

# Public Expenditure Growth and Inflation in Nigeria: The Causality Approach

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## Abstract

*The paper examined empirically the causal relationship existing between public expenditure growth and inflation in Nigeria from 1981 to 2012. Employing modern time series econometric techniques such as; Augmented Dickey-Fuller (ADF) Unit Root test, Johansen Co-integration test and the Granger Causality test. The Augmented Dickey-Fuller (ADF) for unit root test shows that two of the variables excluding INFL were not stationary at level but became stationary at first difference and the Johansen co-integration technique indicated the presence of co-integration among the variables. The study provides evidence that there is no statistically discernible relationship between government expenditure growth and inflation in Nigeria. we therefore, kick against the 'old-time religion' of restricting aggregate demand by tight monetary policy as often demonstrated by the Central Bank of Nigeria through adjustments in the Monetary Policy Rate (MPR), but we rather advocate a relaxation of the MPR with the necessary adjustments when*

*necessary as inflation is occasionally necessary to jump-start an economy that is floundering.*

**Keywords: Government Expenditures, Public Finance, Prices, Price Level and Causality**

## INTRODUCTION

Public expenditure refers to the expenses which a government incurs for (i) its own maintenance (ii) the society and the economy, and (iii) helping other countries. In practice, however, with expanding state activities, it is becoming increasingly difficult to separate the portion of public expenditure meant for the maintenance of the government itself from the total.

Historically, public expenditure has recorded a continuous increase over time in almost every country. However, traditional thinking and philosophy did not favour this trend because it rated market mechanism as a better guide for the working of the economy and allocation of its resources. It was argued that each economic

unit was the best judge of its own economic interests and the government should not try to decide on behalf of others. Furthermore, while a private economic unit was guided by its own economic interests, the public sector had no such motivation. Accordingly, its efficiency was bound to be very low. Had this philosophy been practiced in its entirety, public expenditure would not have grown as rapidly as it did? In reality, however, the state could not ignore problems of economic growth and social injustice. It could not remain silent spectator of the miseries of the people. This resulted in the acceptance of several versions of socialist and welfare philosophy. Ajie, H.A, Akekere, J and Ewubare, D.B (2008).

The annual budget spells out the direction of the expected expenditure, as it contains details of the proposed expenditure for each year, though the actual expenditures may differ from the budget figures due, for example, to extra-budgetary expenditures or allocations during the course of the fiscal year, Oziengbe Scott Aigheyisi (2013).

The debate on government expenditure growth and inflation nexus is still ongoing. The argument had centred on whether or not the increasing public spending has the potential to induce inflation. While some scholars are of the belief that increasing public expenditure enhances inflation, others are of the view that, it is inflationary pressure that causes the growth of government spending in both developing and developed countries (See Ezirim, C.B, Muoghalu, M.I and Elike, U,

2008) There is still an unresolved issue theoretically as well as empirically as to the effect of government spending on inflation. Although, the theoretical positions on the subject matter are quite different yet the conventional assumption is that a large government spending can result to price instability. However, empirical research does not conclusively support the conventional wisdom as opined by Mesgben (2006), in the work of Olaiya et al (2012). This study therefore, attempts to examine the direction of causation between public expenditure growth and inflation in Nigeria using data spanning 1981 to 2012 and possibly make policy recommendations on the way forward.

The rest of the paper is structured as follows: Section 2 reviews the literature on government expenditure. Section 3 describes the data used in the study. Section 4 gives the empirical analysis and the discussion of results. Section 5 concludes the paper.

## **2.0 Literature Review**

### **2.1 Introduction**

The Oxford Advance Learners Dictionary defined literature review as an examination of pieces of writing or printed information on a particular subject, with the intention of changing it if necessary. Literature review deals with citing the contribution of other authors in the area and concentrates on highlighting the results, findings and conclusion on the subject area, ( Apere, 2004).

This section critically examines the views of other scholars on the issue we are investigating. This step is pertinent in order to examine arguments raised by scholars on the topic and also to create a path by which our present study will be channelled. Our review is organized thus: Theoretical and Empirical Literature.

## **2.2 Theoretical Literature**

### **2.2.1 Wagner's Law**

Wagner's Law is named after the German political economist Adolph Wagner (1835-1917), who developed a "law of increasing state activity" after empirical analysis on Western Europe at the end of the 19th century. He argued that government growth is a function of increased industrialization and economic development. Wagner stated that during the industrialization process, as the real income per capita of a nation increases, the share of public expenditures in total expenditures increases. The law cited that "The advent of modern industrial society will result in increasing political pressure for social progress and increased allowance for social consideration by industry."

Wagner (1893) designed three focal bases for the increased in state expenditure. Firstly, during industrialization process, public sector activity will replace private sector activity. State functions like administrative and protective functions will increase. Secondly, governments needed to provide cultural and welfare services like education, public health, old age pension or retirement insurance, food subsidy, natural disaster aid, environmental protection programs and other welfare functions. Thirdly, increased industrialization will bring out technological change and large firms that tend to monopolize. Governments will have to offset these effects by providing

social and merit goods through budgetary means.

### **2.2.2 Peacock and Wiseman Theory of public expenditure**

In 1961, Peacock and Wiseman elicited salient shaft of light about the nature of increase in public expenditure based on their study of public expenditure in England. Peacock and Wiseman (1967) suggested that the growth in public expenditure does not occur in the same way that Wagner theorized. Peacock and Wiseman choose the political propositions instead of the organic state where it is deemed that government like to spend money, people do not like increasing taxation and the population voting for ever-increasing social services.

There may be divergence of ideas about desirable public spending and limits of taxation but these can be narrowed by large-scale disturbances, such as major wars. According to Peacock and Wiseman, these disturbances will cause displacement effect, shifting public revenue and public expenditure to new levels. Government will fall short of revenue and there will be an upward revision of taxation. Initially, citizens will engender displeasure but later on, will accept the verdict in times of crisis. There will be a new level of "tax tolerance". Individuals will now accept new taxation levels, previously thought to be intolerable. Furthermore, the public expect the state to heal up the economy and adjust to the new social ideas, or otherwise, there will be the inspection effect.

Peacock and Wiseman viewed the period of displacement as reducing barriers that protect local autonomy and increasing the concentration power over public expenditure to the Central government. During the process of public expenditure centralization, the role of state activities tend to grow larger and larger. This can be referred to as the concentration process of increasing public sector activities.

Nowadays, the growth in public expenditure has become a compulsion and thus, the disturbance situations matter little. (Retrieved from <http://www.ukessays.com/essays/economics/review>)

### **2.3 Empirical Literature**

For Grilli, Masciandaro and Tabellini (1991) inflation and government spending are positively correlated. Similarly, Han and Mulligan (2006) found a positive relationship between big size of government (government spending) and inflation. That big government causes high inflation rates.

Ezirim, C.B, Muoghalu, M.I and Elike, U, (2008), in their work titled *Inflation Versus Public Expenditure Growth in the US: An Empirical Investigation using cointegration analysis and Granger Causality Model* found out that inflation significantly influences public expenditure decisions in the United States of America. Public expenditure growth was seen to aggravate inflationary pressures in the country, where reduction in public expenditure tends to reduce inflation. Thus, as in previous studies, the efficacy of Keynesian's fiscal policy as a veritable tool to combating inflation in the developed countries is not falsified. Their work lends credence to the effectiveness of Keynes fiscal policy as an instrument of macroeconomic stabilization.

Investigating the causality among economic growth, public expenditure and inflation rate in Nigeria for the period spanning 1970 to

2010, Olaiya, S.A, Nwosa P.I and Amassoma D (2012) reported the existence of long run relation among the variables. Their findings revealed the existence of a bi-directional causality between government expenditures and economic growth both in the short run and in the long run while a unidirectional causality was observed in the short run from economic growth and government expenditure to inflation rate. The implication of this result is that both government spending and economic growth also influence inflation rate in Nigeria. Based on these findings, they recommend that government should implement policies that would moderate government spending in order to reduce inflation rate. To compliment for the loss in economic growth through the reduction in government spending, lending rate should be moderated in order to encourage private investors in investing in the Nigerian economy. The reduction in inflation rate is essential because price stability is an incentive for investment and motivation for inflow of foreign capital, which can promote economic growth.

As a way of sharp departure the studies of Compillo and Miron (1997) and Click (1998), did not show how inflation is related to the components of government spending. Sergeant (1982) suggests that inflation as a fiscal phenomenon is not useful for predicting inflation across countries. Also Okpara (1988), in his study on government expenditure, money supply and prices in Nigeria, found a very poor and insignificant relationship between government expenditure and prices.

He finally concluded that inflation in Nigeria is a monetary phenomenon.

Cukierman (1992), suggest that government spending may respond to inflation and not the other way round. Barro (1979), Judd (1989) also used positive theories of long-run inflation. Mankiw (1987), Veigh (1989) and Poterba and Rotemberg (1990), suggested that the optimal inflation tax should increase with government spending. While Kimbrough (1986), Woodford (1990) and Correia and Tales (1996) are of the opinion that, it is not necessarily optimal for bigger governments to inflate more.

Empirical studies in Nigeria failed to address the link between government expenditure growth and inflation. Indeed, most of the works apart from Okpara (1988) have focused on the causal relationship between fiscal deficit and macroeconomic variables such as, private investment, money supply, interest rate and economic growth. For instance, Oladipo and Akinbobola (2011) confirmed that there is a significant causal relationship from budget deficit to inflation while Chimobi and Igwe (2010) revealed that money supply causes budget deficit.

It is evident from the review of literature that there is dearth of studies on the link between government expenditure growth and inflation. The interest of this paper is, therefore, to address the neglect issue on the nexus between government expenditure and inflation. Therefore, the present study intends to fill this gap.

### 3.0 Method of Study

The study adopts an econometric model in investigating the causal relationship existing between public expenditure growth and inflation in Nigeria. The study gathered time series annual data for the period covering 1981 to 2012 from the Central Bank of Nigeria Statistical bulletin and National Bureau of Statistics. The method involves econometric techniques such as; Augmented Dickey-Fuller (ADF) Unit Root test, Johansen Co-integration test and the Granger Causality test.

### 3.3 Model specification

The relationship between inflation and government expenditure can be expressed as follows:

$$INFL = f(CEXP, REXP, \dots) \text{-----1}$$

Specifying equation (1) in exponential regression model, we have;

$$INFL = \alpha CEXP_t^{\beta_1} REXP_t^{\beta_2} e^{\mu_t} \text{-----2}$$

In this form, the coefficients  $\beta_1, \beta_2$ , can be directly estimated by applying log-linear regression techniques via logarithmic structural transformation; and those coefficients will be elasticities. Taking natural logs of both sides of equation (2), we have:

$$\ln INFL = \ln \alpha - \beta_1 \ln CEXP - \beta_2 \ln REXP + \mu \text{-----3}$$

$$\ln INFL = \beta_0 - \beta_1 \ln CEXP - \beta_2 \ln REXP + \mu \text{-----4}$$

Where:

$\beta_0 = \ln \alpha$ ,  $\ln$  is the natural log (that is log to the base  $e$ , and where  $e = 2.718$ ), INFL is inflation rate, CEXP is the capital expenditure and REXP is the recurrent capital expenditure. These multiple linear (in the coefficient) models enable us to fit to empirical observations of the variables. When estimated, the model becomes:

$$\ln \text{INFL} = \beta_0 - \beta_1 \ln \text{CEXP} - \beta_2 \ln \text{REXP} \text{-----} 5$$

We then differentiate partially with respect to the log of each variable to obtain elasticity of inflation and *a priori* sign expectation of equation.

$$\frac{\partial \ln \text{INFL}}{\partial \ln \text{CEXP}} = \left( \frac{\partial \ln \text{INFL}}{\partial \text{CEXP}} \right) \left( \frac{\text{CEXP}}{\text{INFL}} \right) = \beta_1 > 0 \text{-----} 6$$

$$\frac{\partial \ln \text{INFL}}{\partial \ln \text{REXP}} = \left( \frac{\partial \ln \text{INFL}}{\partial \text{REXP}} \right) \left( \frac{\text{REXP}}{\text{INFL}} \right) = -\beta_2 > 0 \text{-----} 7$$

**4.0 Data Analysis and Interpretation of Findings**

Most time series variables are non-stationary and using non-stationary variable in the model might lead to spurious regressions (Granger and Newbold, 1974). The first or second

difference terms of most variables will usually be stationary (Ramanathan, 1992). Accordingly, to avoid the problem of none sense correlation, we begin by testing the variable using the Augmented Dickey-Fuller (ADF) test technique.

**4.2 Unit Root Test**

Time series data are often assumed to be non-stationary and thus, it is necessary to perform unit root test to ensure that there is stationary of data. The test would be employed to avoid the problem of spurious regression. In conducting this test, the Augmented Dickey-Fuller (ADF) unit root test would be employed to determine the stationarity of data.

The decision rule is that Augmented Dickey-Fuller (ADF) test statistics must be greater than Mackinnon Critical Value at 5% and at absolute term i.e. ignoring the negativity of both the ADF test statistics and Mackinnon critical value, before the variable can be adjudged to be stationary, otherwise we accept the null hypothesis (H0) i.e. data is non-stationary and reject the alternative hypothesis (H1) i.e. data is stationary.

**Table 1: Summary of ADF unit root test results (Trend and Intercept)**

Variables		ADF	Order of Integration
INFL	Level	-3.571**	I(0)
	Ist Diff		
CEXP	Level	0.083	
	Ist Diff	-3.643**	I(1)
REXP	Level	2.059	
	Ist Diff	-14.278*	I(1)

**NB: \* Indicates stationary at the 1% level & \*\*Indicates stationary at the 5% level**

The ADF unit root test indicates that INFL was stationary at level while CEXP and REXP became stationary after the first difference was taken. However, following Harris (1995) and Gujarati (2009), both I(1) and I(0) variables could be carried forward to test for cointegration which forms the basis of the next section.

The Johansen cointegration test was used to test for the existence or not of a long run relationship among the variables. The Johansen methodology was preferable for the study because it has the advantage amongst others of allowing for more than one cointegrating vector. The result of the Johansen cointegration test is shown in table 2 below:

**Table 2: Johansen cointegration test result**

Hypothesized		Trace	0.05	
No. Of CE(s)	Eigenvalue	Statistic	Critical value	Prob**
None*	0.727528	63.61890	29.79707	0.0000
At most 1*	0.372809	24.61234	15.49471	0.0016
At most2*	0.298060	10.61723	3.841466	0.0011

  

Hypothesized		Max-Eigen	0.05	
No. Of CE(s)	Eigenvalue	Statistic	Critical value	Prob**
None*	0.72758	39.00656	21.13162	0.0001
At most 1*	0.372809	13.99510	14.26460	0.0551
At most 2*	0.298060	10.61723	3.841466	0.0011

Trace test indicates 3 cointegrating equation. The Max-Eigen test also indicates 1 cointegrating equation. Thus, it could be concluded that a long-run relationship exists among REXP, CEXP and INFL.

To confirm and establish the existence of causal relationship between federal government expenditure (recurrent and capital) and inflation and to further confirm the

existence of long-run cointegrating relations between the variables, the pair-wise Granger causality test advanced by Granger (1969) was conducted. Cointegration relationship also implies existence of causal relationships (unidirectional or bidirectional) between the variables (Gujarati and Porter, 2009). The results of the test are presented below.

**Table 3: Summary of Pairwise Granger causality Test**

Direction of Causality	Number of Lags	F Value	Decision
REXP→CEXP	2	23.56	Reject
CEXP→REXP	2	2.79	Reject
INFL→CEXP	2	0.13	Do not reject
CEXP→INFL	2	0.19	Do not reject

INFL→REXP	2	0.85	Do not reject
REXP→INFL	2	0.99	Do not reject

From table 3 above two-way (bidirectional) causation is observed between recurrent expenditure and capital expenditure, in other words causality runs in both directions. Suffices to say that REXP causes CEXP and CEXP causes REXP and by extension there is bilateral causality between REXP and CEXP since the estimated F is significant at the 5% level. On the other hand, there is no ‘reverse causation’ from government expenditure (both REXP and CEXP) to inflation since the F value is statistically insignificant. In addition,

there is no statistically discernible relationship between government expenditure growth and inflation in Nigeria during the period under review. Our finding is in conformity with the studies of Compillo and Miron (1997) and Click (1998) who was unable to show how inflation is related to the components of government spending. Similarly, Sergeant (1982) suggests that inflation as a fiscal phenomenon is not useful for predicting inflation across countries.

### 5.0 Conclusions

The study examined empirically the causal relationship existing between public expenditure growth and inflation in Nigeria from 1981 to 2012. The study employed econometric techniques such as; Augmented Dickey-Fuller (ADF) Unit Root test, Johansen Co-integration test and the Granger Causality test. The Johansen cointegration test revealed a long run relationship among the variables. The study provides evidence that there is no statistically discernible relationship between government expenditure growth and inflation in Nigeria during the period under review. In view of the forgoing analysis, we therefore,

kick against the ‘old-time religion’ of restricting aggregate demand by tight monetary policy as often demonstrated by the Central Bank of Nigeria through adjustments in the Monetary Policy Rate (MPR), but we rather advocate a relaxation of the MPR with the necessary adjustments when necessary as inflation is occasionally necessary to jump-start an economy that is floundering.

The study is limited to the causal relationship existing between public expenditure growth and inflation in Nigeria from 1981 to 2012. It covered the period of thirty-two (32) years, spanning from 1981-2012 due to the availability of data.

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