

Nigerians Total Government Expenditure: It's Relationship with Economic Growth (1980-2012)

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Abstract

This paper investigates the relationship between Nigeria's total expenditure and economic growth from 1980-2012. This study makes a modest contribution to the debates by empirically analyzing the relationship between Nigeria total government expenditure and its contribution to economic growth, using time series data from 1980 to 2012, obtained from the Central Bank of Nigeria Annual Report and Statement of Account and Federal Office of Statistics. It employs the Engle-Granger two step modeling (EGM) procedure to co-integration based on unrestricted Error Correction Model and Pair wise Granger Causality tests. From the analysis, our findings indicate that GDP and total government expenditure are cointegrated in this study. The speed of adjustment to equilibrium is 44% within a year when the variables wander away from their equilibrium values. Based on the result of granger causality, the paper concludes that a very weak causality exist between the two variables used in this study. Therefore, the policy implication of these findings is that any reduction in total government expenditure would have a negative repercussion on economic growth in Nigeria.

Keywords: Causality, Gross Domestic Product, Total Expenditure

1. Introduction

The relationship between government expenditure and economic growth has long been a subject of analysis and debate. The analysis and debate are essentially about the role of government in the national economic growth. There are mainly two views regarding the relationship. On the one hand, within Keynesian macroeconomic framework, the standard effective demand theory suggests that government expenditure, seen as an exogenous factor, can be used as an important policy instrument to stimulate economic growth. On the other hand, the 'law of the expanding state role', postulated by Adolph Wagner in 1890, suggests that government expenditure is an endogenous factor or an outcome, not a cause of economic development.

Various empirical studies on the relationship between government expenditure and economic growth also arrived at different and even conflicting results. For example, Landau (1983), based on a cross-country study for 96 countries, concluded with a significantly negative relation between the share of government consumption in GDP and the growth rate of per capita GDP; Kormendi and Meguire (1985) found no significant relation between average growth rates of real GDP and average growth rates or levels of the share of government consumption in GDP, and Grier and Tullock (1989) extended the Kormendi and Meguire form of analysis to 115 countries, and showed a significantly negative relationship between the growth rate of real GDP and the ratio of government consumption to GDP. Different to them, Ram (1986) applied international comparable data of Summer and Heston (1984) for 115 countries to his theoretical model and found that the overall effect of government size on economic growth is significantly positive. Barro (1990),

predict that only those productive government expenditures will positively affect the long run growth rate.

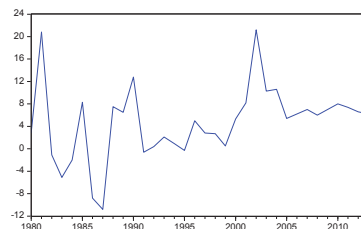
In the neoclassical growth model of Solow (1956), productive government expenditure may affect the incentive to invest in human or physical capital, but in the long-run this affects only the equilibrium factor ratios, not the growth rate, although in general there will be transitional growth effects. Others have argued that increase in government expenditures may not have its intended salutary effect in developing countries, given their high and often unstable levels of public debt. The government consumption crowd-out private investments, dampens economic stimulus in short run and reduces capital accumulation in the long run. Vedder and Gallaway (1998) argued that as government expenditures grow incessantly, the law of diminishing returns begins operating and beyond some point further increase in government expenditures contributes to economic stagnation and decline.

These previous empirical studies are primarily based on cross-sectional analysis for developed countries, and most of them lack rigorous theoretical model. In this study we examine the expenditure-growth nexus by using a set of time series data from Nigerian economy in the period 1980-2012. The reason for focusing this study on Nigeria is also that it has achieved impressive growth rate of gross domestic product, especially since the start of its structural adjustment programme in 1986, with an average annual GDP growth rate of 5.13 percent see figure 1.

Figure 2 shows the historical path of government expenditures in Nigeria. As can be seen from the graph, the Nigerian government allocated a large portion of its budget in the early 1970s to recurrent spending, but with the decline in oil prices in late 1970s and early 1980s, capital expenditure increased significantly. Since the current present democracy, recurrent expenditure has always been more than 60% of the total budget.

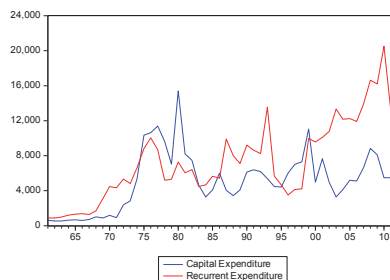
Therefore, it would be interesting to know how total government expenditure, among other determinants, has contributed to economic growth in Nigeria for the period 1980-2012 as a whole. This study comprises section one introduction, section two review of related literature, section three is methodology and section four is conclusion and recommendation.

Figure 1: Real GDP Growth, %



Source: IMF World Economic Outlook, October 2013

Figure 2: Nigeria's Capital and recurrent Expenditure



Source: CBN, 2012

2. Review of Related Literature

This section examines relevant related literature and theoretical framework on the relationship between government expenditure and economic growth. According to the classist's model, government fiscal policy does not have any effect on the growth of the national output. Converse to this view, the Keynesian model argued that increase in government expenditure will lead to higher economic growth. The implication of this is that government fiscal policy (through intervention) will help improve the failure that might arise from the inefficiencies of the market. According to Easterly & Revelo (1993), government activities influence the direction of economic growth.

This same view was however shared by Baro & Sala (1992). Jiranyakul & Brahmasrene (2007) examined the association between government expenditures and economic growth in Thailand, by employing the Granger causality test. The results showed that government expenditures and economic growth are not Co-integrate. Hence, it further exposed the unidirectional relationship as causality runs from government expenditures to growth.

Finally, the results expressed a positive effect of government spending on economic growth. Cooray (2009) had a cross sectional study of 71 countries with respect to government expenditure and quality of governance using an econometric model. The results revealed that both size and quality of government are associated with economic growth. Folster & Henrekson (2001) in their study on growth effects of government expenditure and taxation in rich countries, using different econometric approaches confirmed that more meaningful results are generated. Liu et' al (2008) examined the causal relationship between GDP and public expenditure for US data from 1947–2002. The result revealed that total government expenditure causes growth of GDP while growth of GDP does not cause expansion of government expenditure. Thus, they concluded that judging from causality test; Keynesian hypothesis has more influence compared to Wagner's law.

Abdullah (2000) in his paper titled "The relationship between government expenditure and economic growth in Saudi Arabia", discovered that the size of government is an important determinant of the performance of the economy. Therefore, he concluded that government should increase its spending on infrastructure, social and economic activities as well as encourage and support the private sector to accelerate economic growth.

In Nigeria, several studies have been carried out in this area of research. For instance Taiwo and Agbatogun (2011) in there study government expenditure in Nigeria: a sine qua non for economic growth and development found out that total capital expenditure, inflation rate, degree of openness and current government revenue affect economic growth significantly while total recurrent expenditure and exchange rate are statistically insignificant to economic growth. Oyinola (1993) reported that there is a positive impact of government expenditure on defence and economic growth. Also, study by Ogiogio (1995) showed a long term effect of government expenditure on economic growth. He also found out that recurrent expenditure has more influence than capital expenditure.

Fajingbesi and Odusola (1999) investigated the relationship between public expenditure and growth. The results showed that real government capital expenditure has more significant positive influence on growth than real government recurrent expenditure. Also, Akpan (2005) in his disaggregated approach to determine the effect of government expenditure on Economic growth concluded that there is no reasonable relationship between the components of government expenditure and growth.

Recent study by Abu & Abdullahi (2010) showed that total capital expenditure, total recurrent expenditure and government expenditure on education have negative effects on economic growth. Also, on the contrary, expenditure on transport & communication and health result to an increase in economic growth in Nigeria.

3. Theories of Public Expenditure and Economic Growth.

This section highlights some basic theories that have been used to support the effects of public expenditure on economic growth. According to Chude and Chude (2013) such theories amongst others are:

1. **Musgrave Theory of Public Expenditure Growth:** This theory was propounded by Musgrave as he found changes in the income elasticity of demand for public services in three ranges of per capita income. He posits that at low levels of per capita income, demand for public services tends to be very low, this is so because according to him such income is devoted to satisfying primary needs and that when per capita income starts to rise above these levels of low income, the demand for services supplied by the public sector such as health, education and transport starts to rise, thereby forcing government to increase expenditure on them. He observes that at the high levels of per capita income, typical of developed economics, the rate of public sector growth tends to fall as the more basic wants are being satisfied.
2. **The Wagner's Law/ Theory of Increasing State Activities:** Wagner's law is a principle named after the German economist Adolph Wagner (1835-1917). Wagner advanced his 'law of rising public expenditures' by analyzing trends in the growth of public expenditure and in the size of public sector. Wagner's law postulates that: (i) the extension of the functions of the states leads to an increase in public expenditure on administration and regulation of the economy; (ii) the development of modern industrial society would give rise to increasing political pressure for social progress and call for increased allowance for social consideration in the conduct of industry (iii) the rise in public expenditure will be more than proportional increase in the national income (income elastic wants) and will thus result in a relative expansion of the public sector. Musgrave and Musgrave (1988), in support of Wagner's law, opined that as progressive nations industrialize, the share of the public sector in the national economy grows continually.
3. **The Keynesian Theory:** Of all economists who discussed the relation between public expenditures and economic growth, Keynes was among the most noted with his apparently contrasting viewpoint on this relation. Keynes regards public expenditures as an exogenous factor which can be utilized as a policy instruments promote economic growth. From the Keynesian thought, public expenditure can contribute positively to economic growth. Hence, an increase in the government consumption is likely to lead to an increase in employment, profitability and investment through multiplier effects on aggregate demand. As a result, government expenditure augments the aggregate demand, which provokes an increased output depending on expenditure multipliers.
4. **The Solow's Theory:** Robert Solow and T.W. Swan introduced the Solow's model in 1956. Their model is also known as Solow-Swan model or simply Solow model. In Solow's model, other things being equal, saving/investment and population growth rates are important determinants of economic growth. Higher saving/investment rates lead to accumulation of more capital per worker and hence more output per worker. On the other hand, high population growth has a negative effect on economic growth simply because a higher fraction of saving in economies with high population growth has to go to keep the capital-labour ratio constant. In the absence of technological change & innovation, an increase in capital per worker would not be matched by a proportional increase in output per worker because of diminishing returns. Hence capital deepening would lower the rate of return on capital.
5. **The Endogenous Growth Theory:** The basic improvement of endogenous growth theory over the previous models is that it explicitly tries to model technology (that is, looks into the determinants of technology) rather than assuming it to be exogenous. Mostly, economic growth comes from technological progress, which is essentially the ability of an economic organization to utilize its productive resources more effectively over time. Much of this ability comes from the process of learning to operate newly created production facilities in a more productive way or more generally

from learning to cope with rapid changes in the structure of production which industrial progress must imply (Verbeck, 2000).

4. Scope of study

This study was designed to cover a period of 32 years (1980- 2012). A time series data was used for this study. Data used in this study were obtained from the Central Bank of Nigeria Statistical Bulletin, CBN Annual Report and Statement of Account and Federal Office of Statistics.

5. Methodology

Engle-Granger two step modeling (EGM) procedure (Engle and Granger, 1987) has been widely used to test for long-run relationship. If X_t and Y_t are individually $I(1)$ processes and there exist a linear combination of this variables that is $I(0)$ process, then X_t and Y_t are cointegrated. In other words, a long run equilibrium relationship exists among these variables. Based on the Granger Representation Theorem (GRT), if two variables are cointegrated, there exists an Error Correction Model (ECM) which relates these variables in the short-run while maintaining the consistency of the OLS estimated long-run parameter obtained in the cointegrating regression. In this instance, ECM indicates the periodic change in the time series variables and how it eventually returns to its long run equilibrium value. Since the ECM equation contains only stationary variables which preclude spurious regression, granger causality test can be applied. This is because cointegration analysis shows that there is causality amongst variables but it does not reveal the direction of such causality.

The long-run cointegrating regression is given as follows

$$GDP_t = \phi TGE_t + u_t \quad (1)$$

Where GDP represents the natural log of real gross domestic product and TGE represents the natural log of total government expenditure. GDP_t and TGE_t are both nonstationary variables and integrated of order one (i.e. $GDP_t \sim I(1)$ and $TGE_t \sim I(1)$). The necessary condition for cointegration is that the estimated residual from equation (1) be stationary (i.e $U_t \sim I(0)$). If the above conditions are met, ECM is estimated from this model.

$$\Delta GDP_t = \delta_1 \Delta TGE_t + \delta_2 \theta_{t-1} + \varepsilon_t \quad (2)$$

Where Δ is the first difference operator, ε_t is the error term and θ is the estimated residual from equation (1) (i.e $GDP_t - \phi TGE_t$). TGE requires that the coefficient δ_2 in the short-run equation (2) be negative and statistically significant to confirm the cointegration of the variables. Note that the estimation of the ECM precludes the question of spurious regression since the variables are stationary and equally incorporates both the static long-run and dynamic short-run components.

Granger causality analysis is used to test the hypothesis of prediction of future values of a particular variable(s) while incorporating the past lags of other variables in the model. In other words, a time series variable X_t is said to granger cause another time series variables Y_t if the former contains useful information to predict future values of the later (Ihugba, Nwosu and Njoku, 2013). In this framework, if the F-test of the included lagged variables is statistically significantly different from zero, it implies that there is causality which can either be unidirectional or bidirectional in a bivariate case.

The granger causality test is estimated from the following equations

$$\Delta GDP_t = \sum_{i=1}^n \alpha_i \Delta TGE_{t-i} + \sum_{j=1}^n \beta_j \Delta GDP_{t-j} + u_{1t} \quad (3)$$

$$\Delta TGE_t = \sum_{i=1}^n \lambda_i \Delta TGE_{t-i} + \sum_{j=1}^n \gamma_j \Delta GDP_{t-j} + u_{2t} \quad (4)$$

Where α, β, λ and γ are the respective coefficient of the variables, t represents time while i and j are

their lags, u_{1t} and u_{2t} are uncorrelated white noise error term. The null hypothesis is $\alpha=0$ for all i , and $\gamma=0$ for all j , while the alternative hypothesis is given as $\alpha_i \neq 0$ and $\gamma_j \neq 0$.

6. Data Analysis Techniques

6.1 Unit root Test

In order to avoid estimating spurious regression, the stochastic properties of the series were tested. This we did by testing for unit root which involved testing the order of integration of the individual series under consideration. Several procedures for the test of order of integration have been developed in which the most popular one is the Augmented Dickey-Fuller (1979). The ADF test relies on rejecting a null hypothesis of unit root in favour of the alternative hypothesis of stationarity. The tests were conducted with or without a deterministic trend for each of the series in order to ascertain the level of their stationarity. The general form of the ADF is estimated by the following regression.

$$\Delta y_t = a_0 + a_1 y_{t-1} + \sum_{i=1}^n a_i \Delta y_t + e_t \dots \dots \dots (5)$$

$$\Delta y_t = a_0 + a_1 y_{t-1} + \sum_{i=1}^n a_i \Delta y_t + \vartheta_t + e_t \dots \dots \dots (6)$$

Where:

- y_t = time series, it is a linear time trend,
- Δ = first difference operator,
- a_0 = constant
- n = optimum number of lags in dependent variable
- e_t = random error term.

Table 1: ADF unit root test result

Variables	Test For Unit Root	ADF Test	Critical Value			Result
			1%	5%	10%	
LGDP	Level	-0.6938	-3.6537	-2.9571	-2.6174	Not Stationary
	1 st Difference	-4.2925	-3.6617	-2.9604	-2.6174	Stationary I(0)
LTGE	Level	-0.7434	-3.6617	-2.9604	-2.6191	Not Stationary
	1 st Difference	-6.8683	-3.6616	-2.9604	-2.6191	Stationary I(0)

Source: Computed by Authors

7. Results

Table 1 reveals that both variables are nonstationary at level but are stationary at their first-difference. In short, both variables are integrated of order one (i.e. they are I (1) processes) which sets the stage for cointegration test. Below is the estimated result of the cointegrating equation (1).

$$GDP_t = 6.96 + 1.09TGE_t$$

(0.23) (0.02)

Note that the standard error is given in parenthesis below the estimated coefficient. The coefficient of TGE is statistically significant different from zero. From this estimation, we retrieved the residual and performed ADF test and confirm that it is integrated of order zero. (i.e. $U_t \sim I(0)$) (Result is not reported to save space) and used it to estimate the ECM of equation (2). The result is given below

$$\Delta GDP_t = 0.11 + 0.47 \Delta TGE_t - 0.42 \theta_{t-1}$$

$R^2 = 0.99 \quad d = 1.5$

The estimated coefficient of the ECM term which is also the speed of adjustment to equilibrium is negative and statistically significant as required by the granger representation theorem. This is enough evidence that GDP and TGE are cointegrated in this study. The speed of adjustment to equilibrium is 44% within a year when the variables wander away from their equilibrium values.

Table 2. Pair wise Granger causality test

Direction of causality	F-stat	pvalue	Decision	Lag length
TGE → GDP	4.29	0.02*	Do not reject	2
TGE ← GDP	2.08	0.14	Reject	2
TGE → GDP	2.48	0.08*	Do not reject	3
TGE ← GDP	2.02	0.14	Reject	3
TGE → GDP	1.89	0.15	Reject	4
TGA ← AGDP	2.45	0.08*	Do not reject	4

The arrow shows the direction of causality.

Since causality test is affected by number of lags included, we tested using 2, 3 and 4 lag lengths. The results in Table 2 shows that up to four lag lengths at 1% level of significance, there was no causality between the variables which is difficult to interpret since they were found to be cointegrated. However, at 5% level of significance and 2 lag lengths TGE is found to granger cause GDP with no reverse causality from GDP to TGE (no feedback). At 10% level of significance and 3 lag lengths TGE is found to granger cause GDP with no reverse causality from GDP to TGE (no feedback). Similarly, at 10% level of significance and 4 lag lengths, a unidirectional causality running from GDP to TGE with no reverse causality from TGE to GDP was found. The hypothesis that the lag values of TGE and GDP are statistically significantly different from zero is not rejected for the fourth lag length as the p-values of the F-test indicate. Based on the result of granger causality, we conclude that a very weak causality exist between the two variables used in this study.

8. Conclusion

In this study, we set out to empirically investigate the empirical relationship between total government expenditure and economic growth (GDP), using annual time series data from 1980 to 2012. Some econometric tools are employed to explore the relationship between these variables. The study examines stochastic characteristics of each time series by testing their stationarity using Augmented Dickey Fuller (ADF) test. Then, the relationship between total government expenditure and economic growth (GDP) is examined using Engle-Granger two step modeling (EGM) procedure and Pairwise Granger causality tests. The results from the Test indicate that there exists long-run relationship between total government expenditure and economic growth (GDP). In addition, the causality results reveal that up to four lag lengths at 1% level of significance, there was no causality between the variables. The flow of causality seems to be running in the other direction from total government expenditure to economic growth in lag 2 and 3 with no reverse causality from GDP to TGE (no feedback) while lag 4, a unidirectional causality running from GDP to TGE with no reverse causality from TGE to GDP was found. Therefore, an important implication of the analysis for the conduct of public policy in Nigeria is that the government can face its deficit by improving its size and increasing its role in the economy.

Following the results reported in the preceding section, the authors make the following

recommendations. Firstly, government should ensure that total government expenditure is properly managed in a manner that it will raise the nation's production capacity and accelerate economic growth. Secondly, government should increase its investment in transport and communication sectors, since it would reduce the cost of doing business as well as raise the profitability of firms. Thirdly, government should encourage the education and health sectors through increased funding, as well as ensuring that the resources are properly managed and used for the development of education and health services. Lastly, government should increase its funding of anti-graft or anti-corruption agencies like the Economic and Financial Crime Commission (EFCC), and the Independent Corrupt Practices Commission (ICPC) in order to arrest and penalize those who divert and embezzle public funds.

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