0.35784
DGES does not Granger Cause DCPI	22	98.5417	2.2E-07
DCPI does not Granger Cause DGES		2.75415	0.35846

Table 3: Results of the integration test

public expenditure	Critical Value 5%	Trace Statistic
0.0001	25.25798	72.65872
0.52481	2.685744	0.214582
Prob	Critical Value 5%	Maximum Eigenvalues Test
0.0002	25.65874	73.65874
0.57215	2.894575	0.255478
investment expenditure		
0.0002	17.24587	63.14578
0.7541	4.478547	0.512457
Prob	Critical Value 5%	Maximum Eigenvalues Test
0.0001	16.47854	67.47854
0.8945	4.801242	0.014571
operating expenses		
0.0001	16.45781	65.14578
0.1214	4.54787	1.545781
Prob	Critical Value 5%	Maximum Eigenvalues Test
0.0001	15.14578	56.45781
0.1341	3.24587	1.11045

Table 4: Results of co-integration test

Inflation and public spending	Coff	T stat
ECT	-0.657481	-15.4578
C	0.01487	35.24587
Adj R ²	0.89145	
F.stat	647.1245	
LM	0.4945 (0.8914)	
Inflation and investment expenditure		
ECT	-0.521457	-40.24578
C	0.41578	29.54789
Adj R ²	0.92457	
F.stat	745.547	
LM	0.8748 (0.7751)	
Inflation and operating expenses		
ECT	-0.402456	-2.5478
C	0.08545	6.4512
AdjR ²	0.43120	
F.stat	9.54715	
LM	0.78545 (0.71545)	



Source: Prepared by researchers based on National Bureau of Statistics

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