Government spending and economic growth: evidence from Nigeria

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GOVERNMENT SPENDING AND ECONOMIC GROWTH: Evidence From Nigeria

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Abstract

This study examines the relationships and dynamic interactions between government capital and recurrent expenditures and economic growth in Nigeria over the period 1961 to 2010. Real Gross Domestic Product (RGDP) was used as a proxy for economic growth in the study.The analytical technique of Vector Error Correction Model and Granger Causality were exploited. Based on the result findings, it is evident that the Wagnerian and Rostow-Musgrave hypothesis were applicable to the relationship between the fiscal variables used in this study in Nigeria. The study therefore recommended among others that: there should be effective channeling of public funds to productive activities, which will have a significant impact on economic growth; there should be joint partnership between the government and the private sector in providing essential infrastructural services that will promote economic growth and development, etc.

Keywords: Economic growth, Capital expenditure, Recurrent expenditure, Vector Error Correction, Causality.

1.0 Introduction

In the 1970s and 1980s, most developing countries experienced serious fiscal imbalance. This manifested in rapid growth in public spending which overshot domestic revenues. In Nigeria for example, while the total federally-collected revenue was N634 million in 1970, the total federal government expenditure in nominal terms was N903.9 million (CBN statistical bulletin, 2009). The resulting fiscal crises had been adjudged to be unsustainable in all the affected countries. Consequently, these countries resorted to the adoption of stabilization and adjustment programmes which required considerable changes in fiscal policy aimed at both reducing unsustainable fiscal deficits and enhancing the growth and distributional impact of public spending. Two options readily come to mind in this respect. First, revenue-increasing measures can be used to reduce the fiscal deficit. But, given the difficulties of increasing tax revenues in the short-run and possible concerns about the overexpansion of the public sector and crowding out of private activities, the second option-expenditure reductions-is often heavily relied upon to

redress fiscal deficits. While such reductions are necessary, across-the-board reductions and other public spending entrenchments that do not take into consideration the growth implications of each of the components of public expenditures can result in unacceptable economic and social costs.

In the absence of robust private sector, African governments, on attainment of political independence, assumed the role of a prime mover of their economies. The public sector then became a channel through which governments could deliver social services and goods, provide socio-economic infrastructure, expand the rate of industrialization and create employment opportunities. This perceived role of the public sector in the growth and development process led to tremendous growth in public expenditure, and consequently, the public sector. A lot of public enterprises were established by various tiers of government in various sectors of the economy, while several privately-held companies were nationalized. In Nigeria, for example, total federal government expenditure in nominal terms rose from about N163.9 million in 1961 to N1529.2 million in 1973 and further to N2740.6 million and N14968.5 million in 1974 and 1980 respectively (CBN statistical bulletin, 2009); representing on average, an annual growth of about 52 per cent during the period. African governments were able to sustain these high levels of public expenditure in the 1970s through the early 1980s because of the windfall gains from commodity boom which they enjoyed during the period. However, the enthusiasm which prompted the massive intervention of African governments in the working of their economies began to fade in the 1980s when sagging commodity prices in the world market resulted into drastic reduction in government earnings. The self-sustaining growth and several other socio-economic objectives of government were, unfortunately, not achieved as a greater part of the government expenditure was channelled into projects that were neither properly conceived nor properly managed (Adubi, et al. 1995).

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 commodity 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.

In Nigeria, like the rest of the developing world, examining the productiveness of the various components of public spending has always been given less attention. This is borne out of the observation that the primary objective of fiscal policy is management of aggregate demand (Diamond, 1990). Generally, this view places emphasis on aggregate government expenditure and appears reluctant to differentiate between or among the 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, it is immaterial whether the deficit is reduced by cutting the capital or current expenditures. This is inevitably in a short-run view of fiscal adjustment .This, however, contrasts with those that are concerned with the long-term effect whose emphasis is on growth.

To the proponents of long-term fiscal adjustment, the way in which public expenditures are allocated has significant effects on both economic growth and poverty alleviation. Thus, only outlay that is directly related to growth must be protected from across-the-board spending cuts aimed at deficit reduction. With reduced or tightly controlled real public spending, there is a greater need to ensure that scarce public funds are allocated to the highest priority areas and used more efficiently. This, thus, implies that, before any meaningful public spending policy could be embarked upon, a thorough empirical analysis of the link between growth and public expenditure is imperative.

The mismatch between theoretical expectations and practical performance in public expenditure management is usually a derivative of the lack of comprehension of public expenditure relationships and related issues. This paper is therefore, aimed at analyzing the existing link between public outlays and economic growth in Nigeria with a view to recommending the appropriate expenditure reforms to embark upon.

The objectives of this paper is therefore, to investigate the impact of current and capital outlays of the government on economic growth and to examine the extent to which government expenditure influences economic growth in Nigeria from 1970-2009. The granger causality and ordinary least sqaure method are being adpted in the course of this study.

Following the introduction, the rest of the paper is organised into five sections. Section two gives a brief background into the study. In section three, the paper attempts to examine the relevant literature to the study and provides the theoretical framework; section four deals with estimation technique and methodology, section five shows the empirical research analysis and section six gives the conclusions and study recommendations.

2.0 Background to the Study

Over the past decades, the public sector spending has been increasing in geometric terms through government various activities and interactions with its Ministries, Departments and Agencies (MDA's), (Niloy et al. 2003).

The size and structure of public expenditure will determine the pattern and form of growth in output of the economy. The structure of Nigerian public expenditure can broadly be categorized into capital and recurrent expenditure. The recurrent expenditure are government expenses on administration such as wages, salaries, interest on loans, maintenance etc., whereas expenses on capital projects like roads, airports, education, telecommunication, electricity generation etc., are referred to as capital expenditure. One of the main purpose of government spending is to provide infrastructural facilities and the maintenance of these facilities requires a substantial amount of spending. Analysis of the relationship between government spending on public infrastructure and economic growth is especially important in developing countries, most of which have experienced increasing levels of public expenditure overtime (World Development Report, 1994). Expenditure on infrastructural investment and productive activities (in State-Owned Enterprises) ought to contribute positively to growth,

whereas government consumption spending is anticipated to be growth-retarding (Josaphat and Oliver, 2000).

However, economies in transition do spend heavily on physical infrastructure to improve economic welfare of the people and facilitate production of goods and services across all sectors of the economy so as to stimulate rapid growth in aggregate output. Empirical studies have found that there exists positive correlation between industrialization and public infrastructural facilities. Manufacturing industries do consider infrastructure services or facilities before locating their production base in order to gain large economies of scale and reduce cost of production. Also, to increase total industrial output at a cheaper price in the economy. Following the World Bank's Development Report (1994), developing countries invest $200 billion a year in new infrastructure-4 percent of their national output and a fifth of their total investment. The result has been a dramatic increase in infrastructure services-for transport, power, water, sanitation, telecommunications, and irrigation. The provision of infrastructural services to meet the demands of business, households, and other users is one of the major challenges of economic development in developing countries like Nigeria.

2.1 Nigerian Economy in Perspective.

Structurally, the Nigerian economy can be classified into three major sectors namely primary/agriculture and natural resources, secondary—processing and manufacturing, and tertiary/services sectors. The economy is characterized by structural dualism. The agricultural sector is an admixture of subsistence and modern farming, while the industrial sector comprises modern business enterprises which co-exist with a large number of micro-enterprises employing less than 10 persons mainly located in the informal sector. The agricultural sector has not been able to fulfill its traditional role of feeding the population, meeting the raw material needs of industries, and providing substantial surplus for export. Indeed, the contribution of the sector to total GDP has fallen over the decades, from a very dominant position of 55.8 per cent of the GDP in 1960-70 to 28.4 per cent in 1971-80, before rising to 32.3, 34.2 and 40.3 per cent during the decades 1981-90, 1991-2000 and 2001 – 2009, respectively (See table 2.1 below). The fall is not because a strong industrial sector is displacing agriculture but largely as a result of low productivity, owing to the dominance of peasant farmers and their reliance on rudimentary farm equipment and low technology. Another feature of the sector is under-capitalization which results in low yield and declining output, among others.

Table 2.1 Sectoral Contributions to GDP

Activity Sector	1960-1970	1971-1980	1981-1990	1991-2000	2001-2009
1.Agriculture	55.8	28.4	32.3	34.2	40.3
2. Industry	11.3	29.1	41.0	38.6	28.4
3.Manufacturing	6.6	7.3	6.1	4.9	3.9
4.Building & Construction	4.8	8.3	2.3	1.8	1.8

5.Wholesale & Retail Trade	12.8	17.6	14.5	13.8	14.0
6.Serviecs	15.3	16.5	9.8	11.5	15.5
Total Value Added	100.0	100.0	100.0	100.0	100.0
Diversification Index	0.2	0.4	0.4	0.4	0.3

Source: National Bureau of Statistics

The industrial sector comprises the manufacturing, mining (including crude petroleum and gas) and electricity generation. Prior to independence in 1960, the Nigerian economy was mainly agrarian. On attainment of independence, the Nigerian government embarked on the programme of transforming the country into an industrial economy. The Nigerian manufacturing sub-sector is made up of large, medium and small enterprises, as well as cottage and hand-craft units. In spite of spirited efforts made to boost manufacturing output and various policy regimes, manufacturing has not made any significant contribution to the growth of the economy. Industry as a whole contributed only 11.3 per cent of the GDP in 1960-70, growing significantly in the next two decades to a high of 41.0 per cent in 1981-1990, owing largely to the crude petroleum and gas production during the decades. The contribution contracted to 38.6 per cent in the 1990s and further to 29.4 per cent during 2001-2009. These numbers, in fact, belie the poor contribution of the manufacturing sub-sector to aggregate output in Nigeria compared with its peers in Asia and Latin America. Indeed, the contribution of the manufacturing component has on average been below 5.0 per cent in the last two decades. Even the relatively high contribution of oil sector to the industrial sector contribution is being driven largely by crude production and not by the associated 'core industrial' components like refining and petrochemicals. The contribution of wholesale and retail trade and services has more or less remained stable while that of building and construction rose sharply from 5.3 per cent in the 1960s to 8.3 per cent in the 1970s, but fell consistently, thereafter, to 1.8 per cent during 2001-2009. During and some few years after SAP, the main manufactured exports were textiles, beer and stout, cocoa butter, plastic products, processed timber, tires, bottled water, soap and detergents as well as iron rods. However, some of these products have disappeared from the export list owing to poor enabling environment.

The components of the mining sub sector in Nigeria are crude petroleum, gas and solid minerals. Prior to the advent of petroleum minerals such as coal and tin were the main mineral exports. However, with the emergence of crude oil, the relative importance of solid minerals diminished. Indeed, since the 1970s, the largest mining activity has been crude oil production, which became dominant in terms of government revenue and export earnings. Lately the production of gas has gained increased attention, as the export potential of gas has reduced the dominance of crude oil.

2.2 Performance Trends

The average growth rate of real GDP, which was 5.9 per cent in the period 1960-70, rose to 8.0 per cent in 1971-73 (See table 2.2 below). The Nigerian economy expanded rapidly, as oil

production and export rose phenomenally. However, activities in the service sub-sector were relatively modest even though marketing and advertising, which covers distributive trade, lagged behind. The average GDP growth rate later dropped to 3.2 per cent during 1976-80. This level was sustained in the period 1982-90 following

Table 2.2 Average Growth Rate of Real GDP (Percentages)

Period	Real GDP
1960-1970	5.9
1971-1973	8.0
1976-1980	3.2
1982-1990	3.2
1991-1998	1.9
1999-2007	8.3
2008-2009	6.3

Source: National Bureau of Statistics

improved performance in agricultural and industrial sub-sectors. Suffice it to state that GDP responded favorably to the economic adjustment policies of the eighties during which the SAP and economic liberalization were adopted. Thus, annual GDP grew from a negative 0.6 per cent in 1987 to 13.0 per cent in 1990. However, the average growth rate of real GDP dropped to 1.9 per cent during 1991-1998. This was in spite of the favorable developments in the agricultural and services sub-sectors of the economy. Real GDP growth rate rebounded to 8.3 per cent during the period 1999-2007, reflecting improved economic policy of NEEDS era. Despite the decline in real GDP growth rate to 6.3 per cent in the period 2008-2009, the major drivers remained agriculture, wholesale and retail trade, and services sectors. Indeed, the last decade has been a period of rebirth as affirmed by almost all macroeconomic indicators but the growth rate has not been high enough to push down the poverty profile.

Indeed, the Nigerian economy has not experienced remarkable transformation and restructuring. Equally important is the indication that since 1999, Nigeria has become a trading outpost for goods produced elsewhere with little domestic transformation of the output of primary sectors by the secondary sector. This is particularly so since the Nigerian agriculture is really peasantry and the high contributions of tertiary sector to output suggest that the sector is not really servicing the Nigerian economy but, indeed, the economies of her trading partners. Thus, the Nigerian economy is still dominated by the primary sector, followed rather closely by the tertiary sector with the contribution of the secondary sector remaining insignificant. Little wonder the diversification index remained below 0.4 per cent through the review period, the barrage of reforms notwithstanding.

The Nigerian economy is import dependent with very little non-oil exports. It relies heavily on crude oil and gas exports with other sectors trailing far behind. For example, crude oil accounts for about 90 per cent of foreign exchange earned by the country while non-oil exports account for the balance. The economy is, therefore, susceptible to shocks in the oil industry. In recent times, these shocks have been caused by either developments in the International crude oil market or the restiveness in the Niger Delta region of the country. Agriculture and other mining (besides oil and gas) have been abandoned to the rural poor. Economic and social infrastructure, especially power is grossly dilapidated. The power sector is generally recognized as a binding constraint on Nigerian economy. Poor corporate governance, both in the public and private sectors have led to high incidence of corruption and inequity in income distribution. A review of the statistics from comparable countries shows that the share of primary commodities in total exports is 20.0 percent for Malaysia, 24.0 per cent for India, 12.0 per cent for China. For developed countries it is 17 per cent for Britain and America and 9 per cent for Japan. In Nigeria, the primary sector contributes 99 percent of exports with only 1.0 per cent coming from the secondary sector.

2.3 Growth Drivers

In Nigeria, Agriculture dominates the primary sector, which dominates the entire economy. The population of the country has grown by about 150.0 per cent between 1963 and 2006, approximately 3.75 per cent per annum. A simple calculation shows that for the per capita income to remain the same as in the 1960s, every sector of the economy should at least have grown by the same percentage. But the agricultural sector – the mainstay of the economy – has declined in its contribution to the GDP, manufacturing has declined, building and construction has also declined, while the wholesale and retail trade as well as the services sectors have remained almost the same as in the 1960s. Applying the Harrod-Domar model, this implies that assuming a capital-output ratio of 5.0 per cent and a savings ratio of 15.0 per cent, the economy would grow at 3.0 per cent. Of course, the savings ratio depends on the difference between the population growth rate and the growth rate of the GDP (the economy). Table 2.2 above showed an average growth rate of real GDP of 5.3 per cent in the period 1960-2009. If the average population growth rate of 3.8 is deducted from 5.3, we are left with a GDP growth rate of 1.5 per cent out of which no meaningful savings can be made. In effect, the economy has not been growing in real terms over the years. For Nigeria to make a quantum leap, the economy has to grow by at least double digit rates for a sustained period of time.

3.0 Literature Review

3.1 Theoretical Framework

(a) Wagner's Law: Wagner's law is a principle named after the German economist Aldolph Wagner (1835-1917). The law predicts that the development of an industrial economy will be accompanied by an increased share of public expenditure in gross national product. Musgrave and Musgrave (1989) opined that as progressive nations industrialize, the share of the public sector in national economy grows continually. The theory states that there is a functional relationship between the growth of an economy, and the growth of the government activities; so that the government sector grows faster than the economy (Musgrave, 1969). Thus, all kinds of government, irrespective of their level of intentions (Peaceful or war), and size, indicate the same

tendency of increasing public expenditure. In other words, Wagner's law states that, as per capita income of an economy grows, the relative size of public expenditure grows, the relative size of public expenditure grows along with it. As the economy grows, there will be increase in the number of urban centres, with the associated social vices such as; crime, which require the intervention of the government, to reduce such activities to the bearest minimum. Large urban centres also require internal security, to maintain law and order. These intervention by the government have cost, leading to increase in public expenditure in the economy. (Ogba Likita, 1999).

(b) Peacock-Wiseman's Model: The displacement effect hypothesis expounded by T. Peacock and Jack Wiseman in their well-known 1961 monograph "The Growth of Public Expenditure" in the United Kingdom remains one of the most reliable explanations. According to Peacock and Wiseman's hypothesis, government spending tends to evolve in a step-like pattern, coinciding with social upheavals, notably wars. Jack Wiseman and T.Peacock, hereafter referred to as P-W, adopt a clearly inductive approach to explaining the growth of government expenditure. When P-W observed that expenditure over time appeared to outline a series of plateaus separated by peaks, and that these peaks coincided with periods of war and preparation for war they were led to expound the "displacement effect" hypothesis.

(c) Rostow-Musgrave model: Rostow and Musgrave, also carried out a research on the growth of public expenditure and conclude that at the early stages of economic development, the rate of growth of public expenditure will be very high, because government provides the basic infrastructural facilities (social overhead). And most of these projects are capital intensive, therefore, the spending of the government will increase steadily. The investment in education, health, roads, electricity, and water supply are necessities that can launch the economy from the traditional stage to the take off stage of economic development making government to spend an increasing amount with time in order to develop an egalitarian society (Ogba Likita, 1999).

3.2 Empirical literature

Ekpo (1995), regressed the disaggregated components of government capital expenditures on private investment, using ordinary least squares approach with annual data for 1960-90. The findings show that capital expenditures on transport and communication, agriculture, health and education positively influence private investments in Nigeria, which invariably enhances the growth of the overall economy. However, government capital expenditures on construction and manufacturing crowd out private investments. By implication, the private sector is better placed to invest in construction and manufacturing than the government. Ogiogio (1995), examines the growth impact of recurrent, capital and sectoral expenditures over the period 1970-93. The study observes the existence of long-run relationship between economic growth and government expenditures. Meanwhile, contemporaneous government recurrent expenditures have more significant effect than the capital expenditures while five-year lags of capital expenditures are more growth inductive. The study, thus, argues that for effective assessment of the effect of capital investment programmes on economic growth, one would require a five-year planning horizon. And lastly, the study also indicates that government investment programmes in socio-economic infrastructure provide a conducive environment for private-sector-led growth.

However, the fact that both government expenditures and economic growth are bicausally related makes any deductions from a single equation model invalid. This is owing to the possibility of

simultaneity bias. In order to avoid this problem, Odusola (1996), adopted a simultaneous equations model to capture the interrelationship between military expenditures and economic growth in Nigeria. It is observed from the study that aggregate military expenditure is negatively related to growth at 10 per cent significant level. And when decomposed into recurrent and capital military expenditures, the former was more growth retarding than the latter. The study, therefore, recommends that resource diversification away from military spending will have a positive impact on the economy. Oyinlola O. (1993), examined the relationship between the Nigeria's defence sector and economic development, and reported a positive impact of defence expenditure on economic growth.

Fajingbesi A.A. (1999), empirically investigated the relationship between government expenditure and economic growth in Nigeria. The econometric results indicated that real government capital expenditure has a significant positive influence on real output. However, the results showed that real government recurrent expenditure affects growth only by little. Fajingbesi and Odusola (1998), using vector autoregressive (VAR) method in their study of public expenditure and growth in Nigeria found that real capital expenditure positively and significantly affect real output while the effects of real recurrent expenditure was relatively marginal. They argued that contrary to the general notion of the significance of the implications of capital spending, the implications of recurrent spending are more significant because government spending in Nigeria is skewed toward recurrent expenditure.

Aigbokhan (1996), investigated the impact of government size on economic growth between 1960 and 1993 with a focus on the effects of the structural adjustment programme (SAP) introduced in July, 1986. Empirical estimates from the Aigbokhan study reported a bi-directional causality between government total expenditure and national income. This finding is weakened by the use of the Ordinary Least Square (OLS) regression analysis and augmented with the standard Granger-Causality testing approach. Using the Engle Granger two step procedure and standard causality tests, Essien (1997), found that the variables (public spending and real income) were not cointegrated and hence could not establish a long run relationship. In addition, causality tests performed on his models confirmed that public expenditure does not cause growth in income and there was no feedback mechanism.

Aregbeyen (2006), using Johansen cointegration and standard causality tests found a unidirectional causality from national income to total public expenditure i.e. a support for Wagner's Law. There is bi-directional causality between non-transfer public expenditure and national income. In contrast, the causality from national income to non-transfer public expenditure was found to be stronger than the reverse direction following variance decomposition analysis.

Babatunde (2007), tests Wagner's Law for Nigeria using annual time series data between 1970 and 2006. It adopts the Bounds Test approach based on Unrestricted Error Correction Model and Granger causality tests. Empirical results from the Bounds Test indicate that there exists no long-run relationship between government expenditure and output in Nigeria but found a weak empirical support in the proposition by Keynes.

B.C. Olopade and D.O. Olopade (2010), assessed how fiscal and monetary policies influence economic growth and development in Nigeria. The study found no significant relationship between most of the components of expenditure, economic growth and development. The

estimated result were mixed in particular, some of the variables were weakly significant as a result of none inclusion of effect of environmental impacts. However it provided important clues to the future direction of research.

Adetomobi J. O. and Ayanwale A.B (2006), examined education expenditure trend, higher education student enrolment and linkages with unemployment and economic growth in Nigeria. The results show that government funding is unstable and unpredictable, capital and recurrent funding since 1970 are only a very small fraction of the nation's budget, total enrolment contrasts sharply with level of employment because government could adequately cater for and the proportion of GDP that goes to education is still low.

Dr. Aruwa, Suleiman A.S. (2010), investigated the causal relationship between aggregate public expenditure and its compositions on economic growth for the Nigeria case over the period of 1979-2008. The study developed nine models hypothesizing nine versions of Wagner's law. Empirical methodology employed includes Augmented Dickey-Fuller stationarity test, the Johansen multivariate cointegration method and VAR-based Vector Error Correction modeling techniques for causality test. The effects of stochastic shocks of public expenditure and economic growth are explored. The causal relationship between public expenditure on economic growth was found to be Wagnerian, including public expenditure compositions except transfer expenditure that was found to have a bidirectional relationship with economic growth. Both productive and protective expenditures support Wagner's law for Nigeria case for the sample period. The public expenditure growth pattern is more protective than productive and is relegated to a passive role as a fiscal policy instrument. For fiscal policies to impact on longer-term economic performance, it would depend on the extent to which public expenditure is directed toward increasing the stock of productive physical and human capital. Public expenditures' contribution to an efficient allocation of resources within the economy and their potential to finance growth enhancing spending categories such as infrastructure, research and development, education, and health should be the focus of government's public expenditure management strategy. The introduction of a medium term planning and public expenditure framework based on productive than protective expenditures are necessary fiscal and public financial management reforms.

4.0 Estimation Technique and Methodology

Due to the properties of most time series, it is customary to perform unit root test on the series in the VAR model. If the series are stationary, then the results obtained from the VAR model are valid. However, if the series are non-stationary, then it becomes imperative to carry out cointegration test to verify whether the series in the VAR model are cointegrated or not. The prominent cointegration test for VAR model is the Johansen System Cointegration test. If the Johansen Cointegration test indicates the existence of cointegration in the model, then the VAR model gives the long run causality which is analogous to the long runrelationship in a single-equation model. Similarly, the short run dynamics of the VAR model are captured with the Vector Error Correction Model which is similar to the short run adjustment.

$$\Delta Y_t = \Gamma_1 \Delta Y_{t-1} + \Gamma_2 \Delta Y_{t-2} + \ldots + \Gamma_{p-1} \Delta Y_{t-p+1} + \Omega Y_{t-1} + \varepsilon_t \; ; \; t = 1, \ldots, T \qquad (1)$$

where $\Gamma_i = -(I - \Pi_1 - ... - \Pi_i)$, $(i = 1,..., p-1)$ and $\Omega = -(I - \Pi_1 - ... - \Pi_p)$ $\Omega = \phi\beta^1$

where ϕ represents the speed of adjustment to disequilibrium and β is a matrix of long-run coefficients. Therefore, the term $\beta^1 Y_{t-1}$ embedded in equation (1) is equivalent to the error correction term in a single-equation, except that $\beta^1 Y_{t-1}$ contains up to (n-1) vectors in a multivariate model.

It should be noted that we can determine the long run and short run causality from the VECM. If ϕ is statistically significant and different from zero, it implies the existence of long run causality. The short run causality is determined following the VAR- Granger causality framework. It is important to note the the following about the application of VECM.

- Assuming Y_t is a vector of non-stationary I(1) variables, then all the terms in equation (1) that involve ΔY_{t-1} are I(0) while ΩY_{t-1} must also be stationary for $e_t \sim I(0)$ to be white noise

- When all the variables in Y_t are in fact stationary, which is not likely to happen in reality, it implies that there is no problem of spurious regression and the appropriate modelling strategy is to estimate the unrestricted VAR model in levels.

- When there is no cointegration at all, it implies that there are no linear combinations of Y_t that are I (0) and consequently, Ω is an (n x n) matrix of zeros. In this case, the appropriate model is a VAR model in first- differences involving no long-run elements.

- When there exists up to (n-1) cointegration relationships, it implies that $\Omega Y_{t-1} \sim I(0)$ and therefore, there are linear combinations of Y_t that are I(0). In this instance, we can have r cointegration vectors in which case $r \leq (n-1)$. Therefore, we can estimate both unrestricted VAR and VECM to obtain long-run and short-run causal relationships respectively in addition to other useful diagnostics.

For simplicity, we can specify a tri-variate VECM model as follows:

$$\Delta RGDP_t = \alpha_1 + \sum_{i=1}^{p=4} a_i^{RGDP} \Delta RGDP_{t-i} + \sum_{j=1}^{p=4} \beta_j^{RGDP} \Delta GREC_{t-j} + \sum_{k=1}^{p=4} \gamma_k^{RGDP} \Delta GCAP_{t-k} + \varphi_1 ECM_{1t-1} + e_{1t} \quad (2)$$

$$\Delta GREC_t = \alpha_2 + \sum_{i=1}^{p=4} a_i^{GREC} \Delta RGDP_{t-i} + \sum_{j=1}^{p=4} \beta_j^{GREC} \Delta GREC_{t-j} + \sum_{k=1}^{p=4} \gamma_k^{GREC} \Delta GCAP_{t-k} + \varphi_2 ECM_{2t-1} + e_{2t} \quad (3)$$

$$\Delta GCAP_t = \alpha_3 + \sum_{i=1}^{p=4} a_i^{GCAP} \Delta RGDP_{t-i} + \sum_{j=1}^{p=4} \beta_j^{GCAP} \Delta GREC_{t-j} + \sum_{k=1}^{p=4} \gamma_k^{GCAP} \Delta GCAP_{t-k} + \varphi_3 ECM_{3t-1} + e_{3t} \quad (4)$$

Where:
RGDP = Real Gross Domestic Product

GREC = Government Recurrent Expenditure

GCAP = Government Capital Expenditure

α = Constant term

φ = Speed or rate of adjustment

p = lag length for the Unrestricted Error-Correction Model (UECM)
e = white noise disturbance error term

5.0 Data and Emperical Analysis

5.1 Data

This study is based on annual data and covers the period 1961 to 2010. The data were sourced from statistical bulletin of the Central Bank of Nigeria. The variables of interest in the study are: Gross Domestic Product, Government Recurrent Expenditure and Government Capital Expenditure.

5.2 Test for Stationarity

Table 5.1: Unit Root Test Applied to Variables

ADF Test					**Phillips- Perron Test**			
	Constant		Constant & Trend		Constant		Constant & Trend	
Variable Coefficient	t Statisitc	Decision Rule	t Statisitc	Decision Rule	t Statisitc	Decision Rule	t Statisitc	Decision Rule
lnrgdp	-5.336255***	I(1)	-5.390207***	I(1)	-5.336255***	I(1)	-5.390207***	I(1)
lngrec	-7.969576***	I(1)	-7.890611***	I(1)	-9.036161***	I(1)	-8.935082***	I(1)
lngcap	-7.380686***	I(1)	-7.326132***	I(1)	-7.403171***	I(1)	-7.347471***	I(1)

Source: Computed by Author
Note: Three asterisk denote rejection of the Null hypothesis of a unit root at 1% based on MacKinnon critical values.

This section show the unit root test result conducted on the variables. In the first step, the ADF and the Phillips-Perron test were conducted at level; with the variables found to be non-stationary. A further test for stationarity by first level of differencing shows the variables attaining stationarity; all at one per-cent level of significance. Hence the rejection of the null hypothesis of the presence of unit root in the variables. Therefore, we conclude that the variables included in the model are stationary at their 1st difference; since This study uses rejection of the null hypothesis of unit root at least by one test to assume a verdict of stationarity.

5.3 Cointegration test

Table 5.2: Johansen tests for cointegration

Trend: constant				**Number of obs =**	**48**
Sample: 1963 - 2010				**Lags =**	**2**
maximum rank	**parms**	**LL**	**eigenvalue**	**trace statistic**	**5% critical value**
0	**12**	**1.8367851**	**.**	**25.3635***	**29.68**
1	**17**	**11.662068**	**0.33594**	**5.7130**	**15.41**
2	**20**	**14.500482**	**0.11154**	**0.0362**	**3.76**
3	**21**	**14.518559**	**0.00075**		

Source: Computed by Author

In table 5.2 above, the trace statistic indicate one cointegrating equation. Denoting the rejection of the null hypothesis of no cointegrating relationship between the fiscal variables at 5 per cent level of probability. The existence of a cointegrating relationship indicates that there exist a long run relationship between the fiscal variables.

5.4 Vector Error Correction Analysis

Table 5.3: Tabulated VEC results.

Standard errors in [ ]

	lnrgdp	Lngrec	Lngcap
lnrgdp(-2)	0.187893 [0.1331104]	0.2288762 [0.2196676]	0.9054884 [0.267866]
lngrec(-2)	-0.2508529 [0.1079581]	-0.1758298 [0.1781596]	-0.3106025 [0.2172505]
lngcap(-2)	0.0892784 [0.0705827]	0.0222126 [0.1164803]	-0.1275607 [0.1420379]
C	0.0458486 [0.0443831]	0.2429465 [0.073244]	0.0841933 [0.0893149]
ECM(-2)	-0.2671421 [0.0675688]	0.0703614 [0.1115065]	-0.0575577 [0.1359727]
	R-Squared	Chi-Square	P>Chi-Square
lnrgdp	0.6725	88.28137	0.0000
lngrec	0.4374	33.43177	0.0000
lngcap	0.4131	30.27146	0.0000
Log likelihood	11.66207		
AIC	0.2224138		
HQIC	0.4728556		
SBIC	0.8851308		

Source: Computed by Author

Note: Based on the Akaike information criterion, the lag length was set at 2.
The VECM table above shows the estimated values of the coefficients for equations 2-4 earlier stated, the estimated equations are presented in the equations below:

$$lnrgdp_t = 0.0458486 + 0.187893lnrgdp_{t-2} - 0.2508529lngrec_{t-2} + 0.0892784lngcap_{t-2} - 0.2671421ecm_{1t-1} + e_{1t} \quad (5)$$

$$lngrec_t = 0.2429465 + 0.2288762lnrgdp_{t-2} - 0.1758298lngrec_{t-2} + 0.0222126lngcap_{t-1} + 0.0703614ecm_{2t-1} + e_{2t} \quad (6)$$

$$lngcap_t = 0.0841933 + 0.9054884lnrgdp_{t-2} - 0.3106025lngrec_{t-2} - 0.1275607lngcap_{t-2} - 0.0575577ecm_{3t-1} + e_{3t} \quad (7)$$

Equations 5,6 and 7 shows that each of the equations have a positive constant, denoting a positive intercept which shows by how much the dependent variables in each equation responds to changes in the explanatory variables at their zero levels. From equation 5, it could be observed that lnrgdp has a positive relationship with the explanatory variables but with exception to lngrec; which showed a negative relationship. The negative relationship implies that when ever there is an increase previous values of government recurrent expenditure, there is a crowding out effect of funds that could have been used to grow the economy in the present. In order words; increase in past recurrent outlay of the government retards economic growth in the future. Thus, a one unit increase in lagged lngrec leads to a fall in lnrgdp by 0.25. A similar behaviour is also observed in equations 6; in which lngrec shows a negative relationship when regressed against its lagged value. A unit increase in lagged lngrec yields a fall of 0.18 in current lngrec; indicating that previous values of government recurrent expenditure have the ability to reduce present values of thesame government outlay. This may be due to some policies of the government which may be targeted at reducing the running cost of the government. An example was during the obasonjo administration when the policy to downsize the civil service was being implented. The negative coefficient of lngrec to lngcap in equation 7, simply shows the inverse relationship that exist between government capital outlay and its recurrent expenditure. This means that, when the government decides to increase its cost of running the government, such decisions has the potnetial to crowd out funds that could have been used for the development of basic infrastrucutures and social amenities that are major drivers of economic growth. From equation 7, a unit increase in lagged lngrec would yield a fall of 0.31 in present values of lngcap.

Equations 6 and 7 like equations 5, shows a positive relationship between the dependent variables and other explanatory variables (with exception to lngrec). The positive relationship between lnrgdp and its lagged value as observed in equation 5, shows that a unit increase in the previous values of rgdp have the tendency to increase current level of rgdp by 0.19. also a unit increase in lngcap would lead to increase in economic growth by 0.09. this can be attained through the provision of basic infrastuructures such as roads, electricity, farm irrigation projects, etc. In equation 6, the positive relationship between lagged lnrgdp and lngrec shows that an increase in the previous values of lnrgdp will yield a 0.23 increase in current levels of lngrec. We can therefore say, that an increase in the growth of the economy will lead to a positive increase in the recurrent outlay of the government and not vice versa. Furthermore, an increase in lagged lngcap will yield 0.22 increase in current lngrec. This is because government capital expenditure

is known to stimulate recurrent expenditure growth. For example, the Unversal Basic Education (UBE) policy introduced by the federal government during the Obasonjo administration, led to the building of more primary and secondary schools and class rooms in the country. This therefore led to the employment of more teachers; driving upwards the recurrent expenditure of the government. In equation 7, a unit increase in lagged lnrgdp yields 0.91 increase in current lngcap. This is due to the fact that past growth in the economy; makes for growth in current capital outlay, which inturn are growth stimulating in the future. However, the negative relation between lagged capital expenditure and current lngcap, implies that an increase in the previous values of gcap does not stimulate or encourage growth of current gcap. This is because most at times, gorth in gcap is being determined by government policies at the moment. For example when the federal government decided to reform the power sector in the country; with the aim of boosting electricity supply in the country under the Obasonjo administration. Nigeria's capital outlay suddenly experienced a sharp rise as a result of the policy.

The ecm value in equations 5, 6 and 7, shows how much distortion that is being removed from the system. In oredr words, it tells us how long it would take for equilibrium to be attained in the short-run, given there is a long-run relationship. Therefore, based on the ecm value of -0.27 in equation 5, we can then say, it would take the economy about 27 months (i.e two years and three months) to be restored to the state of equilibrium in the short-run. Likewise in equation 7, the ecm value of -0.06 indicates that for equilibrium to be restored in the short-run, it will take about 6 months.

5.5 Granger Causality test

Table 5.4: Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
lnrgdp	lngrec	16.475	2	0.000
lnrgdp	lngcap	1.659	2	0.436
lnrgdp	ALL	18.497	4	0.001
lngrec	lnrgdp	1.4944	2	0.474
lngrec	lngcap	0.16413	2	0.921
lngrec	ALL	1.6731	4	0.796
lngcap	lnrgdp	14.274	2	0.001
lngcap	lngrec	14.274	2	0.001
lngcap	ALL	14.274	2	0.001

Source: Computed by Author

The granger causality result in table 5.4 above, shows the dircetion of causality between the fiscal variables. It tells us how the behaviour of a variable in the current period, can actually forcast the growth of another in the long-run. Therefore from the table above, the direction of causality is based on the probability values. This study makes use of the 0.05 level of significance in deciding the direction of causality.

The first row shows that lnrgdp does granger cause lngrec, but does not granger cause lngcap. This means that growth in the ecomony can translate into increase in government recurrent spending and not increase in capital outlay of the government. However, on the aggregate, lnrgdp does granger cause government spending; confirming emperical results of Wagner's

hypothesis for Nigeria. The second row reports no causality between lngrec and lnrgdp, likewise there exist no causality between lngrec and lngcap.This also can be interpreted to mean growth in government recurrnet spending does not result in growth in the economy; neither does it yield growth in government capital outlay. This finding helps in buttressing the earlier submission from the VEC model that: government increased recurrent spending, does not yield economic growth nor positively influence its capital spending. Rather, such policy erodes funds for capital development of the economy and generally retards economic growth. The third row shows the existence of granger causality from lngcap to lnrgdp as well as from lngcap to lngrec. Also, this result supports the earlier submission arrived at from the VECM result, that growth in government capital outlay can translate into positive economic growth as well as bring about growth in recurrent government spending. Thus, supporting the Rostow-Musgrave hypothesis.

The above causality results supports empirical findings by: Aregbeyen (2006), who used Johansen cointegration and standard causality tests and found a unidirectional causality from national income to total public expenditure i.e. a support for Wagner's Law. Also, Dr. Aruwa, Suleiman A.S. (2010), who investigated the causal relationship between aggregate public expenditure and its compositions on economic growth for Nigeria over the period of 1979-2008. The study developed nine models hypothesizing nine versions of Wagner's law. Empirical methodology employed includes Augmented Dickey-Fuller stationarity test, the Johansen multivariate cointegration method and VAR-based Vector Error Correction modeling techniques for causality test. The effects of stochastic shocks of public expenditure and economic growth were explored, and the causal relationship between public expenditure on economic growth was found to be Wagnerian. The Rostow-Musgrave hypothesis was found to be valid in studies by: Fajingbesi A.A (1999), empirical investigations into the relationship between government expenditure and economic growth in Nigeria.Which indicated that real government capital expenditure has a significant positive influence on real output; but showed that real government recurrent expenditure affects growth only by little. Furthermore, Fajingbesi and Odusola (1998), using vector autoregressive (VAR) method in their study of public expenditure and growth in Nigeria, also found that real capital expenditure positively and significantly affect real output; while the effects of real recurrent expenditure was relatively marginal. A submission being supported by our findings.

5.6 Test for Residual Autocorrelation

Table 5.5: Residual autocorrelation test

Lags	chi2	df	Prob > chi2
1	9.1866	9	0.42023
2	7.5075	9	0.58444
3	4.9001	9	0.84293
4	3.0550	9	0.96207

Source: Computed by Author

Ho: no autocorrelation at lag order

The residual autocorrelation test above, indicates that there is no autocorrelation in the series. This decision is based on the probability values derived from the test, which are greater than 0.05 level of significance. thus, denoting the acceptance of the null hypothesis of no autocorrelation at lag order.

5.7 Normality Test

Table 5.6: Jarque-Bera test

Equations	chi2	df	Prob > chi2
D_lnrgdp	6.792	2	0.03350
D_lngrec	6.164	2	0.04587
D_lngcap	1.168	2	0.55765
ALL	14.124	6	0.02828

Source: Computed by Author

Table 5.7: Skewness test

Equations	Skewness	chi2	df	Prob > chi2
D_lnrgdp	0.85629	5.866	1	0.01544
D_lngrec	0.68134	3.714	1	0.05396
D_lngcap	-0.37193	1.107	1	0.29281
ALL		10.686	3	0.01355

Source: Computed by Author

Table 5.8: Kurtosis test

Equations	Kurtosis	chi2	df	Prob > chi2
D_lnrgdp	3.6806	0.926	1	0.33579
D_lngrec	4.1069	2.450	1	0.11751
D_lngcap	2.8248	0.061	1	0.80430
ALL		3.438	3	0.32888

Source: Computed by Author

Ho: residuals are not multivariate normal

The Null Hypothesis for the normality test above states that: residuals are not multivariate normal. The acceptance of the Ho would depend on the joint probability value for the skewness and kurtosis; which is being captured by the jarque-Bera result. Based on the 0.05 level of significance adopted for the acceptance or rejection of null hypothesis in this study. The Ho for the normality test is thus being rejected, since the jarque-Bera joint (ALL) probability value of 0.03 is less than 0.05 level of significance. We can therefore say, that the residuals are multivariate normal.

5.7 VEC Stability test

Table 5.9: Eigenvalue stability condition

Eigenvalue	Modulus
1	1
1	1
.5437595	.543759
.290736	.290736
-.288708	.288708
-.02210082	.022101

Source: Computed by Author

The VECM specification imposes 2 unit moduli.

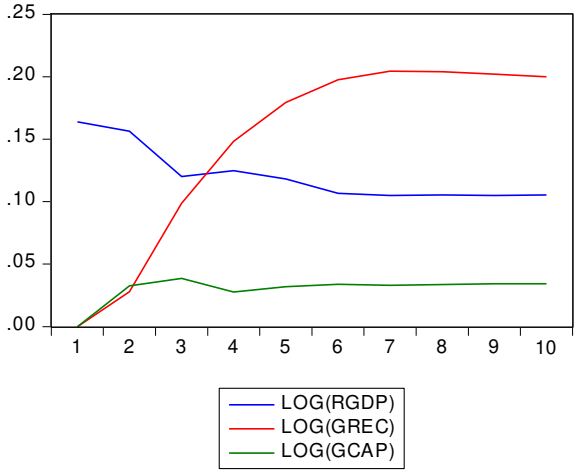
The VEC stability test conducted shows the stability of the VEC model. The stability of the VEC is being known if the eigenvalue and the modulus values are both less than 1. From the above it is obviuos that the eigenvalue as well as the moduls results for the VEC are both less than 1. Thus, we conclude that the VECM is stable.

5.8 Impluse Response Analysis

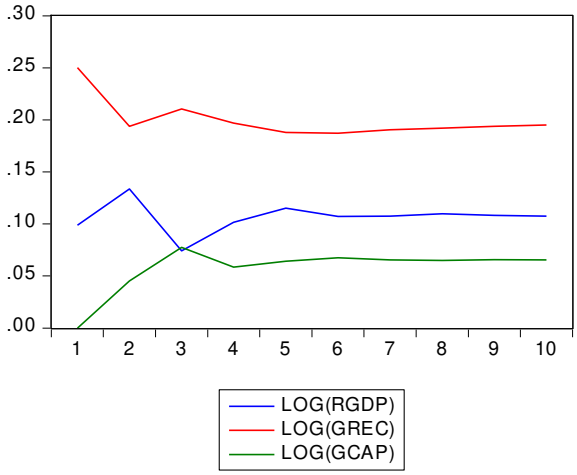
The impulse response result functions (IRFs) show the effects of shocks on the adjustment path of the variables in the VAR model. IRFs can also be graphically presented showing the effect of shocks on the current and future path of the variables under consideration. In essence, IRs show how these variables react to different shocks in the model.

From the graphical presentation of the IRF below, it is observed that the variables response to shocks either in the short-run or long run is positive. This is evident by the graphs representing each of the variable in the three boxes below, falling within the positive region. The first box shows the response of the variables to shocks from rgdp. It could be seen that grec has the highest rate of positive reponse compared to the other variables. This therefore shows that sudden distortions in rgdp could yield higher distortions to the level of grec when compared to response from gcap and rgdp itself. The second box like the first also show grec reponding more to shocks from itself either in the short or long-run than response from gcap and rgdp. This means that whenever there are shocks, as a result of sudden government recurrent expenditure policy; there is the likelihood for such policies to create more distortions to current and future levels of recurrent expenditure, than it would generate in its capital expenditure and growth of the economy in the short or long run. The third box however, shows gcap reponding more to shocks from itself than grec or rgdp. This therefore signifies that attempts by fiscal authorities to distort the level of capital expenditure, have the capacity to create higher distortions in the current and future levels of capital expenditure; than distortions such policy would create to the recurrent level of expenditure and the growth of the economy either in the present or the future.

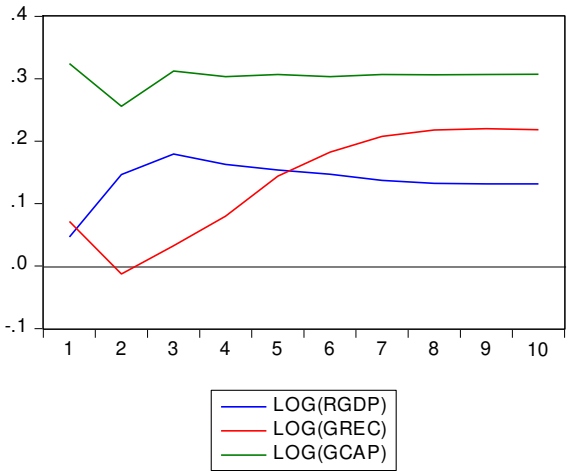
Response of LOG(RGDP) to Cholesky
One S.D. Innovations



Response of LOG(GREC) to Cholesky
One S.D. Innovations



Response of LOG(GCAP) to Cholesky
One S.D. Innovations



6.0 Conclusions and Research Recommendations

6.1 Conclusions

This study focused on investigating the impact of government expenditure on economic growth from 1961 to 2010, using the Vector Error Correction Model and Granger Causality approach. Based on the findings of this study, we conclude that:

- The wagnerian hypothesis of economic growth spuring increase in aggregate government expenditure in the economy is valid for Nigeria.
- The causal effect of economic growth on government capital spending is more significant when compared with government recurrent expenditure.
- Growth in government recurrent expenditure does not bring about significant growth in the economy.
- There is also evidence validating the Rostow-Musgrave hypothesis, of government capital spending causing economic growth in Nigeria.

6.2 Research Recommendations

Based on the findings of this study, the following policy recommedations were being proposed:

- There should be effective channeling of public funds to productive activities, which will have a significant impact on economic growth.
- There should be joint partnership between the government and the private sector in providing essential infrastructural services that will promote economic growth and development.
- Government consumption spending should be well coordinated at all arms of government, to prevent "crowding out" effect on government investment. Likewise, there should be high degree of transparency and accountability of government spending in various sectors of the economy in order to prevent the channeling of public funds into private accounts of government officials and workers.
- Government should monitor the contract awarding process of capital projects closely, to guard against over estimation of project execution cost. This will bring about significant impact of public investment spending on economic growth.
- Lastly, there should be autonomy of the anti-graft or anti-corruption agencies like: the Economic and Financial Crimes Commission (EFCC), Independent Corrupt Practices Commission (ICPC), and the Code of Conduct Bureau; in order to effectively police the activities of public funds custodians.

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