# THE PUBLIC EXPENDITURE SIZE AND ECONOMIC GROWTH IN A DEVELOPING ECONOMY: A CASE OF THE NIGERIAN ECONOMY

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**ABSTRACT***: The study investigates public expenditure size and economic growth in Nigeria from 1981 to 2017 with the aim of determining the optimal size of government expenditure that maximized growth in the economy. Time series data were employed in the analysis with the application of the classical least square of multivariate model, Augmented Dickey Fuller (ADF) was used in testing the stationary status of the data which shows that all variables turn statio*
*nary after first difference. The estimated result shows that government expenditure is a true determinant of economic growth in Nigeria with a marginal effect of .570406 and significance at 5% level of significance, while private investment has an inverse relationship with economic growth and not statistically significance at same level. The coefficient of determination and f-statistics also reveals that the estimated regression has a fair fit and generally significance. The computed government expenditure size of the country is 75.3% which is expected to be devoted on productive activities that will enhance the economic decision of other economic agents in promoting growth and industrialization. We recommend for efficient utilization of productive resources and ease of tax burden to promote economic productivity in the economy*.
**Key words: Government, Expenditure Size, Economic Growth, Nigeria**

## INTRODUCTION

Theoretical and empirical evidence reveals high levels of government expenditure, as a share of the economy, can be detrimental to economic growth due to the economic costs of raising taxation to finance such expenditure. According to New Zealand Treasury (2011), there is strong evidence that taxes reduce economic growth through their negative impact on incentives to work, save and invest.

The provision of public services may also drag down growth if public sector productivity is lower than what is obtainable in the private sector.

However, scholars emphasize that we cannot divorce the economic growth impact on the level of expenditure from the mix of expenditure and revenue. Hence, the need to balance the

economic costs of taxation against expenditure benefits is paramount, much of which contributes to economic growth. The participation of government in promoting growth and development in an economy has been crucial in recent theoretical development in economics and political economy.

After Keynes postulation on full participation of government in the economy, most economies utilized the lead way while others abused it by encouraging fiscal illusion through over flooding the budget with unproductive expenditure, mitigating economic productivity as a results inflation, high cost of investment, and capital flight. The question is what level of government participation is required in an economy to enhance growth; scholars are yet to establish this. The reason been that every economy has their own unique cultural diversities and policies apply in developed economies are less effective in developing economies.

Armey (1995) popularized the existence of an optimal size of government as depicted by his curve. He illustrated the existence of a government share of GDP that maximizes growth.

Studies on the size of government and GDP or GDP growth has focused on the size of Federal Government spending in Nigeria from 1970 – 2010 by Nworji & Okwu, (2012), the size of public expenditure and economic growth in ECOWAS state from 1986 – 2004  by Oteng-Abayie, (2011), the impact of government spending on economic growth from 1977-2012 by Chude and Chude, (2013), government spending and economic growth nexus in Nigeria from 1970-2009 by Oyinlola and Akinnibosun, (2013), and time series analysis of public expenditure and economic growth nexus from 1977-2006 (Maku 2011).

While in other countries, Heitger (2001) distinguishes between government consumption and investment spending. According Yavas (1998), increase in the size of government increase/decrease output at low/high output level. That due to lack of infrastructure and public goods most developing countries enjoyed high public participation in the economy as compared to developed countries.

In another development, Suleiman (2009) asserted that government participation rate and it implication on growth results fiscal management problem in most emerging economies resulted from external shocks and volatility of finances, the role and size of government become germane to adjustment and stabilization programmes.

Economists of the leviathan public choice school tend to support a view that sees a large public expenditure as detrimental to economic growth. Public choice theorists established the adverse influence of government size on employment. Feldman (2006) cited in Cullis and Jones (2009) details the links from a large government spending to increase unemployment.

First it crowds out the private sector especially private sector investment reducing technical progress, productivity
 growth and international competitiveness. Secondly, with a relatively small private sector there is a reduced ability to absorb labour force entrants and those made unemployed by structural changes in the economy both fostering long run unemployment.

Thirdly and most importantly, there exists the effect of the implied higher tax burden. Taxes reduce disposable income, aggregate demand, and whilst at the same time reduces the profitability of private investment thereby reducing its attractiveness. Thus, the long run effect is investment and growth reduction. He concludes that countries with both high unemployment and large government expenditure should consider a reduction of the size of the government as a means of fighting unemployment and growth promotion.

**Statement of the Problem**

Nigeria as a developing economy with features of high rate of unemployment and ever-increasing size of the government expenditure, all forms of revenue raise from taxes have potential disincentive effects and the latter effect being the one of crowding out.

Then adhering to the principle of increasing size of government spending is consequential to growth. Ajie, Akekere, and Ewubare (2009) opined that in a developed economy through economic stabilization, stimulation of investment activity, and so on, the size of the government maintains a rate of growth which is a smooth one.

Ajie et al further emphasized that in less developed economy the government size has an active role in reducing regional disparities, developing social overheads, creation of infrastructure of economic growth in the form of transport and communication facilities, education and training, growth of capital goods industries, basic and key industries, research and development and so on.

Hence, the government size plays a great role in stimulating savings and capital accumulation in the context of taxation and other measures being pursued by the government and that there is a coordination between different objectives and institutions.

The Nigeria experienced in the 1970s to late 90s, and from early 2000s to date of increasing size of government in the economy via deficit financing contradicts Keynes principle (see different volumes of CBN statistical bulletin for details).

Rahmanti and Horn (2010), examine expenditure efficiency and the optimal size of government in developing economies from 1990to 2003, using Data Envelopment Analysis (DEA) discovered that a critical level of efficiency is required for government expenditure to have positive effect on growth, and beyond that critical level greater efficiency lower the optimal size of government required to maximized growth.

Nigeria was among the sixty-three (63) economies in their analysis; however, they fail to establish an optimal level of the government expenditure that maximizes growth of the economy. Reason behind this failure was not explained, but may be as a result of the period under review or lack of viable data.

Public choice scholars argued that a failing of democratic process like that of Nigeria is that of exploiting fiscal illusion by politician. Politicians gain momentum in promoting little or zero tax and fiscal rascality. In as much as we sustain Keynes principle of government participation in the economy which has resulted to fiscal illusion in most developing economies and literature on optimal size of government in Africa and specifically Nigeria are rarely accessible if available, necessitates this study to cover this literature gap by investigating the optimal size of government participation in the economy with its implication on economic growth in Nigeria.

Addressing this problem, we intend to answer the questions like what is the optimal size of government that maximize growth. And what complement government expenditure in promoting growth in the economy?

**Objectives of the Study**

The broad objective of this study is to investigate the size of government expenditure that maximizes growth in Nigeria. The attainment of this purpose will be guided by the following specific objectives:

i. To examine the impact of government expenditure on economic growth.

**ii.** To determine the optimal size of government expenditure that maximizes economic growth and

**iii.** To critically evaluate the impact of the related factors that complement government expenditure on economic growth

## Hypothesis

The formulated null hypothesis is

i. Government expenditure has no significant effect on economic growth in Nigeria

ii. There is no significant relationship between private investment and economic growth in Nigeria

## Significance of the Study

This study is seen as a new measure of fiscal issues in Nigeria and as such the study will serve as a policy tool to the government in readdressing their fiscal measures in stabilizing growth. Secondly being a new aspect of public expenditure in the west African sub-region with reference to Nigeria as a country, it will add to existing stock of literature on government spending and economic growth relationship. Finally, it will serve as a source of reference to academician and students in economics.

## Scope of the Study

The study is expected to cover a period of thirty-six years from 1981 to 2017 with reference to the Nigerian economy as a case for developing economy. The choice of this period is base to data availability.

## RELATED LITERATURE REVIEWED

In this section we reviewed both theoretical and empirical literature on the optimal size of government. Theoretically we will focus on growth theories with emphasis on the neoclassical models with the integration of government.

The concepts of optimal size of government emerge in the early sixties after the sermon of deficit financing had been preached by Keynes (1936) in his General Theory of income, interest and employment. Critical evaluation of these theory is credited to Scully (1994), Barrow (1990), Ram (1986), Armey (1995), to mention but a few.

Most empirical literature reveals the negative impact of large size of public spending on economic growth. Theoretical literatures provide two main categories of arguments that explain the public spending size in time and among countries. The first category has as starting point with the Wagner's law, which emphasized on the elasticity of governmental expenditures compared to GDP is greater than one.

As countries become more developed, the demand for public goods rises and is consistent with the increasing ability to collect the necessary funds. On the other hand, the Baumol cost, explains that the percentage of governmental expenditures increases because the rise of public servants' salaries is higher than their productivity, while the price related to public services demand is relatively non-elastic.

The second category of arguments is political. For election purposes, the fiscal policies, especially those concerning the governmental expenditures, tend to be inconsistent in time and focuses on greater deficits and greater public spending. The question the revolve within our mind right now is what mean by the optimal size of government. This is the maximum share of government expenditure in promoting economic growth in an economy. We believe

on the principle of diminishing return wherein a continuous participation of government in the economy holding every other economic agents 'activity constant will enhance economic growth positively (an increase) at the initial stage and later sustain/stabilize (constant return) its impact, any further injection/government participation will rather deplete output. Our concern is the size that will stabilize growth.

## Theories on Government Spending and Economic Growth

### Neoclassical growth theory

In neoclassical models (pioneered by Solow and Swan 1956), there are diminishing returns to capital and the long-term growth rate is exogenous. Novel or higher taxes will affect GDP by creating a distortion in the form of a wedge between supply and demand. As a result, some transactions that would take place without the tax will not take place when the tax is levied.

However, this effect is static and when taxes are constant (at any level) the economy will grow at a rate determined by exogenous technological progress. Because neoclassical growth models omit the factors that explain long-term growth they are sometimes viewed as at best less useful and at worst inadequate. Nevertheless, even static policy effects can be sizeable, affecting the level of savings or the level of employment.

According to Feldman (2006) considering that taxable income is probably more responsive than hours worked; static welfare costs of taxation may be large. Also, effects that in the theoretical model appear as temporary‖ may still last for twenty years or more as the economy adjusts to a new steady state.

### Endogenous growth theory

In endogenous growth models (pioneered by Romer 1986), the production function is specified without diminishing returns. As a consequence, anything that affects the level of technology also affects the long-run per capita growth rate. This means the growth effects of distortionary tax wedges are conceivably far greater than in neoclassical growth models. According to King and Rebelo (1990), the welfare cost of a 10 percent increase in the income tax rate can be forty times greater in basic endogenous growth models than in neoclassical growth models.

On the other hand, the potential growth gains from what Barro (1990) calls productive government spending is also higher in endogenous models. Hence, the negative effects of higher taxes may be partly or completely offset by government spending on, for example, education and health care, which may lead to higher long-term growth as they enter growth models as higher levels of technology.

In other words, as taxes cause dynamic efficiency losses through effects on occupational choice, schooling attainment, and other decisions that affect the accumulation of human capital, these effects may partly or completely be offset by public expenditure on education.

### Institutions as fundamental determinants of growth

The most recent trend involves investigating the role of institutions on economic growth. Several studies, following works like North (1987), have tested and found strong support for the idea that certain fundamental institutional arrangements are crucial for economic growth – probably the most important being the rule of law and well-functioning

property rights. The critical role of the latter as more important for growth than factors such as geography and trade was stressed in a famous paper by Rodrik *et al.* (2004). Successive literature reviews by Armey (1995), Abdiweli (2003) and Asoni (2008) have confirmed the consensus that institutions matter for growth. In addition to the importance of well-defined property rights, Abdiweli empirically confirmed that judicial efficiency, low levels of corruption and a well-organized public bureaucracy also co-vary positively with high levels of growth.

The risks of a breach of contract or government expropriation have clear negative effects on growth.

**The Armey curve**

The Armey curve outlines the fact that an increase in the level of public expenditures in GDP can be translated into social welfare and economic growth up to a certain level, beyond these point additional expenditures will be generating a reversed effect (Armey, 1995).

In a state of anarchy, output per capita is low, similarly, where all input and output decisions are made by government, output per capita is likewise low. Where there is a mix of private and government decisions on the allocation of resources, however, output often is larger.

The output-enhancing features of government dominate when government is very small, and expansions in governmental size are associated with expansions in output.

At some point, however, further expansion of government no longer leads to output expansion, as the growth-reducing aspects of government grow larger, and the growth enhancing features of government diminish. Further expansion of government contributes to economic stagnation and decline (Armey, 1995).

Why is this so? In a world without government, there is no rule of law, and no protection of property rights. Bullies and strong people can steal the assets of weaker persons with impunity. There is little incentive to save and invest because the threat of expropriation is real and constant. Moreover, without some collective action, there is no protection from bigger bullies, namely foreign nations, or pirates on the high seas. Collective action also facilitates the creation of roads that improve transportation and lower trading costs. Government can also create a reliable medium of exchange, further developing the gains from trade.

Thus, the establishment and early growth of government is associated with rising levels of income and positive rates of economic growth (Vedder and Gallaway, 1998).As governments grow, the law of diminishing returns begins operating. Moreover, the taxes and/or borrowing levied to finance government impose increasing burdens. New taxes, such as income taxes, are added to low consumption levies, with increasingly adverse effects on human economic behavior.

Tariffs are raised, thwarting trade. New government spending no longer enhances economic growth. When government is small, political actions at income redistribution via tax policy or through payments to the poor are modest in magnitude. As the payments grow larger and more comprehensive, they lead to pronounced work disincentive effects. Thus, it is to be expected that as government absorbs an increasingly large percent of national output, incremental spending will actually have an adverse effect on output (Vedder and Gallaway, 1998).

The Armey Curve does not suggest that all government is bad. To the contrary, some government serves the public good. But like most good things, too much of it is harmful. Just as drinking one glass of wine daily may be good for the drinker's health but drinking 10 glasses is bad, so government in moderation is good for the economy while in excess it is bad.

Hence, as spending rises, additional projects financed by government become increasingly less productive and the taxes and borrowing levied to finance government impose increasing burdens. At some point, the marginal benefits from increased government spending become zero (point G* in Figure 1).

**Figure 1:** Government spending and the economy (the Armey Curve)
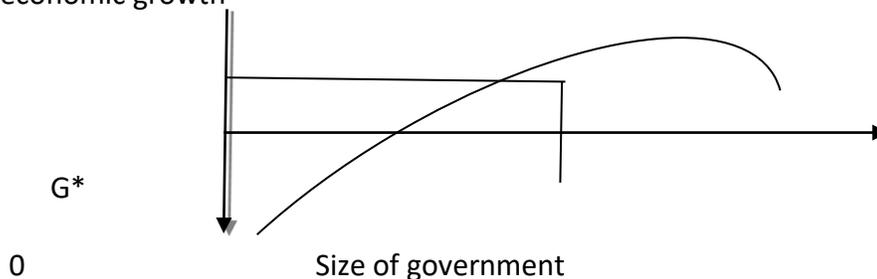


According to Chao and Grubel (1998), several forces shape afore mentioned inverted U curve. Namely, they stress that the law of diminishing returns to additional government spending exists and the additional
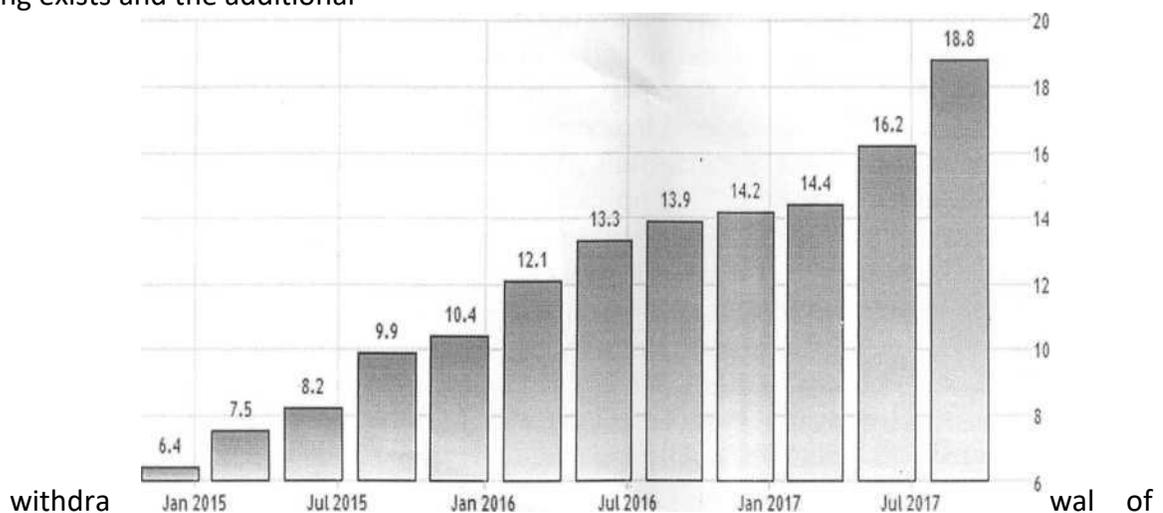


withdrawal of resources from the private sector more and more occurs at the cost of projects with ever-higher returns. Besides, in order to raise revenue to finance government spending, taxes have to be imposed, which reduce the private sector's incentives to work, save, invest, and take risks. Nevertheless, some of the spending programmes can also disincentive effects if they lower the risk of economic life.

These effects change economic behaviour of individuals, which decrease the effective supply of labour and entrepreneurship. As Chao and Grubel point out, all these forces reduce economic growth.

Milton Friedman, comparing the United States and Hong Kong, put it well recently: Government has an essential role to play in a free and open society. Its average contribution is positive; but I believe that the marginal contribution of going from15% of the national income to 50% has been negative (Friedman, 1997). Friedman opined that the threshold where government's role in economic growth is probably somewhere between 15 and 50 percent of the national income or output.

**Government Size and Economic Growth**

Economic theory thus suggests several mechanisms by which government activity can affect growth. However, these mechanisms do not suggest an unambiguous link between government size and growth. In fact, there are many reasons to expect a relationship that is inversely U-shaped, a hypothesis sometimes referred to as the Armey-curve (Armey 1995). At the bottom rung of less developed countries there appears to be a positive association between tax revenue and growth, as states succeed in collecting taxes, providing the necessary stability for economic activity to start growing (Besley and Persson 2009).

The most basic tasks for government, such as protecting property rights and the rule of law, can be accomplished at low levels of taxation. When such a minimal Hobbesian state expands to providing things like infrastructure, basic health care and education, the effect of government size on growth is more likely positive than negative. However, if productive government expenditures are characterized by decreasing returns, the negative effect of taxes to finance public expenditure may at some point dominate the positive effect of growth-promoting government activities (Bergh and Henrekson, 2011).

There are also reasons to expect the marginal negative effect of government size to increase in absolute terms as government grows. For instance, Angell (1996) noted the distortionary effect of taxation is proportional in size to the squared tax rate. Distortions are small for low levels of taxation, but as taxes increase, they grow rapidly, beyond a certain point becoming extremely large. An additional reason to expect rich countries to show a negative correlation comes from the mechanism suggested by Olson (1982): Organized interest groups tend to evolve, and strive to obtain advantages for themselves in the form of legislation or transfers which have a side effect, retarding the normal functioning and growth of the market economy.

The scope for interest group action of this kind is likely to be greater in countries with larger public sectors. This situation is compounded as the public sector grows, as the potential profits from rent-seeking activities are larger. This may lead to a greater diversion of resources into unproductive use (Buchanan 1980).

There are thus several theoretical reasons to uphold the following contrasting pattern:

**1.** In poor countries, public sectors are typically small, and the relationship between government size and growth is positive.

**2.** In rich countries, public sectors are typically large, and the relationship between government size and growth is less positive than in poor countries, and possibly negative.

The concern is, have developing countries democracies with reference to the Nigerian democracy reached a point where government size becomes an impediment to growth. Although volumes of empirical studies have been conducted, there is no consensus on the impact of government size on economic growth. Most economists believe a larger government size than a certain optimal level has detrimental impact on economic growth due to the inefficiencies inherent in government. Government has as its most basic function the protection of life and property which is the foundation for the efficient operation of a market economy. In addition, a provision of limited set of goods and services, called public goods, such as roads and national defense, may also enhance economic growth. However, Gwartney, Lawson, and Holcombe, (1998) states, as governments move beyond these core functions, they will adversely affect economic growth because of (a) the disincentive effects of higher taxes and crowding-out effect of public investment in relation to private investment, (b) diminishing returns as governments undertake activities for which they are ill-suited, and (c) an interference with the wealth creation process, because governments are not as good as markets in adjusting to changing circumstances and finding innovative new ways of increasing the value of resources.

Liu, Hsu, and Younis (2008) examined the causal relationship between economic growth and government spending for US data to further clarify which of them causes the other. Their result further supports Keynes' postulation.

Thus, in the US, Keynes postulation has a stronger position than Wagner's. With respect to ECOWAS countries Iyare, Lorde and Francis (2005) and Oteng-Abayie and Frimpong (2009) found no long run causal relationship between government expenditure and economic growth. Oteng-Abayie (2011) revisited the issue using an expanded data covering five ECOWAS member countries, as against three by Oteng-Abayie and Frimpong (2009), explore a cointegration relationship between government expenditure and economic growth with the application of panel cointegration approach, his result showed that there is no long run relationship between government expenditure and economic growth in the five ECOWAS Countries (Gambia, Ghana, Guinea, Sierra Leone and Nigeria) covering from 1986 to 2004.

In another development, Abu and Abdullahi (2010) observed that a rising government expenditure has not translated to meaningful development as Nigeria still ranks among world's poorest countries. In an attempt to investigate the effect of government expenditure on economic growth, they employed a disaggregated analysis. The results reveal that government total capital expenditure (TCAP), total recurrent expenditures (TREC), and government expenditure on education (EDU) have negative effect on economic growth. On the contrary, rising government expenditure on transport and communication (TRACO), and health (HEA) results to an increase in economic growth.

Chude and Chude (2013) investigated the effects of public expenditure in education on economic growth in Nigeria from 1977 to 2012, with particular focus on disaggregated and sectoral expenditures analysis. Government expenditures are very crucial instruments for economic growth at the disposal of policy makers in developing countries like Nigeria using Error Correction Model (ECM). The results indicate that total educational expenditure is highly and statistically significant and have positive relationship with economic growth in the long run. Oyinlola and Akinibosun (2013) examine the relationship between public expenditure and economic growth from 1970-2009.

A disaggregated public expenditure level was employed using the Gregory-Hansen structural breaks co-integration technique. The result confirms Wagner's law in two models in the long run; there was a break in 1993 in which the political crisis that engulfed the nation was accountable. The result also shows that economic growth and development are the main objectives of government expenditure, especially investment in infrastructure and human resources all of which falls under social and community services.

Again, Nworji and Okwu (2012) for the same period established that capital and recurrent expenditure on economic services had insignificant negative effect on economic growth.

Also, capital expenditure on transfers had insignificant positive effect on growth. But capital and recurrent expenditures on social and community services and recurrent expenditure on transfers had significant positive effect on economic growth. Consequently, the study recommended more allocation of expenditures to the services with significant positive effect.

Egbetunde and Fasanya (2013) from 1970 -2010 using Autoregressive Distribution Lag established impact of total public spending on growth to be negative which is consistent with other past studies. And finally, Mitchell (2005) has argued that a large and growing government is not conducive to better economic performance. From the literature seems that public expenditure has a crucial impact on growth.

Barro (1990), Armey (1995), and Scully (1994, and 2008) theoretical and empirical research popularized the existence of an optimal size of government as depicted by an inverted U curve. Chen and Lee (2005), examining the presence of Armey curve in Taiwan and using data from 1979-2003, estimated the threshold levels for the government total, consumption and investment expenditures as 22.84, 14.97 and 7.30 percent respectively and suggest that Armey curve holds.

Again, Abounoori and Nademi (2010), for Iran from 1959-2006, find out that the threshold levels of government total, consumption and investment expenditures are 34.7, 23.6 and 8 percent. They conclude that a nonlinear relationship between the government size and economic growth exists in Iran. Vaziri, Nademi, Paghe, and Nademi, (2011), cited in Turan (2014) using data from 1960 to 2007 for Pakistan and Iran, detect a nonlinear relationship between government expenditure and economic growth and conclude that Armey curve is valid. Husmain (2011) investigate if the size of government is optimal in Paskistan with balance budget assumption, using the Scully (1994) model for the period thirty-three years (1975-2008).

The time series analysis reveals that government size is optimized when public expenditures stand at 21.48% of GDP. The estimated threshold size is lower than the current size of government in Pakistan. However, the difference between current and optimal size is very small. This suggests that enhancing efficiency of public sector is the better option than large fiscal adjustments to improve level of economic growth as average tax burden does not far exceed the optimum level.

Turan (2014) examines the relationship between a size of the government and the economic growth and estimates the optimal size of the government for Turkey by using two different specifications. He established that the optimal size of the central government varies from 8.8 (15.4) to 9.1 (17) percent of GDP for 1950-2012 (1970-2012) period, depending on the

specification. The optimal size of the central government expenditures excluding the interest payments is 14.4 percent of GDP.

The actual rates have been well above the estimated optimal ones for a long time. The results of the quadratic specification also suggest that Armey curve is valid for Turkey during the period examined. We find that the estimated optimal sizes of the government from different specifications are consistent with each other, but there is a substantial variation in the size when different time periods are used. This shows that Armey curve is

Sensitive to change in the time periods. It worth mentioning here that literature on Armey curve or optimal size of government and growth maximizing in Nigeria are scarce, and this is the gap this study tends to cover within a period of thirty-five years (1981-2015)

**METHODOLOGY**

With reference to theoretical framework, this study employed Scully model that estimates the share of government spending that maximizes real economic growth. The mathematical formulation is based on a nonlinear Cobb-Douglas production function with a government and a private sector.

The public sector provides goods financed with tax revenues that is $\frac{G}{Y} = \tau$ and 1-τ is the share retained by private sector after tax payment. The total output consists of the contribution of both private and public sectors.

**Y = γ (G/Y)$^{\alpha}$ + (1-τ)$^{\beta}$1**

Where Y is real GDP

G is government expenditure

τ is tax to GDP ratio

γ is arbitrary production factors

α is relative share of government output and

β is relative share of private sector output

Linearizing the above equation by taking the logarithm of equation (1) result to

**lnY = lnγ + α ln(G/Y) + β ln(1-τ)2**

Withthe assumption of a balance budget equation 2 results to

**lnY = lnγ + α ln(τ) + β ln(1-τ) 3**

To obtain the optimal size that maximize growth we differentiate equation 3 which result to

**τ\* = $\frac{\alpha}{\alpha+ \beta}$4**

The estimated parameters in eqn. 3 substituting into eqn. 4 estimate the optimal size that maximize the growth rate of the economy. The adoption of this framework is as a result of its efficiency in previous studies by scholars, and also the model satisfies all the basic assumptions of classical least square, hence, will proffer an efficient estimate. Thus, our model is quadratic and interacted in nature as specify in the next section.

**Model Specification**

With reference to the above theoretical framework of Scully (1994, 2008) we specify our model as follows;

**Q$_t$ = A(GEXP)$^{\beta}$+ X$^{\alpha}$      (0 < β, α < 1) 5**

Linearizing equation 5 by taking the logarithm

**LnQ$_t$ =LnA+ βLn(GEXP) + αLnX$_t$  6**

Introducing the error term, making eqn. 6 more econometric result to eqn. 7

**$LnQ_t$ = LnA + $\alpha LnX_t$ + $\beta_1 LnGEXPt$+ $\mu$   7**

Where LnQ is the log of output (real GDP) proxy for economic growth

*GEXP* is log of government expenditure

*X* is Private Investment

t subscript stand for time period and

μ is the random term which is assumes to independently and identically distribute (iid).

The optimal size of the government is obtained by differentiating equation 7 taking cognizance of the model nature being linear and not quadratic and variables interaction,

**GEXP* = 1 $- \dfrac{1}{(\beta)}$ 8**

The estimate of eqn. 8 is the optimal size of the government that maximizes growth in the economy, which address objective two of this study.

**Estimation Procedure**

All-time series data seeming to be non-stationary at level, so in order not to run into spurious analysis we will employ the Argument Dickey Fuller (ADF) test to examine the Level of Stationarity (order of integration) of the data collected. Secondly, we will also test for none violation of the Classical Least Square assumptions (Multicollinearity, Autocorrelation, and Heteroskedasticity).

**Data Source and Collection**

The data for this research work was collected from secondary sources. The bulk of data are from publications of the Central Bank of Nigeria (CBN) Statistical Bulletin, International Monetary Fund (IMF), National Bureau of Statistics (NBS), The World Bank, and Journal Articles. The data cover from 1981 to 2017, the choice of this period is as a result of data availability, and the existence of crucial fiscal measures within the period by the government of the country.

**Result and Discussion**

The unit root test result

| Variables | ADF stats | Critical values at level | Critical values at $1^{st}$ difference | Order of integration |
|---|---|---|---|---|
| LNRGDP | -5.5839 (0.0003) | | -4.2436 -3.5443 -3.2047 | I(1) |
| LNGEXP | -4.2529 (0.0032) | | -4.2529 -3.5485 -3.2071 | I(1) |
| LNPRINVEST | -9.0784 (0.0000) | | -4.2436 | I(1) |

| | | | -3.5443 | |
| | | | -3.2047 | |
| RESIDUAL | -3.6570 (0.0000) | -3.6394 -2.9511 -2.6143 | | I(0) |

**Estimated model**

LNRGDP = 10.6489 + 0.5704LNGEXP − 0.1633LNPINVEST

P-values             0.0001              0.0822

$R^2$ = 0.4695        F-stats = 15.0427 (0.0000)         DW = 0.520971

The estimated regression line above is the exact relationship between government expenditure and economic growth with an intercept of 10.6489.

The sign and size of the estimated parameter are in line with theoretical postulation on the relationship between government expenditure and economic growth, which satisfy our apriori expectations, with a marginal effect of 0.5704 on economic growth at a unit change in government expenditure.

Positive impact of government expenditure on economic growth agree with previous findings like Abu & Abdullahi (2010), Egbetunde &  (2013), Chude & Chude (2013), and Abounoori & Nademi (2010) and large productive size of government participation in the market. In accordance with the public choice theory the role of government in developing economy is quite different from that of developed economy and as such the size also varies. On the other hand, private share of the economy output has an inverse relationship with economic growth, that a unit change in private investment will reduce the marginal value of economic growth by 0.1633.

Addressing objective two of our study, the result shows that the optimal size of government that will maximize growth in the economy is 75.3%. If government channel such percentage of the annual budget to productive economic activities growth is maximized with positive impact on citizens' welfare.

This result contradicts previous findings of advance economies of 38 to 45 percent of government size in the economy, beyond that further release of fund will amount to fiscal illusion and crowding out of the private sector from the market. The size of government is so large because almost 100% percent of the private sector contribution to the economy depends on government fiscal policy decision.

The result further reveals that government expenditure is a true determinant of economic growth in Nigeria as rightly indicated by the computed probability value of 0.0001 at 5% significance level. While the control variable, private investment seems not to be at same level of significance but does at 10%. The coefficient of determination shows that government expenditure and private investment determine about 47% of the total variation of the economic growth in the economy.

This implies that the estimated regression line has a fair fit, and this was further confirmed by the computed f-statistics value which reveals that the overall regression line estimated is significance at same level of significance and as such is different from zero. The unit root test result shows that all the variable turn stationary at first difference, and the stationary of the residual at level implies that the estimated regression line is true. With reference to the rule of tomb the estimated regression line satisfies all the classical assumptions as rightly indicated by the computed Durbin Watson value, hence, there is autocorrelation.

## CONCLUSION

The findings of the study on the size of public expenditure and economic growth met all objectives; that government expenditure is a true determinant of economic growth, the optimal size of the government to maximize growth in the economy is 75.3 percent which is quite high with reference to other advanced economies but commensurable with most developing economies, and finally, the control variable which is private investment happen to be insignificance in determining the variability of economic growth in the economy at 5% level of significance.

Nigeria as a developing economy over the years has striven to foster and sustain growth by introducing different economic policies and developmental plans. These measures centers on the effectiveness of macroeconomic policy stabilization, wherein fiscal policy is the armament of economic defense.

There is no gainsay on the effectiveness of government spending in promoting growth, however, the state spending should revolve within its bound to avoid low productivity, unemployment and inflation. We believe the manipulation of government expenditure will continue to enhance growth at a margin of .570406, that is at a hundred percent increase in government expenditure, growth will improve by 57 or more percent, which is a good stand for an emerging economy to gear towards industrialization, as disposable income continues to be stable with stable tax burden on the masses.

## RECOMMENDATIONS

Base on the above findings we then therefore, recommend that:

i. Government should endeavour to limit its participation within the defined bound and allocate productive resources on productive activities that will enhance economic agents' economic decisions.

ii. Government expenditure as policy instrument should be seen as a productive drive of the economy by politician through efficient allocation and utilization of resources to compliment productive private sector for growth optimization.

This we believe will promote growth and industrialization if strictly adhere to by political office holders and policy makers.

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**APPENDICES**

Dependent Variable: LNRGDP
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 04/05/19   Time: 05:11
Sample: 1981 2017
Included observations: 37
LNRGDP = C(1) + C(2)*LNGEXP + C(3)*LNPINVEST

|  | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | 10.64895 | 0.523304 | 20.34946 | 0.0000 |
| C(2) | 0.570406 | 0.130342 | 4.376216 | 0.0001 |
| C(3) | -0.163349 | 0.091198 | -1.791148 | 0.0822 |

| | | | |
|---|---|---|---|
| R-squared | 0.469459 | Mean dependent var | 12.45033 |
| Adjusted R-squared | 0.438250 | S.D. dependent var | 1.296954 |
| S.E. of regression | 0.972067 | Akaike info criterion | 2.858820 |
| Sum squared resid | 32.12706 | Schwarz criterion | 2.989435 |
| Log likelihood | -49.88817 | Hannan-Quinn criter. | 2.904868 |
| F-statistic | 15.04275 | Durbin-Watson stat | 0.520971 |

| | |
|---|---|
| Prob(F-statistic) | 0.000021 |

Null Hypothesis: D(LNGEXP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -4.708372 | 0.0032 |
| Test critical values: | 1% level | -4.252879 | |
| | 5% level | -3.548490 | |
| | 10% level | -3.207094 | |

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNRGDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.583908 | 0.0003 |
| Test critical values: | 1% level | -4.243644 | |
| | 5% level | -3.544284 | |
| | 10% level | -3.204699 | |

*MacKinnon (1996) one-sided p-values.
Null Hypothesis: D(LNPINVEST) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -9.078420 | 0.0000 |
| Test critical values: | 1% level | -4.243644 | |
| | 5% level | -3.544284 | |
| | 10% level | -3.204699 | |

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: RESID_000 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

| | t-Statistic | Prob.* |
|---|---|---|
| Augmented Dickey-Fuller test statistic | -5.656956 | 0.0000 |

| Test critical values: | 1% level | -3.639407 |
| | 5% level | -2.951125 |
| | 10% level | -2.614300 |

*MacKinnon (1996) one-sided p-values.

In testing our hypotheses considering the fact that it gives a synchronize account of the