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PUBLIC EXPENDITURE, OFFICIAL DEVELOPMENT ASSISTANT AND ECONOMIC GROWTH: A TIME SERIES ANALYSIS FOR NIGERIA (1981 - 2018)

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ABSTRACT: *In addition to divergent views of economists on the effect of public expenditure on economic growth, results of existing empirical studies in developed and developing economies has remained inconclusive and tends to depend on the period of study, econometric method, nature of data and the composition of government expenditure. In this study, public expenditure in Nigeria is decomposed into domestic and the foreign receipts components. The domestic component comprises capital expenditure (GCE) and recurrent expenditure (GRE) while the foreign receipts component captures foreign inflow of official development assistance (ODA). Employing extended aggregate production function framework and bound test approach (ARDL model), this study examined the impact of each of these three components of public expenditure (GCE, GRE and ODA) on economic growth in Nigeria for the period (1981-2018). The findings of this study indicate the existence of a long run relationship between the macroeconomic variables estimated in the model. The recurrent expenditure (GRE) has positive impact on economic growth both in the short-run and in the long-run, countering the widely held view that government consumption spending is growth-reducing. The capital expenditure (GCE) and official development assistance (ODA) have negative impact on economic growth in Nigeria both in the short-run and long-run. The granger causality test result shows no causal relationship between GDP and GCE and between GDP and ODA, but a bi-directional causal relationship exists between GDP and GRE. It is recommended that greater percentage of public fund should be expended as capital expenditure and such fund should be properly utilized on acquisition of physical capital and social overhead capital like transportation, electricity, communication, irrigation, flood control, research and human capital development, capital formation in agricultural and industrial sectors to enhance the productive capacity of the economy. ODA in recent times has been unreliable source of finance in Less Developed countries, hence Nigeria should not heavily depend on it. However, whatever ODA is received should be properly utilized and channel into productive projects which have significant positive impact on economic activities and wellbeing of the populace. The fight against corruption in the country should be frontally confronted to free more public fund for collective development purposes in the country.*

KEY WORDS: public expenditure, official development assistance, capital expenditure, recurrent expenditure, economic growth, Nigeria.

INTRODUCTION

Public expenditure is outlay of public authorities at the central, state and local government levels. It is an outflow of resources from government to other sectors of the economy whether requited or unrequited (CBN, 2019). Public expenditure is a powerful fiscal policy instrument available to a government to regulate the level of economic activity in the country. When the

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level of economic activity in a country is low, usually manifested in low aggregate demand and high level of unemployment, government can stimulate it by increasing its spending thereby raising aggregate demand, the level of output and create employment. On the other hand, when the level of economic activity in a country is over stimulated, usually indicated by high inflation rate, government can restrain it by reducing its expenditure. Public spending, therefore, can be used to influence national output, employment level, general price level as well as redistribute income in favour of the poor. It is importance in contributing to economic stability, growth and poverty reduction.

Though public expenditure is crucial to the functioning of the economy and necessary for existence, enhancement and control of economic activity, economists have divergent views on the relationship between public spending and economic growth. The neoclassical growth theory (Solow growth model (1956)) predicts that economic growth occurs as a result of exogenous technological change and population growth and that per capita incomes of countries will converge in the long-run. The implication is that government policy cannot affect growth rates except temporarily during the transition of economies to their steady state. The neoclassicals argue that large government expenditure is a source of economic instability and has negative effect on economic growth. According to them, as the size of public expenditure increases, distortionary effects of high taxes and public borrowing which are required to finance larger government expenditure, diminishing returns in public capital, rent-seeking activities and bureaucratic inefficiencies become more prevalent, thereby reduce growth rate of the economy. On the other hand, the endogenous growth theory developed by Lucas (1988), Barro (1990) and Romer (1996) postulates that short-run and long-run economic growth is facilitated by endogenous factors. Barro (1990) cited by Siraj (2012), asserts that productive public spending which includes spending on property rights enforcements as well as spending on activities that enhance the production capacity of the country can have positive effect on economic growth. Similarly, the Keynesian maintains that government spending can have multiplier effects in the economy by stimulate aggregate demand during times of recession, creates employment and increase investment and output. This group are of the opinion that public expenditure in the provision of public goods like defence, maintenance of law and order, physical infrastructure, rule of law and protection of property right, merit goods such as education and health services, and target intervention (such as export subsidies) enhances economic growth.

In addition to divergent views of economists, results of empirical studies carried out to examine the effect of public expenditure on economic growth in developed and developing economies had remained inconclusive. The findings of some empirical studies show positive and significant relationship between public expenditure and economic growth (Chi-Hung et al, 2008; Taiwo and Abayomi, 2011) while a good number of empirical studies report significant negative relationship (Barro,1990; Engen and Skinner,1992; Hansson and Henrekson,1994). There are also some empirical studies whose results are mixed (Jackson and Fettu, 1998; Fan and Rao, 2003; Amanja and Morrissey, 2005; Bose, Haque and Osborn, 2007) while in some there is no relationship between public spending and economic growth (Chamorro - Narvez, 2012). These results indicate that empirical evidence on the effect of public expenditure on economic growth is mixed. The result seems to vary across period of study (Hsieh and Lai, 1994), econometric techniques, assumption, country or set of countries and data sets used for the study (Bose, Haque and Osborn, 2007). Of great interest is the fact that Kweka and

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Morrissey (2000) asserted that the empirical result on the growth-effect of public expenditure also depend on the categorisation of the public expenditure.

In the literature, public expenditure had been subjected to diverse categorisation. The earliest and classical economist's classification was productive and non-productive public expenditure. In studies like Barro (1990), Barro and Sala-i-Martin (1992) and Amanja and Morrissey (2005), productive and non-productive public expenditure classification was employed. There is development and non-development expenditure categorisation (Pham, 2007; Siraj, 2012), which is the modern form of productive and non-productive expenditure classification. Another categorisation of public expenditure is transfer payment and non-transfer payment expenditures. Non-transfer expenditure is further categorised into investment and consumption expenditures. These are adopted in studies like Laudau (1983), Kweka and Morrissey (2000), Ketema (2006) and Taban (2010).

Furthermore, in many economies, public expenditure is categorised into economic and functional (sectoral) components. Economic component categorisation of public expenditure are capital and recurrent expenditures. The functional (sectoral) component categorisation of public expenditure include expenditure on general services, defence, public order and safety, education, health, social security and welfare, agriculture, manufacturing and communication, environmental protection (Heller and Diamond, 1990). In Nigeria, public expenditure is grouped into two economic components categories namely capital and recurrent expenditures, and four functional categories namely administration, economic services, social and community services and transfer payments with capital and recurrent expenditure compositions (CBN, 2011).

The economy can as well be decomposed into two broad sectors comprising domestic and external sectors. In the same vein, public expenditure can as well be decomposed into domestic and the foreign components, to capture foreign inflow of development assistance (Alexiou, 2009). The foreign component of public expenditure represents the foreign inflow of development assistance (Khan and Reinhart, 1990; Alexiou, 2009). Foreign inflow of development assistance refers to foreign aid provided by government of developed countries, multinational institutions and regional development banks to promote the economic development and welfare of developing countries (Akinbola and Nwosu, 2015). It comes directly to the government and is seen as source of revenue which is used to finance various development projects capable of contributing to the growth of the recipient economy.

Over the years, Nigeria has received reasonable amount of money as official development assistance (ODA). The importance of ODA in economic growth has been quite debateable. For robust analysis, the composition of total public expenditure in Nigeria is extended to include ODA. Consequently, aggregate public expenditure in Nigeria is categorised into capital expenditure (GCE), recurrent expenditure (GRE) and official development assistance (ODA). The objective of this study is to examine the impact of each this three components of public expenditure (GCE, GRE and ODA) on economic growth in Nigeria for the period (1981- 2018) using bound test approach. The study is organised into five sections. Following the introduction, section 2 reviews relevant literature on the effect of government expenditure on economic growth. The methodological approaches adopted in the study are presented in section

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3. Section 4 elaborates on the empirical results. Finally, section 5 provides the summary, conclusions and policy recommendations.

LITERATURE REVIEW

Conceptual, theoretical and Empirical Review

Public spending are those expenditures made by public authorities at the central, state and local government levels. Public expenditure has received considerable attention in economic literature overtime. As observed above, the results and evidences from studies carried out to examine the effect government expenditure on economic growth had been diverse, mixed and in most cases conflicting. This is linked to the fact that various measures of public expenditure and method of analysis have been employed by different researchers. In most studies, the productive and non-productive expenditure classification of the classicalists had been used (Barro, 1990; Barro and Sala-i-Martin, 1992; Amanja and Morrissey, 2005). Barro (1990) categorized government expenditure as productive and unproductive. He stressed that productive public expenditure which includes spending on property rights enforcements as well as spending on activities that enhance the production capacity of the country have a positive growth effect. In the same vein, Barro and Sala-i-Martin (1992) classified expenditures as productive and unproductive, and asserted that productive expenditures have direct impact on the rate of economic growth while the unproductive expenditures have an indirect or no effect. Productive expenditure includes public spending made on property rights enforcements, as well as activities that enter directly into the production function of the economy. Unproductive expenditure, on the other hand, includes expenditure like government consumption expenditure that could not enter into production function directly but indirectly. Bleaney et al (2001) classified productive expenditures as general public service expenditure, defence expenditure, educational expenditure, health expenditure, housing expenditure and transport and communication expenditure while expenditure on recreation, expenditure on economic services and social security and welfare expenditure had been classified as unproductive expenditure.

Amanja and Morrissey (2005) examined the relationship between various measures of fiscal policy on economic growth of Kenya using time series techniques and annual data for the period (1964 – 2004). In the study, government expenditure was categorized into productive and unproductive expenditures and, tax revenue into distortionary and non-distortionary. The results show that unproductive expenditure and non-distortionary tax revenue were neutral to growth. Productive expenditure had strong adverse effect on growth whereas distortionary tax had no distortionary effect on economic growth. Government investment expenditure was found to boost economic growth in the long-run. In studies like Laudau (1983); Kweka and Morrissey (2000); Ketema (2006) and Taban (2010), public expenditure is classified into investments expenditure, consumption expenditure and transfer payment. Transfer payments are expenditures on pensions, unemployment allowances, interest on public debt, etc. which government do not get goods or any service from them. Government investment expenditure is government capital expenditure incurred to obtain capital goods. Government consumption expenditure is expenditure made on consumption goods. It refers to government total recurrent expenditure less expenditure on education and health. The total expenditure (capital and recurrent) on health and education refers to expenditure on human capital.

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In a cross country study for a sample of 96 countries conducted to examine the effect of government consumption expenditure on economic growth, Laudau (1983) found that government consumption expenditures had a negative effect on growth of real output. Employing a simple growth accounting model patterned after Ram (1986), in which government total expenditure was disaggregated into physical investment spending, consumption spending and human capital investment spending, Kweka and Morrissey (2000) investigated the impact of public expenditure on economic growth of Tanzania using time series data for a 31years period (1965-1996). Their findings show that increased productive expenditure (physical investment) had a negative impact on economic growth whereas consumption expenditure related positively to economic growth and, expenditure on human capital was insignificant in the regressions.

Ketema (2006) studied the impact of various components of government spending (investment, consumption and human capital expenditures) on the growth of real GDP in Ethiopia for the period (1960/61-2003/04) using Johanson Maximum Likelihood estimation procedure. The result shows that only expenditure on human capital has long-run significant positive impact, government investment (productive) spending has a negative but insignificant impact on growth of real GDP, which again reveals the inefficiency and poor quality nature of public investment.

Taban (2010), based on Barro's (1990) endogenous growth model, examined the government spending-growth nexus for the Turkish economy for the sample period (1987: Q_1 - 2006: Q_4), using bounds testing approach and MWALD Granger causality test, and government spending at aggregated and disaggregated levels was used. At disaggregated level, total government spending was broken down into investment spending and consumption spending. The findings of the study show that the share of total government spending and the share of government investment expenditure to GDP had negative impacts on the growth of real per capita GDP in the long-run. There was no evidence of co-integrating relation between government consumption spending to GDP ratio and per capita output growth. The MWALD causality test indicates strong bi-directional causality between the total government spending and economic growth. There was no statistically significant relationship found between the share of government consumption expenditure to GDP and economic growth.

Government expenditure is also categorised as developmental and non-development expenditures in some other studies (Pham, 2007; Siraj, 2012). All government expenditures perceived to promote economic growth are categorised as developmental expenditure, otherwise they are classified as non-development expenditure. Government expenditure on acquisition of physical capital and social overhead capital like transportation, communication, irrigation, flood control, capital formation in agricultural and industrial sectors formed developmental expenditure. Expenditure on defence, police, judiciary, interest payment on public debts, etc. had been grouped as non-development expenditure. Pham (2007) studied the impact of government spending on economic growth in China, Hong Kong, Malaysia and Singapore for period (1990-2008) using the panel fixed effect model. Government spending was subdivided into three components: economic development, social development and general development. The empirical findings show a significant negative impact of government expenditure on social and general development on GDP. However, development expenditure was found to have a significant positive impact on GDP.

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Siraj (2012) examined the role of Ethiopia's government expenditure in economic growth and the impact of Official Development Assistant (ODA) on economic growth. The result of the study shows that public spending on physical investment and capital development have positive contribution on economic growth while spending on consumption affect economic growth negatively. ODA was found to have a positive effect on Ethiopia's economic growth.

There are studies which adopt the accounting categorization of government expenditure: capital (developmental) and current (or recurrent) expenditures. Current expenditure refers to expenditures on day-to-day transactions and consumable items such as spending on wages and salaries, supplies and services, rent and so on whose benefits are consumed or exhausted within each financial year. Capital expenditures, on the other hand, include spending on fixed assets such as road and railway construction, buildings and plant and machinery, the benefits of which are more durable, lasting several years. CBN (2011) describes capital expenditures as payments for non-financial assets used in the production process for more than one year while recurrent expenditures are payments for transactions within one year.

Government expenditure is also categorised as economic and functional (sectoral). Economic categorisation of public expenditure are capital and recurrent expenditures. While capital expenditure otherwise described as government gross capital formation, is government expenditure on capital projects and government investment, recurrent expenditure, otherwise described as government consumption expenditure, is public expenditure made to meet up with the day-to-day running of government business. The functional (sectoral) categorisation of public expenditure include expenditure on general services, defence, public order and safety, education, health, social security and welfare, agriculture, manufacturing and communication, environmental protection, etc (Heller and Diamond, 1990). CBN (2010) grouped government expenditures in Nigeria into two economic categories – capital and recurrent expenditures, and four functional categories namely administration, economic services, social and community services and transfer payments with capital and recurrent expenditure compositions. Each functional group consists of some sections (or sectors) of the economy. Administration expenditure is made up of expenditure on general administration, national assembly, defence and internal security. Economic services expenditure comprises expenditure on agriculture, expenditure on construction, expenditure on transport and communication and others. Community services expenditure includes expenditure on education, expenditure on health and others. Transfer payment consists of public debts (internal and external) charges, pension and gratuities, subventions and subsidies, among others.

Niloy et al. (2003) studied the effect of government expenditure on economic growth in a panel of 30 developing countries during the 1970s and 1980s and found a positive and significant relationship between government capital expenditure and GDP growth. In the same vein, Bose, Haque and Osborn (2007) investigated the growth effects of government expenditure at its' aggregated and disaggregated levels for a panel of 30 developing countries in the 1970s and 1980s. Having taken into consideration the role of the budget constraint and the possible biases arising from omission of some variables, the results show that the share of government capital expenditure in GDP has a positive and significant relationship with economic growth while recurrent expenditure is insignificant. At the sector levels, government investment expenditure and expenditure in education was found to be significantly associated with economic growth.

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Alexiou (2009) used two different panel data methodologies to examine the impact of government spending on economic growth for transition economies of the South Eastern Europe. The results indicate that out of the five variables used in the estimation, government spending on capital formation, official development assistance, private investment and trade openness all have positive and significant effect on economic growth whereas population growth was found to be statistically insignificant. Chamorro – Narvaez (2012) employed a generalized method of moment to examine the effect of the two economic components of government expenditure, namely, capital and current expenditure, on the per capita economic growth rate in a set of Latin American countries for the period (1975-2000). The results show that neither government capital nor current expenditures has statistically significant effect.

At sectoral level, government spending on education, health and infrastructure are believed to enter directly into private sector production and stimulates economic growth since they are complimentary to private investment (Blejer and Khan, 1984; Aschauer, 1989; Lindauer and Ann, 1992). Blejer and Khan (1984) affirmed that public investment which has some bearing on infrastructure and the provision of public goods can be complementary to private investment. Lindauer and Ann (1992) buttressed further by reporting that government spending, particularly, investment in infrastructure enters directly into private sector production. Aschauer (1989) examined the impact of public investment in infrastructure on economic growth by estimating aggregate production function using US time series data. The results reveal strong positive relationship between the US productivity slowdown and the decline in the rate of growth of the public capital stock. This suggests that an aggressive and appropriate public investment strategy in infrastructure can facilitate accelerated growth. Similarly, Easterly and Rebelo (1993) reported that in developing countries, public investments in transport and communication tends to maintain a consistent positive correlation with a very high coefficient.

Fan and Rao (2003) reviewed trends in government expenditures in the developing countries, analysed the causes of change, as well as developed an analytical framework for determining the differential impacts of various government expenditures on economic growth. The finding of the study indicates that the impact of various types of government spending on economic growth is mixed. In Africa, government spending in agriculture and health promote economic growth strongly. Asian's government investment expenditure on agriculture, education and defence had positive growth-promoting effects. All types of government spending except health were statistically insignificant in Latin America. Saad and Kalakech (2009) studied the growth effects of public expenditure by sector in Lebanon using a multivariate co-integration analysis for the period (1962-2007). Four sectors considered in the study were human capital (education and health), defence and agriculture. The results of the study show that government expenditure on education has a positive effect on growth in the long run and a negative impact in the short-run while spending on defence has a negative effect on economic growth in the long-run and insignificant impact in the short-run. Health spending was negatively correlated to growth in the long-run and insignificant linkage in the short-run. Spending on agriculture was found to be insignificant in both cases.

In Nigeria, studies have been conducted to examine the effect of government spending on long-run economic growth. Ekpo (1996) examined the effect of government spending in Nigeria, though indirectly, by regressing various categories of public capital expenditure on private

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investment for the period (1960-1990). The results indicate that some categories of government capital expenditure crowd-in private investment while others negatively affected private investment. Ekpo concluded that the empirical results still confirm the importance of the public sector in the development process. Nurudeen and Usman (2010) employed disaggregated analysis to investigate the effect of government expenditure on economic growth using co-integration and error correction method for the period (1970-2007). The results show that government total capital expenditure, total recurrent expenditure, and government expenditure on education have negative effect on economic growth. Increased government expenditure on transport, communication and health has positive effect on economic growth. Similarly, Oriavwote, Gbosi and Onuchuku (2011) examined the relationship between human capital (education and health) development and economic growth in Nigeria using the co-integration technique for period (1980 – 2008). The results reveal that investment in human capital, in the form of education and health, impact positively on economic growth.

Given the reviewed empirical literature, it has been observed that there is no conventional method adopted in the classification of government expenditure. For instance, what constitute productive expenditure or developmental expenditure varies from one study to another. In addition, even the classification of expenditure as capital and recurrent is not coherent; what constitutes capital expenditure in one country is grouped as recurrent expenditure in another. This explained the mixed and sometimes conflicting results obtained from different empirical studies. It is believed that this study will add to the pool of literature on government expenditure-growth nexus as it examines the impact of domestic and foreign receipts components of aggregate public expenditure namely capital expenditure (GCE), recurrent expenditure (GRE) and official development assistance (ODA) on economic growth in Nigeria.

An Overview of the Capital Expenditure, Recurrent Expenditure and Official Development Assistance in Nigeria

The overview of the capital expenditure (GCE), recurrent expenditure (GRE) and inflow of official development assistance (ODA) in Nigeria for the period (1981-2018) is shown in Figure 1. The figure reveals that from 1981 to 1995, GCE, GRE and ODA were low and more or less the same. This reflects the long period of low rate of economic growth and infrastructural decayed in the country. Public expenditure started rising from 1996, with GCE being slightly higher than GRE and ODA in 1996, 1997 and 1998, after which GCE fell and remain lower than GRE but above ODA except for 2007. The emergence of democratic rule in 1999 brought about substantial increase in public expenditure as shown in the graph from 1999 to 2018. As observe from the overview, for the period (2000-2018), recurrent expenditure assumed an upward trend while capital expenditure has been fluctuating below it. ODA was relatively low within the period under observation.

Figure 1: Nigeria's Capital Expenditure, Recurrent Expenditure and Official

Development Assistance (1981-2018)

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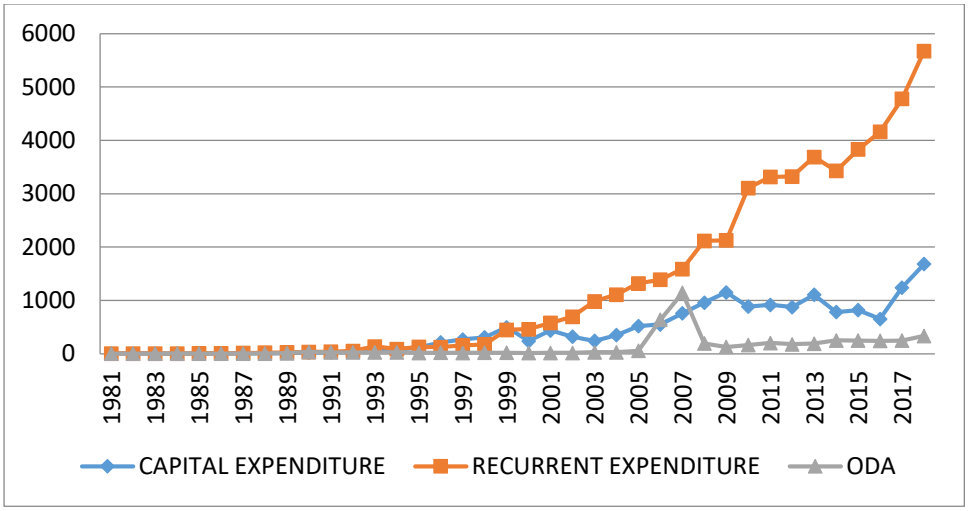

Source: Central of Nigeria Statistical Bulletin (2019) and World Bank WDI (2019)

METHODOLOGY

The econometric method of analysis was adopted to examine the relationship between government spending and economic growth in Nigeria. The data collected were subjected to unit root test to examine the stationarity property of the time series data, co-integration test to ascertain the existence of long run relationship of the variables, Error Correction Method (ECM) to ascertain the speed of adjustment from the short run equilibrium to the long equilibrium state. The Autoregressive Distributed Lag (ARDL) model, otherwise called the bounds testing approach proposed by Pesaran, Shin and Smith (2001), was employed to examine the nature of short and long term relationship.

Model Specification

The data analysis of this study is modelled in an aggregate production function framework (APF). The APF was adopted because along with "conventional inputs'' of labour and capital used the in the neoclassical production function, "unconventional inputs" may be included in the model to capture their contribution to economic growth. The standard aggregate production function is given as

$$Y = AF(K, L) \quad (1)$$

Where Y denotes the aggregate production of the economy (real GDP per capita) and A, K, L are the level of technology, the stock of domestic physical capital and the stock of labour force respectively. When the level of technology, A is ignored, the standard aggregate production function becomes:

$$Y = F(K, L) \quad (2)$$

According to Feder (1982), Ram (1986) and Grossman (1988), the standard aggregate production function can be modified to include the total public expenditure, TPE and rewritten as

$$Y = F (K, L, TPE) \quad (3)$$

Akinbobola and Nwosu (2015) asserted that since foreign aid is a source of government revenue, then public investment is partly financed by foreign aid. Thus, government

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expenditure in the economy can be discomposed into domestic component (TPE_d) and foreign component (TPE_f), reflecting receipts for development assistance (Alexiou, 2009).

$$Y = F (L, K, TPE_d, TPE_f) \quad (4a)$$

The domestic component of public expenditure (TPE_d) comprises capital expenditure (GCE) and recurrent expenditure (GRE). The foreign component of government spending (TPE_f) represents the foreign inflow for official development assistance (ODA) (Khan and Reinhart, 1990; Alexiou, 2009). For analytical purposes, aggregate public expenditure in Nigeria is extended to include the foreign component and three components of public expenditure (ODA, GCE and GRE) is adopted in this study. These different components of public expenditure are captured in the standard aggregate production function as independent variables and the relationship is expressed as

$$Y = F (K, L, GCE, GRE, ODA) \quad (4b)$$

In order to properly capture the growth-effect of public expenditure at components aggregate level, other variables like fiscal balance (FISB), inflation rate (INFL), broad money (M2) and trade openness (OPEN) which are believed to affect economic growth are included in the model. The fiscal balance (FISB) is included because government decisions on spending are interdependent with those of revenue. The ratio of broad money supply to GDP controls for financial deepening while the international trade intensity ratio (trade openness) is meant to capture the degree of the country's openness. The inflation rate is used as measure of the country's macroeconomic stability. The aggregate production function used for the analysis are specified as

$$Y = F (K, L, GCE, GRE, ODA, FISB, INFL, M2, OPEN) \quad (5)$$

The variables of interest in this study are GCE, GRE and ODA. The other variables, K, L, FISB, INFL, M2 and OPEN are included to serve as controls. From the functional equation above, after taking the natural logarithm of both sides, the estimable equation is specified as follows:

$$\ln Y = b_0 + b_1 \ln K + b_2 \ln L + b_3 \ln GCE + b_4 \ln GRE + b_5 \ln ODA + b_6 \ln FISB + b_7 \ln INFL + b_8 \ln M2 + b_9 \ln OPEN + e_t \quad (6)$$

Econometric Model

The Autoregressive Distributed Lag (ARDL) model, otherwise called the bounds testing approach developed by Pesaran, Shin and Smith (2001), is employed in this study to examine empirically the nature of short and long term relationship between the three components of government spending and economic growth in Nigeria. The ARDL model is preferred to the conventional Johansen co-integration method which uses a system of the equation to estimate long run relationship for four major reasons. Firstly, once the model lag order is identified, the ARDL model can be estimated by Ordinary Least Squares (OLS). Secondly, it is possible to estimate the long-run and short-run parameters of ARDL model simultaneously. Thirdly, the ARDL can be applied irrespective of the order of the integration of the regressors, whether purely I(0), purely I(1) or fractionally integrated. However, the procedure will crash if I(2) series is presence. Fourth, this method is efficient especially with small (finite) sample sizes.

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According to Pesaran et al. (2001) as adopted by Choong et al. (2005) and Taban (2010), the vector autoregressive (VAR) model of order p denoted by VAR (p) is constructed to establish the relationship between economic growth and the three components of government spending in Nigeria thus:

$$Z_t = \mu_o + \delta_t + \Sigma\varphi Z_{t-1} + \varepsilon_t \qquad t= 1, 2, - - - T \qquad (7)$$

Where μ_o is (k+1) vector of intercepts and denoting a (k+1) vector of trend coefficients. The vector error correction model (VECM) for equation (7) is derived as:

$$\Delta Z_t = \mu_o + \delta_t + \lambda Z_{t-1} + \Sigma\Upsilon_t \Delta Z_{t-1} + \varepsilon_t \qquad (8)$$

where λ and Υ are vector matrices that contain the long-run multipliers and short-run dynamics coefficients of the VECM respectively. Z_t is a vector of x_t and y_t variables respectively, where y_t is the dependent variable defined as real GDP per capita and x_i = [K, L, GCE, GRE, FDA, INFL, M2, FISB, OPEN] is a vector matrix of a set of explanatory variables. All the variables are transformed to their logarithmic form as in equation (6). As a requirement, y_t must be an 1(1) variable while x_t explanatory variables can either be 1(0) and 1(1). E_t is a stochastic error term. To derive the preferred model, following the assumptions made by Persran et al (2001) in case II, that is, unrestricted intercepts and no trends, Equation (8) becomes an unrestricted error correction model (UECM) as:

$$\Delta Z_t = \mu_o + \lambda Z_{t-1} + \Sigma\Upsilon_i \Delta Z_{t-1} + \varepsilon_t \qquad (9)$$

Decomposing into x_t and $y_{t,}$ the reduced form of Equation (9) is stated as:

$$\Delta y_t = C_y o y_{t-1} + {}^{\beta}{}_{xx}\, X_{t-1} + \Sigma\Upsilon_i \Delta y_{t-1} + \Sigma\Upsilon_i \Delta x_{t-1} + \varepsilon_t \qquad (10)$$

Incorporating in the variables of interest, the UECM of Equation (10) becomes thus:

$$\Delta RGDPPC_t = a_o + {}^{\beta}{}_1 RGDPPC_{t-1} + {}^{\beta}{}_2 K_{t-1} + {}^{\beta}{}_3 L_{t-1} + {}^{\beta}{}_4 GCE_{t-1} + {}^{\beta}{}_5 GRE_{t-1} + {}^{\beta}{}_6 ODA_{t-1} + {}^{\beta}{}_7 FISB_{t-1} + {}^{\beta}{}_8 INF_{t-1} + {}^{\beta}{}_9 M2_{t-1} + {}^{\beta}{}_{10} TOP_{t-1} + \Sigma\Upsilon_1 \Delta RGDPPC_{t-1} + \Sigma\Upsilon_2 \Delta GCE_{t-1} + \Sigma\Upsilon_3 \Delta GRE_{t-1} + \Sigma\Upsilon_4 \Delta K_{t-1} + \Sigma\Upsilon_5 \Delta L_{t-1} + \Sigma\Upsilon_6 \Delta ODA_{t-1} + \Sigma\Upsilon_7 \Delta INF_{t-1} + \Sigma\Upsilon_8 \Delta FISB_{t-1} + \Sigma\Upsilon_9 \Delta M2_{t-1} + \Sigma\Upsilon_{10} \Delta TOP_{t-1} + \varepsilon_{t-1} \qquad (11)$$

Where Δ is the first difference operator, ${}^{\beta}i$ are long-run multipliers and Υ_i are short-run dynamic coefficients and a_o is the intercept (drift).

ARDL Testing Approach: Three steps are involved in the testing procedure of the ARDL bounds test. First, OLS is conducted on equation (11) to test for the existence of co-integrating long-run relationship normalized on Y_t based on the Wald test (F-statistic) for the joint significance of the lagged levels of variables. The null and the alternative hypothesis are as follows:

H_o: ${}^{\beta}{}_1 = {}^{\beta}{}_2 = {}^{\beta}{}_3 = {}^{\beta}{}_4 = {}^{\beta}{}_5 = {}^{\beta}{}_6 = {}^{\beta}{}_7 = {}^{\beta}{}_8 = {}^{\beta}{}_9 = {}^{\beta}{}_{10} = 0$ (no long-run relationship)

H_1: ${}^{\beta}{}_1 \neq {}^{\beta}{}_2 \neq {}^{\beta}{}_3 \neq {}^{\beta}{}_4 \neq {}^{\beta}{}_5 \neq {}^{\beta}{}_6 \neq {}^{\beta}{}_7 \neq {}^{\beta}{}_8 \neq {}^{\beta}{}_9 \neq {}^{\beta}{}_{10} \neq 0$ (a long-run relationship exists)

The computed F - statistic value is compared with the critical bound values given in Pesaran et al. (2001). The optimal lag length for estimating equation (11) is selected using the Schwarz Bayesian Criterion (SBC). The upper and lower bound critical values assume that the explanatory variables are purely 1(0) and purely 1(1) respectively. The null hypothesis of no

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co-integration is accepted if the F-statistic lies below the lower critical values. On the other hand, if the F-statistic lies above the upper critical values, the null hypothesis of no co-integration is rejected which means, the dependent and the explanatory variables share a long-run level relationship. The results are inconclusive if the computed F-statistic lies in between the lower and upper bound critical values.

When co-integration is established, the next step involves estimating the long-run ARDL model for $RGDPPC_t$ as follows:

$$RGDPPC_t = C_o + \Sigma^{\beta}_1 y_{t-1} + \Sigma^{\beta}_2 K_{t-1} + \Sigma^{\beta}_3 L_{t-1} + \Sigma^{\beta}_4 GCE_{t-1} + \Sigma^{\beta}_5 GRE_{t-1} + \Sigma^{\beta}_6 ODA_{t-1} + \Sigma^{\beta}_7 INF_{t-1} + \Sigma^{\beta}_8 FSIB_{t-1} + \Sigma^{\beta}_9 M2_{t-1} + \Sigma^{\beta}_{10} TOP_{t-1} + \varepsilon_t \quad (12)$$

As the last step, an error correction model (ECM) below, derived from equation (12), is estimated to obtain the short-run dynamic parameters as specified below:

$$\Delta RGDPPC_t = Co + \Sigma\Upsilon_1 \Delta RGDPPC_{t-1} + \Sigma\Upsilon_2 \Delta K_{t-1} + \Sigma\Upsilon_3 \Delta L_{t-1} + \Sigma\Upsilon_4 \Delta GCE_{t-1} + \Sigma\Upsilon_5 \Delta GRE_{t-1} + \Sigma\Upsilon_6 \Delta ODA_{t-1} + \Sigma\Upsilon_7 \Delta FSIB_{t-1} + \Sigma\Upsilon_8 \Delta INF_{t-1} + \Sigma\Upsilon_9 \Delta M2_{t-1} + \Sigma\Upsilon_{10} \Delta TOP_{t-1} + \mu ECM_{t1} + \varepsilon_t \quad (13)$$

Where μ is the speed of adjustment parameter and ECM_{t-1} is the residuals that are obtained from the estimated co-integration model of equation (6).

Data and Sources

The government spending-growth effect in Nigeria is examined using time series data covering the period of 38years (1981-2018). The variables are measured as follows. Economic growth (Y) is defined as real GDP per capita. Real GDP is obtained by dividing nominal GDP by the CPI. Real GDP per capita is obtained by dividing real GDP by population. GCE is the percentage share of real government capital expenditure in real GDP. GRE is the percentage share of real government recurrent expenditure in real GDP. ODA is the value of real gross foreign inflow for development assistance. L and K are the volume of the total labour force and the capital stock of the economy respectively. The time-series on capital stock is not directly available for Nigeria; hence K is proxied by the real value of gross fixed capital formation (GFCF). This proxy for capital stock has been used in many studies including Mansouri (2005), Frimpong and Oteng-Abayie (2006). FISB is the percentage share of the overall fiscal balance in real GDP. INFL is the inflation rate. M_2 is the percentage share of real broad money in real GDP. OPEN is the percentage share of the sum of export and import values in real GDP.

Estimation Technique

Time series statistics for the period spanning 38years (1981 - 2018) of the included variables were used in the estimation procedure. The data collected were subjected to some verification tests such as unit root test using Augmented Dickey-Fuller (ADF) test and causality test using granger causality test. The study employed the Autoregressive Distributed Lag (ARDL) model, otherwise called the bounds testing approach to evaluate the nature of relationship between the variables. To ascertain that the model satisfies some basic econometric assumptions, some diagnostic tests such as auto-correlation (serial correlation) test using Durbin-Watson statistics, normality test using Jarque Bera test, ARCH test to check for heteroscedasticity, RESET and LM test to check for misspecification on the model were conducted.

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PRESENTATION AND ANALYSIS OF RESULTS

Stationarity (Unit Root) Test Results:

Table 4.1: Unit Root (ADF)Test for Stationarity

Augmented Dickey-Fuller (ADF) Test			
Variables	Level	1st / 2nd Diff	Status
LGDP	-3.696455**	-	I(0)
LGCF	-0.062945	-5.024888*	I(1)
LLF	2.766533**	-	I(0)
LGRE	-2.229328	-6.993260*	I(1)
LGCE	-2.399081	-5.558895*	I(1)
LM2	-3.251681*	-	I(0)
TOP	-1.293316	-6.183904*	I(1)
INFL	-2.268031	-4.042320*	I(1)
LODA	-0.808265	-5.339815*	I(1)
FISB	-0.048435	-4.810289*	I(1)

Source: Author's Computation

Note: The symbols *, ** and *** indicate the rejection of the null hypothesis of non-stationary at significance level 1%, 5% and 10% respectively. The null hypothesis is that the series is non-stationary, or contains a unit root. The rejection of the null hypothesis is based on MacKinnon (1996) critical values.

When the variables are non-stationary, there is tendency to generate spurious regression results (Granger and Newbold, 1974). To avoid this, stationary status of all the variables were examined by conducting test for the order of integration of the individual variables, before carrying out the ARDL bounds test. The bound test is based on the assumption that the variables were 1(0) or 1(1) series. The presence of 1(2) series renders the calculated F-statistic invalid thereby crashing the ARDL procedure. Hence, pre-testing for unit roots becomes crucial for the analysis as it helps to authenticate that the variables were not 1(2) stationary. The Augmented Dickey-Fuller (ADF) test was conducted for both levels and first difference on each variable and the results as presented in Table 4.1 reveal that the dependent variable, LRGDP, was stationary at levels, 1(0). As for the explanatory variables, labour force (LF) and money supply (M2) were stationary at levels, 1(0) while government recurrent expenditure (GRE), government capital expenditure (GCE), foreign development assistant (ODA), gross capital formation (GCF), inflation rate (INFL), trade openness (TOP) and fiscal balance (FISB) were integrated at the order one, 1(1). Based on this result, the order of integration level of the variables is the mixture of both I(0) and I(1); hence indicting the suitability of the variables for ARDL bounds test.

Lag Length Selection Results: The computation of ARDL F-statistic is very sensitive to lag order selection; hence, before conducting ARDL co-integration test to establish a long-run relationships among the variables, it was imperative to select an appropriate lag length. In chosing the lag length, the various lag length selection criteria such as Akaike information criterion (AIC), Schwarz information criterion (SIC) and the Hannan-Quinn information criterion (HQC) were utilized. This study adopts the HQ criterion on the ground that its optimal lag length is in-between the AIC which has long lag length and SC which is known for short lag length and it performs better. The lag length selection test result as presented in Table 4.2 shows that two (2) lag was selected based on HQ criterion as the appropriate lag length for the series and to compute the F-statistic for co-integration.

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Table 4.2: Lag Selection Critiria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-281.9741	NA	5036030.	18.24838	18.70642	18.40021
1	-259.3455	29.70003*	1313088.	16.89659	17.40044	17.06360
2	-256.7443	3.251477	1199119.*	16.79652	17.34617*	16.97871*
3	-255.7390	1.193804	1212303.	16.79619*	17.39164	16.99356
4	-255.7239	0.016959	1306858.	16.85774	17.49900	17.07030
5	-254.4167	1.388857	1302900.	16.83855	17.52561	17.06629

Source: Author s Computation

Note: * indicates lag order selected by the criterion. LR: sequential modified LR test statistic (each test at 5%level) FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion.

Bound Test Co-integration Result: The long run relationship between the variables and economic growth was investigated by conducting the bound test for the estimated model. To verify the existence of co-integration or otherwise, ARDL bounds tests approach was applied and the results as shown in Table 4.3 reveals the existence of a long run relationship between the macroeconomic variables estimated in the model since the F-statistic of 5.861 is greater than the lower and the upper bound critical value at 1per cent, 5 per cent and 10 per cent level of significant.

Table 4.3: Bound Testing Approach (ARDL)

ARDL Bounds Test
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	5.861486	3

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Source: Author's Computation

Long Run Impact Results

The long-run impact results as presented in Table 4.4 indicates that recurrent expenditure (RCE) has positive long-run relationship with economic growth whereas capital expenditure (GCE) and foerign development assistance (ODA) have negative long run impact on economic growth in Nigeria. As for the control variables, domestic capital (GFCF), fiscal deficit (FISBD), labour force (LF) and trade opness (OPEN) have positive long run impact on economic growth while inflation rate (INFL) and money supply (M2) have negative impact on econmic growth. The result also shows that the ECT (-1) is negative and significant. The ECT

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(-1) is the speed of adjustment from the short-run equilibrium to the long-run equilibrium. This means that 34.1% of the error is corrected in each time period. This speed of adjustment implies that it will take approximately a year to correct all errors/deviations and bring the economy back to equilibrium.

Table 4.4: Long Run Impact Result

ARDL Co-integrating and Long Run Form
Dependent Variable: LY
Selected Model: ARDL(1, 2, 2, 2)

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GCE)	-0.014546	0.024667	-0.589709	0.5627
D(GCE(-1))	0.037426	0.022700	1.648734	0.1165
D(GRE)	0.010814	0.015515	0.697057	0.4947
D(GRE(-1))	-0.039560	0.020701	-1.911060	0.0721
D(FISB)	0.000008	0.000037	0.228961	0.8215
D(FISB(-1))	-0.000077	0.000054	-1.414719	0.1742
D(GFCF)	0.000001	0.000005	0.162765	0.8725
DLL	0.943778	0.696937	1.354178	0.1924
D(ODA)	-0.000020	0.000017	-1.130602	0.2731
D(INFL)	-0.000278	0.000629	-0.442642	0.6633
DLM2	-0.106320	0.079444	-1.338304	0.1975
D(OPEN)	0.001354	0.001049	1.291068	0.2130
CointEq(-1)	-0.341021	0.109274	-3.120782	0.0059

Cointeq = LY - (-0.1510*GCE + 0.2629*GRE + 0.0005*FISB + 0.0000 *GFCF + 2.7675*LL - 0.0001*ODA - 0.0008*INFL - 0.3118*LM2 + 0.0040*OPEN - 34.1636)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GCE	-0.151010	0.099636	-1.515617	0.1470
GRE	0.262905	0.083537	3.147159	0.0056
FISB	0.000453	0.000242	1.870166	0.0778
GFCF	0.000002	0.000015	0.161902	0.8732
LL	2.767505	2.340589	1.182397	0.2524
ODA	-0.000058	0.000056	-1.034176	0.3147
INFL	-0.000817	0.001853	-0.440752	0.6646
LM2	-0.311769	0.265287	-1.175215	0.2552
OPEN	0.003971	0.003391	1.170892	0.2569
C	-34.163649	39.226319	-0.870937	0.3953

Source: Author's Computation

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Short Run Impact Results

Table 4.5: Short-run Impact Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GCE(-1)	-0.024867	0.072965	-0.340807	0.7471
GCE(-2)	-0.043962	0.053801	-0.817122	0.4510
GRE(-1)	-0.036552	0.077107	-0.474040	0.6554
GRE(-2)	0.025106	0.035761	0.702050	0.5140
LL(-1)	3.556222	6.804008	0.522666	0.6235
LL(-2)	-3.880999	5.953019	-0.651938	0.5432
LGFCF(-1)	-0.005669	0.020573	-0.275532	0.7939
LGFCF(-2)	0.010379	0.025765	0.402833	0.7037
ODA(-1)	-6.51E-05	6.23E-05	-1.045529	0.3437
ODA(-2)	-3.00E-05	4.16E-05	-0.720201	0.5037
FISB(-1)	-3.18E-05	0.000116	-0.274306	0.7948
FISB(-2)	5.56E-05	0.000120	0.461841	0.6636
INFL(-1)	3.14E-05	0.001080	0.029093	0.9779
INFL(-2)	-0.000547	0.001270	-0.430609	0.6847
LM2(-1)	0.282960	0.317643	0.890812	0.4138
LM2(-2)	-0.249126	0.227852	-1.093367	0.3241
OPEN(-1)	-0.001314	0.002834	-0.463791	0.6623
OPEN(-2)	-0.003285	0.002436	-1.348292	0.2354

Source: Author's Computation

The short run impact results presented in Table 4.5 reveal that government capital expenditure (GCE) and official development assistance (ODA) have negative impact on economic growth while government recurrent expenditure (GRE) has negative impact on economic growth in first difference and positive impact in the second difference. As for control variables, trade openness (OPEN) has negative impact on economic growth, domestic capital (GFCF) and fiscal balance (FISB) had negative impact on real GDP at first difference and positive impact at second difference while inflation rate (INFL) and money supply (M2) had positive impact on real GDP.

Granger Causality Test Results: The common rule of thumb for granger causality states that the null hypothesis (H_0) should be rejected if the reported probability is less than 0.05 per cent (the level of significance). The granger causality test using the pairwise approach result presented in Table 4.6 shows no causal relationship between LGDP and LGCE and between LGDP and LODA. However, LGDP does granger cause LGRE and LGRE does granger cause LGDP, which shows a bi-directional causal relationship between LGDP and LGRE.

Table 4.6: Pairwise Granger Causality Tests Results.

Lags:1			
Null Hypothesis:	Obs	F-Statistic	Prob.
LODA does not Granger Cause LGDP	25	2.08031	0.1633
LGDP does not Granger Cause LODA		2.52041	0.1267
LGCE does not Granger Cause LGDP	25	0.50218	0.4860
LGDP does not Granger Cause LGCE		2.83480	0.1064
LGRE does not Granger Cause LGDP	25	4.59122	0.0435
LGDP does not Granger Cause LGRE		5.04666	0.0350

Source: Author's Computation

Diagnostic Test Results

Auto Correlation Test: The model was checked for autocorrelation using the Breusch-Godfrey Serial Correlation LM Test and the result is presented in Table 4.7. The result shows

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that there is no evidence of serial correlation as the p-value of the models (0.3303) is greater than 0.05 per cent level of significance.

Table 4.7: Auto correlation test (Breusch-Godfrey Serial Correlation LM Test)

F-statistic	1.626577	Prob. F(1,2)	0.3303
Obs*R-squared	10.76438	Prob. Chi-Square(1)	0.0010

Source: Author's Computation

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This study employed modified and extended aggregate production framework and capital expenditure (GCE), recurrent expenditure (GRE) and official development assistance (ODA) categorization of public expenditure to examine the effects of public expenditure on economic growth in Nigeria for the period (1981-2018) using bound test approach. The data used for the study were obtained from the Central Bank of Nigeria Statistical Bulletin (various issues) and World Development Indicator (2018). The ARDL bounds tests co-integration result shows the existence of a long-run relationship between the macroeconomic variables estimated in the model. The results of the study indicates that recurrent expenditure (GRE) has positive impact on economic growth both in the short-run and in the long-run, countering the widely held view that government consumption spending is growth-reducing. The capital expenditure (GCE) and foerign development assistance (ODA) have negative impact on economic growth in Nigeria both in the short-run and in the long-run. The capital expenditure (GCE) negative impact is in line with Nurudeen and Usman (2010) finding for Nigeria while ODA negative impact contradicts Siraj (2012) finding for Ethopia. The granger causality test result shows no causal relationship between LGDP and LGCE and between LGDP and LODA. However, LGDP does granger cause LGRE and LGRE does granger cause LGDP, which implies a bi-directional causal relationship between LGDP and LGRE for the observed period. The Breusch-Godfrey Serial Correlation LM Test result indicates that there was no evidence of serial correlation.

The negative impact of GCE and ODA on economic growth in Nigeria implies that GCE and ODA have not translated into sufficient government gross capital formation to propel economic growth in the country. This may be due to relatively low GCE and ODA as revealed in the overview of GCE, GRE and ODA in Nigeria as well as mismanagement of public funds and endemic corruption reported in Nigeria, where a large chunk of public funds is diverted into private pockets instead of expending on execution of capital projects and government investment. Based on the findings of this study, it is recommended that there should be less emphasis on ODA and proper channelling of whatever ODA received to productive activities, which have significant positive impact on economic activities. ODA is a very unreliable source of finance, hence Nigeria should not heavily depend on it. In order to enlarge the productive capacity of the economy, government should restructure its spending away from consumption; hence greater percentage of public fund should be expended as capital expenditure and such fund should be properly utilized on acquisition of physical capital and social overhead capital like transportation, communication, irrigation, flood control, research and human capital development, capital formation in agricultural and industrial sectors. Finally, the fight against

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corruption in the country should be frontally confronted to free more public fund for collective development purposes in the country.

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