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Investigating Government Sectoral Spending and Economic Growth: Empirical Evidence from Nigeria

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Abstract
This paper investigated the empirical relationship between government sectoral spending and economic growth in Nigeria following cointegration approach and ending with error correction framework. The result of the study confirms a longrun relationship between GDP and its explanatory variables which are government expenditures on Education, Health and Agriculture. The explanatory variables conform to apriori expectation and were individually statistically significant in explaining changes in GDP. This implies that government expenditures on Education, Health, and Agriculture in Nigeria has been productive over the period covered. Based on these findings, the study recommends among other things, that there is the need for improved and committed funding of the Educational, Health and Agricultural sectors for a more vibrant economy.
Keywords: Government Expenditure, Stabilization and Economic Growth

1. Introduction

Over the years, there has been a renewed interest among economists and policy makers alike on whether government spending stimulates economic growth or otherwise, thus making the topic an ever-interesting research discourse. Some theories as well as past empirical studies have identified public expenditure as a major driver of economic growth through the channel of fiscal operations. For instance, according to the Keynesian view, government could reverse economic downturns by borrowing money from the private sector and returning same to the private sector through various spending programs. Thus, government expenditure, even of a recurrent nature can contribute positively to economic growth. On the other hand, endogenous growth models such as Barro, (1990), predict that only those productive government expenditures will positively affect the long run growth rate.

Public investment is essential for ensuring economic growth, sustainable development and poverty reduction. It increases the productive capacity of an economy, drives job creation, brings innovation and new technologies, and boosts growth. Solow (1956) in Jhingan (2006) differs from this by adding that 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 growth rate, although in general there will be transitional growth effects. Although increase in government expenditure may not have the intended salutary effect in developing countries given high and often unstable levels of public debt. The government consumption may crowd-out private investments, dampen economic stimulus in short run and reduce capital accumulation in the long run. In the view of Vedder and Gallaway (1998), as government expenditures grows, the law of diminishing returns begins operation and beyond some point, further increase in government expenditures contribute to economic stagnation and decline.

Basic public finance holds that the most critical function of the government expenditure is to maintain a reasonable degree of price stability and an appropriate rate of economic growth that will spur the economy to achieve full development potential and stabilization (Musgrave & Musgrave 1989). Hence, public expenditure is a key instrument used by the government especially in developing countries to promote economic growth which provides the drive in pursuit of sustainable development. Economic growth brings about a better standard of living through provision of better infrastructure, health, housing, education services as well as improvement in agricultural productivity and food security (Musaba, Chilonda & Matchaya 2013). Nearly all the sectors in the national economies of developing countries demand for more budgetary allocations every year. However, in view of the competing uses of public funds, there is a need to investigate the appropriate way of allocating funds and to examine the effect of the composition of public expenditure on economic growth in most countries (Musaba, Chilonda & Matchaya 2013).

In addition, a further justification for continued empirical interest in investigating the effect of government expenditure on economic growth is that previous studies have produced varying results. Some studies suggest that increase in government expenditure on socio-economic and physical infrastructures impact on long run growth rate. For instance, government expenditure on health and education raises the productivity of labour and increase the growth of national output. Similarly, expenditure on infrastructure such as roads, power etc reduces production costs, increase private sector investment and profitability of firms, thus ensuring economic growth (Barro, 1990; Barro & Sali-Martin, 1992). On the other hand, observations that growth in government spending is accompanied by a reduction in income growth has given rise to the hypothesis that the greater the size of government intervention, the more negative it impacts on the economic growth (Glomm, &

Ravikumar, 1997; Abu & Abdullah, 2010).

In Nigeria, the government has a major task to provide essential goods such as education, health, roads, communication, energy as well as improve agricultural productivity to the welfare of its population of about 160 million people, most of whom (about 70 percent) live below the poverty line (Abu and Abdullah, 2010; Aladejare, 2013). Indeed, the major development objective of the government of Nigeria as expressed in various past and present development plans and strategies has revolved around poverty alleviation and sustainable economic growth and development.

Despite the rise in government expenditure in Nigeria over these years, the inefficiencies in the management of public expenditure, which were ignored or camouflaged by substantial government transfers in the form of subsidies or subventions became very glaring in the 1980s owing to severe resource constraints confronting governments. The decline in government earnings from primary product exports and limited domestic savings narrowed the revenue base for financing the inefficiencies in public sector operations. The resort to borrowing for financing large government budgetary deficits led to, and even compounded such macroeconomic problems as excessive debt burden (Both domestic and foreign), high inflationary pressures, exchange rate overvaluation and external imbalance. Public sector borrowing from the domestic credit market also tended to crowd-out private sector investments (Glomm, and Ravikumar, 1997; Abu and Abdullah, 2010; Aladejare, 2013).

In Nigeria, examining the effectiveness of the various components of public spending still requires a bit more emphasis. This borne out of the observation that the primary objective of fiscal policy is management of aggregate demand (Diamond, 1990; Aladejare, 2013). Generally, this view places emphasis on aggregate government expenditure and appears reluctant to differentiate between or among various components of public expenditures. From this policy perspective, the prime fiscal indicator used to judge the appropriateness of fiscal policy has been the overall deficits as far as short-term demand management is concerned. Thus, it is immaterial whether the deficit is reduced by cutting the capital or recurrent expenditures. This is inevitably in a short-term view of fiscal adjustment. This, however, contrasts with those that are concerned with the long-term effect whose emphasis is on growth (Aladejare, 2013).

This paper intends to contribute to literature on how GDP responds to the forces of government sectoral expenditure in terms of magnitude and direction in the light of evidence from Nigeria. Put succinctly, it is still of empirical relevance to determine how GDP behaves given the effect of government sectoral expenditure. This is often due to the disparities between theoretical positions and practical outcomes of public expenditure management and growth.

This paper is therefore, aimed at analyzing the existing link between public sectoral outlays and economic growth in Nigeria with a view to recommending the appropriate policy antidote to embark upon. The logical point of entry is to investigate the nature of the relationship between variables to determine the short run and the long run relationship between government spending on Education, Health and Agriculture and the growth of GDP in Nigeria. To achieve this intention, the work is structured in 6 sections. Following this introductory section is section 2 which reviews related literature. Sections 3 and 4 look at the Methodology of the study and discussions of results respectively. Section 5 contains policy recommendations while section 6 concludes the study.

2. Empirical Review

Seymour and Oral (1997) examined the impact of government expenditure on economic growth in OECD using four econometric regressions models and a fixed effect model that incorporates the distortion effects of government activities. Estimation followed the least square method. The results indicate that government expenditure relative to housing, roads, education is positively and significantly related to economic growth. The non-linear term for education was highly significant and positively correlates with endogenous growth. The non-linear term for health was found significant also but negative, implying that health expenditure can be distortionary.

In another study, Josaphat and Oliver (2000) examined the impact of government spending on economic growth in Tanzania using time series data for 32 years. They formulated a simple growth accounting model, patterned after Ram (1986) model in which total government expenditure is disaggregated into expenditure on investment, consumption spending and human capital investment spending. It was found that increase in productive or investment expenditure has a negative impact on growth while consumption expenditure relates positively to economic growth. The results reveal that expenditure on human capital investment was not significant implying that government investment in trainings and education in Tanzania has not been productive during the period covered in the research.

Nitoy, Emmranul and Osborn (2003), examined the growth effect of government expenditure for 30 developing countries including Nigeria over two decades (1970s and 1980s) with particular focus on sectoral expenditures. The study reported that only government sectoral expenditure on education significantly associated

with economic growth. It further added that government capital expenditure is positively and significantly correlated with GDP. Although government expenditure in other sectors such as transport, communication and defense were found at the primary level to have significant relationship with economic growth, they do not survive when other sectoral expenditures were incorporated into the analysis.

Similarly, Ranjan and Shama (2008) examined the effects of government development expenditure on economic growth of India during the period 1950-2007. The authors reported a significant positive impact of government expenditure on economic growth. They also found the existence on cointegration among the variables. This implies that government spending is a determinant of economic growth both in the shortrun and in the longrun. Cooray (2009), used an econometric model that takes government expenditure and quality of governance into consideration, in a cross-sectional study that include 71 countries. The result revealed that both size and quality of the government expenditure are associated with economic growth.

Gregariou and Ghosh (2007) used the heterogeneous panel data to investigate the impact of government expenditure on economic growth. It reported that countries with large government expenditure tend to experience higher economic growth but the effect varies from one country to another. Abdullah (2000) evaluated the relationship between government expenditure and economic growth in Saudi Arabia. The study affirmed that the size of government expenditure is an important determinant of the performance of the economy and advised that government should increase its spending on infrastructures, social and economic activities. It further recommended that government should encourage and support the private sector in order to accelerate economic growth. In another related study, Oyinlola (1993), analyzed the relationship between the Nigeria's defense sector and economic development and reported a positive impact of defense expenditure on economic growth.

Fajingbesi and Odusola (1999) investigated the relationship between government expenditure and economic growth in Nigeria. The estimation results revealed that real government capital expenditure has positive and significant influence on real output while real government recurrent expenditure has positive but insignificant effect on economic growth. Ogiogio (1995) reported a long run relationship between government expenditure and economic growth. The result also showed that recurrent expenditure exerts more influence than capital expenditure on economic growth, implying that capital expenditure are either distorted or not spent on growth stimulating sectors.

Easterly and Rebelo (1993), studied the impact of government expenditure and income on GDP and found that government activities influence the direction of economic growth in Nigeria. Komain and Bralmasrene (2007) studied the relationship between government expenditure and economic growth in Thailand by employing Granger causality test and observed that government expenditures and economic growth are not co-integrated but causality runs from government expenditure to economic growth thus indicating a uni-directional relationship. The result demonstrates a significant positive effect of government spending on economic growth.

Olugbenga and Owoye (2007) examined the relationship between government expenditure and economic growth for 30 OECD countries for the period 1970-2005 and found the existence of a long run relationship between government expenditure and economic growth. Abu-Bader and Abu-Qarn (2003) examined the direction of causality between government expenditures and economic growth for Egypt, Israel and Syria, employing variance decomposition and multivariate co-integration approach. The study observed a bi-directional and long run negative relationship between government spending and economic growth.

Donald and Shuanglin (1993) examined the effects of various forms of budgetary expenditure on economic growth for 58 countries and found that government budgetary expenditure on education and defense exert positive influence on economic growth. Akpan (2005) adopted a disaggregated approach to determine the components of government expenditure that enhance economic growth and those that do not. The paper concluded that there was no significant relationship between most components of government expenditure and economic growth in Nigeria.

Nurudeen and Usman (2010) observed that rising government expenditure had not translated to meaningful development as Nigeria still ranks among world's poorest countries. In an attempt to investigate the effect of government expenditure on economic growth, the study employed a disaggregated analysis. The results reveal that government total capital expenditure, total recurrent expenditures, and government expenditure on education have negative effect on economic growth. On the contrary, rising government expenditure on transport, communication, and health result to an increase in economic growth.

Musaba, Chilonda and Matchaya (2013) examined the impact of government sectoral expenditure on economic growth in Malawi. Cointegration analysis in the context of an error correction model was employed to estimate the growth effects of government expenditures in agriculture, education, health, defence, social protection and transport and communication. The short run results showed no significant relationship between government sectoral expenditure and economic growth. The long run results showed a significant positive effect on economic growth of expenditure on agriculture and defence. The expenditures on education, health, social protection and transportation and communication were negatively related to economic growth.

Okoro (2013) using time series data of 32years period (1980- 2011), investigated the impact of government spending on the Nigerian economic growth. Employing the ordinary least square multiple regression analysis to estimate the model specified and with the application of Granger Causality test, Johansen Cointegration Test and Error Correction Mechanism, the result showed that there exist a long-run equilibrium relationship between government spending and economic growth in Nigeria.

Olulu, Erhieyovwe and Ukavwe (2014) studied the empirical relationship between government expenditure and economic growth. Government expenditure was disaggregated into, total expenditure, public debt expenditure, expenditure on health and government expenditure on Education. The ordinary least square (OLS) was applied to ascertain the relationship between variables. Results of the test show that there is an inverse relationship between government expenditures on health and economic growth; while government expenditure on education sector, is seen to be insufficient to cater for the expending sector in Nigeria. It was also discovered that government expenditure in Nigeria could increase foreign and local investments.

Yusuf et al (2015) investigated the impact of government expenditures on adjudged critical sectors on economic growth in Nigeria. The study employed quantitative analysis by the use of Auto-Regressive Distributed Lag model (Bound Test Co-integration Approach) while other necessary residual tests were conducted and the analysis was found to be reliable. The specific ARDL estimates of the analysis revealed that government expenditure on defence retards economic growth and government expenditure on agriculture promotes economic growth. Government expenditure on education and transport/communication was found to have no impact on economic growth in the long-run. While in the short run, none of the government expenditure on these sectors contributed to the growth objective.

3. Methodology

3.1. Model Specification

Following the theoretical underpinning and empirical review earlier made in this paper, we can hypothesize that GDP is a positive function of government spending on Education, Health and Agriculture. Thus, our model can be explicitly specified as follows:

$$\text{In GDP} = \beta_0 + \beta_1 \text{InGEE} + \beta_2 \text{InGEH} + \beta_3 \text{InGEA} + \mu \text{ ---------- (3.1)}$$

Where GDP = Gross Domestic Product, GEE = Government Expenditure on Education, GEH = Government Expenditure on Health, GEA = Government Expenditure on Agriculture, μ = Stochastic error term, β_0 = Constant intercept term, β_1- β_3 = Coefficients of explanatory variables, In = Natural logarithm, $B_1 > 0$; $\beta_2 > 0$ and $\beta_3 > 0$.

3.2 Estimation Technique

This paper employs the Ordinary least squares (OLS) technique, cointegration and error correction techniques for data obtained from the CBN statistical bulletin 2014 for the period 1985 – 2014. These methods are expected to overcome the problem of spurious regression while at the same time provide consistent and good estimates of both long run and short run elasticities that satisfy the properties of the classical regression method. The techniques are also unique and preferred to the traditional adaptive expectation and partial adjustment models because the latter are associated with the problems of spurious regression, inconsistent, and indistinct short run and long run elasticity estimates. The first stage of cointegration and error correction technique is the test for unit root. The whole analysis then proceeds from it.

The aim of the cointegration analysis is to establish long run equilibrium relationship between variables. In the Engle-Granger cointegration analysis, variables of consideration are said to be cointegrated if in the regression of one variable on the others, their residuals as the proxy for their combination are integrated less than original variable. Example, if the variables are integrated of order one I(1), then, their residuals should be integrated of order zero, I(0). Also, cointegration exist among variables if they are integrated of the same level. The implication of this analysis is that deviation or drift may occur between the variables, but this is temporary as equilibrium holds in the long run for them. When the cointegration of these variables is confirmed, it portends that a non-spurious long run relationship exist. When this is combined with the error correction model (ECM), consistent estimates of both long run and short run elasticities is evident. This research work employs the Johansen reduced rank procedure in cointegration analysis.

The Error correction model (ECM) represent an alternative way of presenting long run equilibrium relationship between variables. It shows the dynamic error analysis of the cointegrated variables. Thus, in this paper, the first step to the ECM analysis is the estimation of the static GDP function given by equation 3.1. Upon rejection of the null hypothesis of no cointegration, the lagged residuals from the cointegration equation are imposed as the error correction term (ECT_{t-1}) in an error correction equation.

This is given thus;

$$\Delta \text{InGDP} = \beta_0 + \beta_1 \Delta \text{InGEE} + \beta_2 \Delta \text{InGEH} + \beta_3 \Delta \text{InGEA} + \beta_4 ECT_{t-1} + \mu_t \text{ ----------3.2}$$

Where Δ is the difference operator, ECT_{t-1} is the vector of stationary residuals from the cointegration equation

3.1, μ is the error term.
All variables in equation 3.2 are I (0) or stationary, this implies that the t-ratio can now be applied to test for the significance of error correction term or any of the explanatory variables.
The error correction term in the equation represents the speed of adjustment from one period to another. If it is significant carrying with it a negative sign and that all other variables in equation 3.2 are jointly significant, then variables jointly are said to have significant effect on the dependent variable.

4. Results and Discussion

In this section, we start by discussing the order of integration of the series. It is important as an integrated series accumulates past effects, which means that a disturbance to the series does not return to any mean value, hence non-stationarity. The order of such a series is then determined by the number of times it must be differenced to make it stationary. If two or more series are integrated of the same order, then a linear relationship can be estimated. When we examine the order of integration of the linear relationship, it is similar to test for the null hypothesis that there is no cointegration against the alternative that there is cointegration. The results of the order of integration are presented in table 4.1.

4.1 Unit Root

In table 4.1, we have the results for GDP, GEE, GEH and GEA. The tests were carried out on level and were performed by including both a constant and a deterministic trend in the regression. The critical value for ADF tests at 5 percent level of significance is -2.938987.

Table 4.1: Unit Root Tests Statistic: ADF Test Results

Variables	ADF Stat at Level	Critical Value at 5%	Order of Integration
In GDP	-4.023426	-2.938987	I(0)
In GEE	-3.033426	-2.938987	I(0)
In GEH	-5.350633	-2.938987	I(0)
In GEA	-4.683567	-2.938987	I(0)

Source: Researcher's computation

From the table 4.1 above, it can be seen that the hypothesis of non-stationarity is rejected for all the variables at 5% level of significance. This shows that all the series are integrated of order zero, I(0). By implication, it follows that we can proceed to the second stage of testing for cointegration relationship among variables.

4.2. Cointegration Analysis

The main objective is to test for the stationarity of the linear relationship of the variables whose order of integration has been determined. For cointegration analysis, Johansen reduced rank approach was employed. The results of the cointegration are given in table 4.2 below:

Table 4.2: Cointegration Test Results In GDP, In GEE, In GEH, In GEA

Eigenvalue	Max - Eigen Stat.	5% Critical Value	Probability
0.776940	57.01197	33.87687	0.0000
0.544821	29.90847	27.58434	0.0247
0.345533	16.10949	21.13162	0.1115
0.229608	9.912542	13.841460	0.1612

Source: Researcher's Eviews computation

From the results in table 4.2, the long run test indicates two cointegrating equations at 5% level of significance. This means rejection of the null hypothesis of no co-integration among the variables in the series.

4.3. Error Correction Model (ECM)

Following from the long run tests, the results of the error correction model are presented in Table 4.3. Here the model was regressed on the level data of all variables plus the lagged value of the error term.

Table 4.3: Error Correction Model (ECM) Results

Dependent Variable: In GDP				
Variable	**Coefficient**	**Std.error**	**t-statistic**	**Prob.**
C	10.26916	0.16732	61.37277	0.0000
D(In GEE)	0.122046	0.058751	2.077339	0.0478
D(In GEH)	0.062131	0.043322	1.434167	0.0824
D(In GEA)	0.229298	0.072366	3.095790	0.0332
ECT_{t-1}	-0.306412	0.802507	-2.619045	0.0401

Source: Result from Eviews Computation

R –Squared = 0.848900, Adjusted R-squared = 0.836700, F – Statistic = 160.9364, Prob. (F-Statistic) =

0.000000 Durbin – Watson Stat = 1.790388

The results in table 4.3 show that our model has a high coefficient of determination. This can be seen from the R-squared of about 85 percent and the Adjusted R-squared of about 84 percent. The fitness of every regression results is based on its R-squared. The implication of this is that about 85 percent of total variations in GDP is accounted for by variations in GEE, GEH and GEA.

The value of the F-statistic (160.9364) with the P-value (0.000000) shows that the overall regression model is statistically significant at 1% level of significance. This implies that all the explanatory variables in our model jointly explain variations in the dependent variable (GDP).

The estimation results also indicate that all the explanatory variables conform to apriori expectation and are statistically significant at 10%. This implies that a percentage increase in Government Expenditure on Education (GEE) would lead to 0.12 percent increase in the level of GDP in Nigeria. Also, a percentage increase in the government expenditure on Health, would mean 0.06 percent increase in the level of GDP in Nigeria. An increase of 1 percent in government expenditure on Agriculture, would increase GDP by 0.23 percent on the average.

The Durbin-Watson statistic of 1.79 suggests the absence of serial dependence. In other words, our model is free from the problem of autocorrelation. This indicates that there is no correlation among the error term between periods. The closer the Durbin-Watson is to 2, the better the model.

The coefficient of the error correction term of about 0.3064 is statistically significant at 5% level of significance with the expected negative sign. A significant error term with the right sign indicates a strong feedback effect of deviation of GDP from its long run growth path. The value of the coefficient of the error term represents the speed of adjustment. The coefficient (0.3064) of the error term shows that about 31 percent of the discrepancies between actual and equilibrium value of the GDP is corrected in each period.

5. Recommendations

The essence of research is to proffer solutions to existing problems. This research has made some findings and based on these findings, the study puts forward the following recommendation:

I. Government at all levels should ensure that is given needed attention as this study had found it to be productive sector. Improved capital expenditure should be shifted to the educational sector to put in place more learning facilities. Training programmes should be initiated to produce higher skilled labour for a better productive economy.

II. Health sector is another critical sector; there should be an improved collaboration between government and private sector to intensify efforts at revitalizing the existing facility to engender a healthier workforce.

III. Agriculture employs the greater part of the population but has faced increased neglected since the discovery of oil. This has to change through committed public-private intervention to transform the fortunes of the sector and guarantee job creation and food security.

IV. Government capital spending should be prudently utilized to avoid wasteful diversion of funds from productive to unproductive projects.

6. Conclusion

This study examined the effect of government sectoral spending on economic growth in Nigeria. It estimated GDP as a function of government expenditure on Education, Health and Agriculture in Nigeria for the period 1985 – 2014. Empirical results showed that government sectoral spending in Nigeria has positive impact on economic growth while there is a long run relationship between GDP and government sectoral spending in Nigeria. The study also found evidence of stability of both long run and short run GDP during the investigated period. The implication of this from the stand point of policy requires that government spending should be properly channeled to bring the desired result in the economy.

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