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GOVERNMENT EXPENDITURE SIZE AND ECONOMIC GROWTH IN NIGERIA: A THRESHOLD ANALYSIS

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Abstract

This study examined the optimal size of government expenditure that maximizes economic growth in Nigeria from 1970 to 2023 using a threshold analysis which employed quadratic and Threshold Autoregressive (TAR) models. The study employed time series data of Nigeria which were subjected to various diagnostic tests and the results revealed that the variables were suitable for estimation. The empirical results of the quadratic model showed a positive relationship between government expenditure size and real GDP growth, while the excess expenditure of government, measured by the square of government expenditure, has a negative impact on real GDP growth, suggesting a nonlinear relationship between government expenditure size and real GDP growth in Nigeria. The result also showed a significant influence of broad money supply and gross fixed capital formation on real GDP growth. Empirical evidence of the quadratic and TAR models, revealed the optimal size of government expenditure that maximizes economic growth in Nigeria to be approximately 18 percent, confirming the existence of Armey's curve in Nigeria. The Granger causality result indicated a bidirectional causality between government expenditure size and gross fixed capital formation, while a unidirectional causality existed between gross fixed capital formation and real GDP growth. Therefore, based on these findings, the federal government should ensure that an effective and efficient growth inducing fiscal policy management framework is put in place to ensure that government expenditure as a percentage of GDP is at the threshold value of 18 percent in order to promote economic growth in the economy.

Keywords:

Armey's curve, Threshold Autoregressive (TAR) Model, Real GDP and Quadratic Model.

1.1 Introduction

The impact of government size on economic growth has been the focal point of academic research for sometimes now. Some viewed a large government size as harmful to economic growth due to inefficiencies inherent in government, while others argued that a larger size of government is likely to enhance economic growth. Economists such as John Maynard Keynes and John Kenneth Galbraith have argued that an economy needs to be continually fine-tuned by an activist government to operate efficiently. This school of thought grew primarily out of the Great Depression (1929-1939), when markets seemed to fail and government intervention was viewed as the means to restore economic stability. The concept of state intervention to correct inefficiencies stresses that government activities contribute to the provision of vital public goods such as education, health, defense, security and infrastructure. Thus, as an economy grows, a growing government expenditure is also necessary to correct private-sector inefficiencies (Garrett and Rhine, 2006; Gunalp and Dincer, 2010). Similarly, Grossman (1988) and Dalamagas(2000), posited that government provides defense, social security, judiciary, property rights, regulations, infrastructure development, workforce productivity, community services, economic infrastructure, regulation of externalities, and marketplace. To this end, when both public and private capital formations are complementary to each other, government activities may encourage the private sector to increase their investment which consequently boosts economic growth (Akpan and Atan, 2010).

Conversely, other 20th century economists, such as Frederick von Hayek and Milton Friedman, have argued that an activist government is the cause of economic instability and inefficiencies in the private sector. Government should exist to ensure that a private market operates efficiently; it should not act to replace the market mechanism as large government spending may have negative spillover effects on the economy. In the same vein, the classical economists argued that excessive government spending may crowd out private investment, increase taxation, create inflationary pressure and reduce economic efficiency. Therefore, an optimal level of government spending which maximizes growth exists, in view of the fact that if government spending is very small, or even equal to zero, the economic growth would be very limited due to difficulties in the provision of public goods (Ram,1986; Garrett and Rhine, 2006; Asimakopoulos and Karavias,2015; Munene,2015, Okpabi, Ijuo and Edesin, 2021).

One measure of the role of government is the size of government spending relative to the economy. The size of government could be seen as the degree of participation of the government in provision of goods and services. It can be measured by looking at government's spending or revenues relative to the size of the country's economy measured by the Gross Domestic Product and changes in real GDP over time reflect the pace of economic growth or economic performance (Chobanov and Mladenova, 2009). Government expenditure is often regarded as a crucial stimulant of economic activities. In Nigeria, government expenditures enhance the operations of various economic agents and increase economic activities.

To this end, the identification of the government share of GDP which maximizes the real GDP growth becomes necessary because economic growth has suffered from the increase of government spending which has been above optimal levels in most countries. Although, Kormendi and Meguire (1986) posited that increasing government expenditure will promote economic growth and improve the country's investment environment, thereby causing a crowding-in effect on private investment, other studies (Folster and Henrekson, 2001; Dar and AmirKhalkhali, 2002) found a negative relationship between government spending and economic growth and stressed that expanding government size has the effect of a decreasing return of government expenditure and can cause a crowding-out effect to private investment.

Similarly, Armey (1995) proposed an inverted U-shape curve, which showed the relationship between the ratio of public expenditure to GDP and the variation of GDP, as a measure of the general welfare of the country. The idea beneath that shape is that a too low level of public expenditure would not allow the government to guarantee the functioning of the market economy, and therefore a positive GDP growth rate. On the other hand, very high rates of public expenditure to GDP would discourage citizens from investing and producing because of the high fiscal burden. Thus, there is an optimal level in the relationship between public expenditure and GDP that maximizes the GDP growth. Other empirical evidence has shown that up to a point, government expenditure will boost economic growth, but beyond some point, the extra spending is mostly wasted (Barro, 1990). This evidence reveals that there is an optimal size of government expenditure and that as the public sector grows larger, its positive contribution to growth becomes smaller and eventually has a negative impact on economic growth.

Empirical studies such as Pevcin (2000), Gunalp and Dincer (2005), Scully (1994), among others, have shown that there is no unique optimal size of government expenditure for all countries. Every country has its own optimal size of government expenditure which depends on a number of factors and conditions, such as, the level of economic development, the level of permanency and effectiveness of the institutions of the market economy, the effectiveness of the public sector and the state administration and population preferences, among others (Mitchell, 2005). Also, openness is proposed as an additional factor that has a positive effect on the scope of government, with the relationship being robust when the risk associated with terms of trade is highest (Rodrik, 1998).

However, since there is no empirical regularity as to the unique optimal size of government expenditure in Nigeria, there is need to empirically ascertain the optimal level of government expenditure size that maximizes economic growth for the period 1970 to 2023, In considering Nigeria's development and growth statusin spite of the huge government expenditure over the years (Oziengbe, 2013; WDI, 2012),the pertinent question therefore is, what is the right size of expenditure for the federal government of Nigeria from the standpoint of welfare maximization and economic growth? Has the size of government expenditure been too little, too much or about right from the standpoint of increasing the output of goods and services? In other words, what is the optimal size of government expenditure in Nigeria that would ensure macroeconomic stability, promote private investment and welfare maximization in the economy? The answer to these questions requires an empirical verification of the existence of Armey's Curve in Nigeria.Thus, the objective of this study is to determine the optimal size of government expenditure that maximizes growth and enhances economic performance in Nigeria using a threshold analysis.

2.1 Theoretical Literature

2.1.1 Wagner's Theory

Adolph Wagner, a German economist, developed the Wagner's theory in 1886. This theory which is popularly known as the Wagner's law, is primarily concerned with the explanation of the growth of the share of GDP taken up by the public sector. It states that as per capita income in an economy grows, the relative size of the public sector will grow also. According to Wagner's law, the development of an industrial economy will be accompanied by an increased share of public expenditure in Gross National Product. This suggests that the development in the industrial sector of a country will be accompanied by increased government expenditure through the provisions of key facilities such as; infrastructure, health services and security.

According to Musgrave (1989), as progressive nations industrialize, the share of the public sector in the national economy grows continually. Abizadeh and Yousefi (1988), equally posited that the size of government grows as an effect of industrialization. The richer a society becomes, the more the government spends in order to alleviate social and industrial stress. Therefore, Wagner's theory maintains that there is a functional relationship between the growth of an economy and government activities with the result that the governmental sector grows faster than the economy. Wagner reveals that there are inherent tendencies for the activities of different layers of a government such as central, state and local governments to increase both intensively and extensively. This is due to the fact that if the state would need to expand administration, law and order services, there would be an increased concern for distributional issues, and there would be a greater need to control private monopolies and other forms of market failures. Thus, the state grows like an organism reflecting changes in society and economy and making decisions on behalf of its citizens.

2.1.2 Peacock and Wiseman Displacement Theory

One of the traditional explanations as to why the public sector has grown over time is the Peacock-Wiseman Displacement Theory. This theory was expounded by Alan T. Peacock and Jack Wiseman in their well known 1961 monograph, 'The Growth of Public Expenditure in the United Kingdom' (Musgrave and Musgrave, 1984). The theory is based on the political theory of public expenditure determination in which government likes to spend more money, while citizens do not like to pay more taxes, and government needs to pay some attention to the wishes of their citizens. The theory assumes that there is some tolerable level of taxation which acts as a constraint on government behaviour. As the economy grows, tax revenue would rise thereby enabling public expenditure to grow in line with GDP.

According to Auld and Miller (1982), the Peacock-Wiseman Displacement theory dealt with the supply side by arguing that the rate of growth of public expenditures is driven by what taxpayers consider to be tolerable levels of taxation and that this tolerance is greater during times of national or social crisis. Thus, the public sector has grown in a step-like fashion of abrupt jumps and long plateaus driven by crises such as war. This means that a country's government spending does not follow a smooth trend, but some jumps at discrete intervals as a result of political instability such that government expenditure of a country increases during periods of social, political and economic upheavals. The theory has three underlying assumptions namely; government can always find profitable ways in terms of its votes to expand available fund; citizens in general are susceptible to higher taxes; and government must be responsive to the wishes of their citizens.

2.1.3 The Leviathan Theory

The Leviathan theory which was introduced by Thomas Hobbes in 1651, proposed that the aggregate government's intervention in the economy will be reduced as the taxes and expenditures are reduced, other things being equal. According to Buchanan (1980), the leviathan model is an explanation which considers government as a revenue-maximizing entity, whose ability and propensity to maximize tax-pricing revenue is only constrained by constitutional limits placed upon its activities. An example of such constraints is the constitutional provision for decentralization of spending and taxing powers among sub-national government. The cardinal hypothesis postulated by Buchaman (1980) is that the lesser the total government intrusion into the economy, other things being equal, the greater the extent to which taxes and expenditures are decentralized (Aigbokhan, 1997). Similarly, Rodden (2003), explained that the Leviathan theory emanates from the fact that the central government is viewed as a revenue maximizing leviathan that seeks to maximize her revenue by fiscal decentralization of the central government monopoly on taxation. This theory maintains that the more decentralized the central government is, the lower the government spending in the economy because the decentralized unit will be responsible for revenue generation and expenditure disbursement.

2.1.4 The Keynesian Theory

This is an economic theory based on the ideas of John Maynard Keynes also known as Keynesian economics. The theory promoted a mixed economy, in which both the state and private sector were considered to play an important role in an economy. Keynesian economics sought to provide solutions to what some economists believed to be the failure of *laissez-faire* economic system, which advocated that markets and the private sector operated best without state intervention. The Keynesian theory argued that an economy needs to be continually fine-tuned by an activist government to operate efficiently. The theory stressed the importance of aggregate demand for goods as the driving factor of the economy, especially in periods of downturn. The theory believed that increase in government expenditure can assist in pulling the economy out of depression through its effect on aggregate demand. Therefore, the Keynesians see demand as prerequisite for growth and their analysis concludes that aggregate demand policies can be used to improve economic performance. Accordingly, the growth rates of an economy vary with aggregate demand and as such firms react by producing more or less goods for consumer markets depending on the behavior of aggregate demand.

Keynes believed that during depression government intervention is needed as a short-term cure. The solution to economic depression is to induce the firms to invest through some combination of reduction in interest rates and government capital investment including infrastructure. Government will then increase public spending giving individuals purchasing power and producers will produce more, creating more employment. This is the multiplier effect that shows causality from public expenditure to national income growth. Keynes categorized government expenditure as an exogenous variable that can generate economic growth instead of an endogenous phenomenon (Munene,2015). The theory believedthe role of the government to be crucial as it can avoid depression by increasing aggregate demand and thus, switching on the economy again by the multiplier effect. According to Ram (1986) government expenditure can help improve the level of productive investment, hence economic growth and development can be secured. Thus government expenditure has a positive impact on economic growth.

2.1.5 The Real Business Cycle (RBC) Theory

The Real Business Cycle theory, which is a class of the new classical macroeconomic models, rejects the Keynesian economics and the real effectiveness of monetary policy as promoted by the new Keynesians and monetarists respectively. According to Abel *et al*. (2008), the RBC theory argues that the real shocks to the economy such as productivity shocks, the real quantity of government purchases, and the spending and saving decisions of consumers are the primary cause of economic fluctuations. The RBC theory posits that the level of national output necessarily maximizes expected utility and government should therefore concentrate on long run structural policy changes and not intervene through discretionary fiscal or monetary policy designed to actively smooth out economic short term fluctuations. According to the RBC theory, government expenditure crowds out private spending because the tax increase induced by the increase in government spending reduces net present value of disposable income which decreases consumption and output (Baxter and King, 1993). The RBC model relies on the consumption decisions of infinitely-lived Ricardian households subject to inter temporal budget constraints.

The Ricardian hypothesis assumes that households behave rationally and are forward looking and that households discount to the present all future taxes expected to be levied to meet interest payments on existing government debt (Argy, 1994). Thus, the expansionary effect of a disposable income due to reduction in tax is exactly neutralized by the deflationary effect of the expected future taxes, leaving real consumption unchanged. Other things being equal, higher taxes needed to finance higher government spending, negatively affect private wealth and consumption (Gali*et al*., 2004).

2.1.6 The Armey's Hypothesis

The concept of Armey's hypothesis originates from the theories of market and government failures. The theory of market failure justifies government intervention to correct externalities and provides public goods, while the theory of government failure, on the other hand, focuses on the possible harmful effect of the state's activity and expansion (Grossman, 1988). According to Armey (1995), low government intervention increases economic growth until it reaches a certain level and beyond this point, excessive government expenditure reduces economic growth. This is what is known as the Armey's curve.

The presence of a government and the provision of public goods create a growth-enhancing environment in the economy. Government contributions for regulation and up-keep of law and order further contribute to the growth of the economy by creating a safe economic atmosphere. Any expansion of government spending in the economy initially is associated with an expansion in output. Nevertheless, as spending rises, additional projects financed by the government become increasingly less productive. Armey (1995) puts this phenomenon into anillustration using graphical technique (an inverted U-shape curve) to explain the relationship between government spending and economic growth. Armey consequently indicates that the size of the government and the growth of the economy can be modeled as a quadratic function, that is, a concave curve, which assumes the role for both the linear term and the squared term of government expenditure in the economic growth process.

2.1.7 The Scully Model

Scully (1998) developed a model that estimates the share of government spending (or general tax rate) that maximizes real economic growth, using a production function specified in Cobb-Douglas form as follows:

$$Y=a(G_{t-1})^b[(1-\tau)Y_{t-1}]^c \quad \ldots\ldots(1)$$

Where Y is real GDP, G is total government spending (in constant prices), τ is total tax rate in the economy measured as the share of government spending as a percentage of GDP.

A balanced-budget assumption is made when $G = Ty$ each year. By substituting this assumption in Equation 2, we obtain:

$$Y=a(\tau_{t-1}Y_{t-1})^b[(1-\tau)Y_{t-1}]^c \quad \ldots\ldots(2)$$

By finding the first and second differential of Y with respect to τ, Scully model showed that the maximum real output is derived when government spending as a share of GDP equals the following:

$$\tau^* = b/b+c \quad \ldots\ldots(3)$$

Thus, the following equation is used to estimate the optimum level of government spending:

$$In(y_t)=ln(a)+bln((\tau_{t-1}Y_{t-1})+cln[(1-\tau_{t-1})Y_{t-1}] \quad \ldots\ldots(4)$$

Where, the index t indicates the period, y_t is real GDP per capita in year t.

Hill (2008), however, pointed out that the relationship in the Scully model produces spurious estimates of an optimal tax rate.

2.1.8 The Quadratic Model

The theoretical and quadratic relationship between government expenditure size and economic growth which is characterized by the inverted U-curve was given by Vedder and Gallaway (1998). The equation is given as follows;

$g_{it} = a + b(GC) + c(GC)_{it}^2$……………………………………..……………………………(5)

where; g represents economic growth, GC is total government consumption expenditure, and $(GC)^2$ is the square of total government consumption expenditure.

The government consumption expenditure as a share of GDP that maximizes economic growth from the quadratic function above is found to be the following after differentiating g with respect to GC: $g^* = -\frac{b}{2c}$……………………….………………………….…………………(6)

Vedder and Gallaway (1998) applied this quadratic functional form to United States data and found a nonlinear relationship between government spending and economic growth.

2.1.9 The Solow Neoclassical Growth Theory

The Solow neoclassical growth model which is credited to Robert Solow, is probably the best-known model of economic growth (Todaro and Smith, 2011). Although in some respect, the Solow's model describes a developed economy better rather than a developing one, it remains a basic reference point for the literature on growth and development. The model posits that economies will continually converge to the same level of income if they have the same level of savings, depreciation, labour force growth and productivity growth. Thus, The Solow model was theoretically expected to predict income per capita convergence. The Solow growth model is the basic framework for the study of the convergence across countries. This theory states that there are three factors namely; technology, capital and labour force that drive the economy.

The Solow neoclassical growth model is different from the Harrod-Domar because the Solow model allows for substitution between capital and labour. The standard exposition of the Solow neoclassical growth model uses an aggregate production function in which $Y=K^{\alpha}(AL)^{1-\alpha}$, where 'Y' is Gross Domestic Product, 'K' is the stock of capital(which may include human capital as well as physical capital), 'L' is labour, 'A' represents the productivity of labour which grows at exogenous rate and 'α' represents the elasticity of output with respect to capital. Because the rate of technological progress is given exogenously, the Solow neoclassical model is sometimes called exogenous model (Todaro and Smith, 2011). The basic assumptions of the Solow model are; the diminishing returns to labour and capital, constant returns to scale, competitive market equilibrium and constant saving rate. In the Solow model, technology is the residual factor that explains long term growth which is determined independently of all other factors in the model.

Moreover, the Solow neoclassical growth focused on the result that long-run growth is determined by technological change and not by savings or investment. Saving only affects temporal growth, or growth when is in its way to the long-term path, because the economy will run into diminishing returns as the ratio of capital per worker increases. The Solow model in which long-term economic growth per worker is explained by labor augmenting technological change and by the increase of capital per worker, gives the framework for the development of "total factor productivity" (TFP) concept.

As stipulated by Mankiw*et al*. (1992) and McCallum (1996), the Solow model is a complete theory of growth that gives the right answers to the questions it is designed to address. Conversely, when it comes to understanding the determinants of saving, population growth, and worldwide technological change, the Solow neoclassical growth model fails to give an explanation on them. In conventional neoclassical economics only physical and human capital accumulation and technology have been considered the long-term economic growth determinants *par excellence*, while the remaining variables have been limited to transitory effects on the rate of growth.

2.1.10 The Endogenous Growth Theory

The neoclassical theory of growth has its origins in the Harrod - Domar model that intends to explain the relationship between investment, growth rate and employment in an economy with stationary growth. This theory was developed by Paul Romer and Robert Lucas in the mid-1980s. It was formulated as a result of increasing dissatisfaction with new neoclassical growth models that did not explain where the technology changes in economies came from. The endogenous growth theory states that economic growth is generated internally and not by external forces as the Solow neoclassical model suggested. This theory represents a key component of the emerging development theory and provides a theoretical framework for analyzing endogenous persistent Gross Domestic Product (GDP) growth that is determined by the system governing the production process rather than by the forces outside the system. The endogenous growth theory seeks to explain the factors that determine the rate of growth of GDP that is left unexplained and exogenously determined in the Solow neoclassical growth equation. Contrary to the Solow neoclassical model, the endogenous growth theory explains GDP growth to be a natural consequence of long run equilibrium.

The endogenous growth theory explains that investment in human capital, innovation and knowledge are significant contributions to economic growth, because they help to develop new technology and make production become more efficient. Endogenous growth models suggest an active role of public policy in promoting economic growth and development through direct and indirect investment in human capital formation and the encouragement of foreign private investment in knowledge intensive industries such as computer software and telecommunications. It is pertinent to note that the endogenous growth theory helps to explain the anomalous international flows of capital that exacerbate wealth disparities between developed and developing countries. The potential high rate of return in investment offered by developing countries with low capital-labour ratios are greatly eroded by lower levels of complementary investment in human capital, infrastructure, and research and development (Todaro and Smith, 2011).

Hence, endogenous growth models are characterized by the assumption of non-decreasing returns to factors of production, and as an implication of this, it concludes that countries that save more, grow faster indefinitely and that countries do not need to converge in income per capita even if they have the same preferences and technology. On the empirical side, endogenous growth models become an alternative to the Solow model, when this fails to explain cross country differences, mainly related to the concept of convergence (Mankiw, 1992; Barro, 1989).

2.1.11 The Growth Accounting Model

This model states that an economy's output of goods and services depend on the quantities of available inputs, such as capital and labour, and on the productivity of those inputs. The relationship between inputs and outputs is described by the production function given as Y = AF(K,N), where Y is total output is capital, N is labour and A is productivity. If inputs and productivity are constant, the production function states that output also will be constant and there will be no economic growth. For the quantity of output to grow, either the quantity of inputs must grow or productivity must improve or both. The growth accounting equation which shows the relationship between the rate of output growth and the rate of input growth and productivity growth is; $\Delta Y/Y = \Delta A/A + \alpha_K \Delta K/K + \alpha_N \Delta N/N$, where $\Delta Y/Y$ is the rate of output growth, $\Delta A/A$ is the rate of productivity growth , $\Delta K/K$ is the rate of capital growth, $\Delta N/N$ is the rate of labour growth, α_K is the elasticity of output with respect to capital, and α_N is the elasticity of output with respect to labour(Abel*et al*., 2008). The growth accounting equation is the production function expressed in growth rate form and it measures the relative importance of these three sources of output growth (productivity growth, capital growth and labour growth).

Although the growth accounting model provides useful information about the sources of economic growth, it does not completely explain a country's growth performance because growth accounting takes the economy's rates of input growth as given. It cannot explain why capital and labour grow at the rates that they do. Therefore, by taking the growth of the capital stock as given, the growth accounting method leaves out an important part of the story (Todaro and Smith,2011).

2.2 Review of Empirical Literature

The empirical literature on the effect of government spending size on economic growth has been diverse and extensive. While some studies found a positive relationship between government expenditure size and economic growth, others found a negative relationship (Dar and Amirkhalkhali, 2002; Barro, 1990; Guseh, 2007; Armey, 1995; Scully, 1994).

Earlier empirical studies such as Ram (1986) and Karras (1996) found a positive relationship between government expenditure and economic growth. Karras (1996), for instance, using an approach based on Barro (1990) and observation on 37 countries over the period 1950 to 1987 found that permanent changes in government spending have positive effects on economic growth, but this growth declines as government size increases. The study found the optimal size of government to be 20 percent of GDP. In a study with a sample of 20 European countries for the period 1950-1990 using the theoretical framework of Barro, Karras (1997) developed an empirical methodology to investigate the role of government services in the process of economic growth, and found out that the optimal government size is 16 percent (+/-3 percent) for the average European country. The study concluded that the marginal productivity of government services may be negatively related to government size and that the public sector may be more productive when it is small.

However, majority of studies supports an inverted "U-shaped" curve relationship, also known as the BARS curve after Barro (1990), Armey (1995), Rahn and Fox (1996) and Scully (1995), between government spending and economic growth. In other words, the increase in government spending is beneficial up to a certain threshold and beyond that level the impact on growth is negative. As a result, several studies have tested the BARS curve following various estimation techniques (Karras, 1996, 1997; Chen and Lee, 2005; Gunalp and Dincer, 2010; Zhu *et al*., 2010; Altunc and Aydm, 2013).

Similarly, in the determination of the optimal size of government expenditure, some studies (Pevcin, 2000; Gunalp and Dincer, 2005) found the optimal size of government that maximizes economic growth to fall within the range of 15 to 30 percent, while others showed that the growth maximizing size of government spending lies between 15 and 25 percent of the GDP (Scully, 1994). In addition, Friedman (1997), opined that the optimal threshold of government expenditure to GDP is somewhere between 15 and 50 percent. The evidence by Chobanov and Mladenova (2009), indicated that the optimum size of government, for instance, the share of overall government spending that maximizes economic growth, is not greater than 25% of GDP (at a 95 percent confidence level) based on data from the OECD countries. In addition, the evidence indicated that the optimum level of government consumption on final goods and services as a share of GDP is 10.4 percent based on a panel data of 81 countries.

Using a non-linear Generalized Method of Moment approach, Karavias and Asimakopoulos, 2015), verified the theoretical BARS curve and found that the optimal level of government size that maximizes economic growth is 18.04 percent for the full sample; 19.12 percent for developing countries and 17.96 percent for developed countries.

The findings of Mehrara and Keikha (2012), confirmed the non-linearity relationship between government expenditure size and economic growth in Iran from 1967 to 2007. Using Armey's approach, the study found a positive relationship between government expenditure size and economic growth with a threshold of 22.8 percent for total government expenditure, 9.8 percent for government investment expenditure and 12.9 percent for government consumption expenditure.

Lin (1994) and Vedder and Gallaway (1998) used different government size indicators to discuss the relationship between government size and economic growth. Vedder and Gallaway (1998) provided five classifications of government size and found that the Armey's curve exists only while the government size variable is "total government expenditure as percentage of GDP" and "net investment expenditure as a percentage of GDP". The study found the optimal size of federal government spending based on the Armey's Curve in the United States in the period 1947 – 1997 to be 17.45 per cent of Gross Domestic Product, The study also found the optimal government size of other OECD countries as 21.4 percent for Canada (1854-1988) and 21.0 percent for the United Kingdom (1830-1988) (Odawara, 2010).

On the other hand, Lin (1994), used "government consumption expenditure as a percentage of GDP" and "government nonproduction expenditure as a percentage of GDP" as government size indicators and found that the two indicators of government size both have positive impacts on economic growth in the short run. However, Lin (1994) indicated that the contribution of government consumption expenditure will be less than the contribution of government investment expenditure, because government investment expenditure has the encouraging effect to private investment.

In considering general government spending, Peden (1991), estimated that the optimal size of U.S. government is about 20 percent of GDP. Scully (1994) realized similar result while estimating the optimal growth-maximizing average rate for federal, state, and local taxes combined to be between 21.5 percent and 22.9 percent of GNP in the United States between 1929 and 1989. Again, Chao and Gruber (1998) estimated that in the period 1929-1996, the optimal size of government spending in Canada was about 27 percent, which is about 20 percentage points less than the actual government spending in 1996.

In order to search for the threshold effects of government expendirure, Chen and Lee (2005), employed Hansen (2000) sample splitting and threshold estimation technique to test whether the Armey's curve exists in Taiwan. The study applied the two-sector production function developed by Ram (1986) to construct the threshold regression model. Three classifications of government size were tested in sequence as threshold variables. Using the quarterly data of Taiwan from 1979 Q1 to 2003 Q3, The result indicated that all three classifications of government size as a ratio to GDP such as; total government expenditure, government investment spending, and government consumption expenditure, have threshold effects and that a non-linear relationship of the Armey curve exists in Taiwan. The study found the optimal government size for these expenditures to be 22.8, 7.3, and 15.0 percents respectively.

Using econometric modeling including the statistical test of Armey's Curve, the study of Dutta (2006), found that the siae of government in India was 21.6 percent, which is closer to its optimal size of 22.7 percent. However, the study suggested that economic growth can be strengthened by bringing about changes in the composition of expenditure while maintaining the present level of government size. In particular, more capital expenditure and less interest payments relative to total expenditure would strengthen the growth momentum of the economy. Dutta (2006) posited that with the spread of the concept of welfare state, the size and role of government in the economy have increased in most countries amounting to a significant proportion of the national output.

On the contrary, other empirical studies have indicated a negative impact of government size on growth (Gwartney*et al*., 1998; Dar and AmirKhalkhali, 2002; Landau, 1983; Barro, 1990). These studies observed an inverse or insignificant relationship between the two variables especially in high- income countries (OECD). These findings implied that an increase in the government size as measured by a share of government expenditure to GDP hampers economic growth.

Grossman (1988) investigated the size of the American government and its effects on economic growth using data for 1929 to 1982. The study hypothesized that government spending would initially contribute positively to overall economic growth but that the decision-making processes of government would lead to incremental expenditures that result in an inefficient quantity of public goods. Grossman‟s analysis confirmed that there was indeed a negative relationship between growth in government and the rate of economic growth.

Barro (1990) presented a theoretical assessment of the impact of government activities on economic activities growth by incorporating the public sector into a constant-returns model of endogenous growth, and showed that different sizes of government can have two effects on growth. When the government is small, an increase in its size can lead to a rise in the rate of growth. As the government size grows larger, its positive contribution to growth becomes smaller and eventually has a negative impact on economic growth. Therefore, as spending rises, additional projects financed by government become increasingly less productive and the taxes and borrowing levied to finance government spending become zero. According to Barro's rule, the government services are "optimally provided" when marginal product equals unity (Chobanov and Mladenova, 2009).

The study of Landau (1983) suggested that a negative relationship exists between the share of government consumption expenditure in GDP and the rate of growth of per capita GDP. An empirical analysis of the data from 23 OECD countries (Gwartney*et al*., 1998) showed a strong negative relationship between both (a) the size of government and GDP growth and (b) increases in government expenditures and GDP growth. The study showed that a 10-percentage point increase in government expenditures as a share of GDP is associated with approximately a one percentage point decline in the growth rate of real GDP. An analysis of a larger data set of 60 countries reinforces the conclusions reached by analyzing the OECD countries. After adjustment for cross-country differences in the security of property rights, inflation, education, and investment, higher levels of government spending as a percentage of

GDP exert a strong negative impact on GDP growth. Gwartney*et al*. (1998), however indicated that different government size indicators all have negative impacts to economic growth.

The study of Dar and AmirKhalkhali (2002), found a negative relationship between government size and economic growth. The study argued that expanding government size has the effect of a decreasing return of government expenditure and over-expanding government size will cause a crowded -out effect to private investment. In addition, government expenditure often turns into inefficient expenditure which will cause a distorted allocation to the resource. When expanding government expenditure, a government needs more taxes to support the expenditure, but expanding taxes will damage the economy.

In the analysis of the relationship between government size and economic growth in Iran, the study of Sameti (1993) concluded that government size is not appropriate. Gray *et al.* (2007) posited that larger governments tend to allocate a bigger share of their spending on unproductive sources compared to smaller countries. As a result, taking into account that government spending is mostly financed through taxation, a lower threshold estimation should be optimal for the developed countries. In Nigeria, the study of Ekeocha and Oduh (2012), using a quadratic model, estimated the optimal government expenditure size and economic growth from 1970 to 2006 and found the optimal size to be approximately 23 percent.

2.3 Summary of literature and Justification of Study

The reviewed studies have shown that not much has been done on the determination of the optimal government expenditure size that maximizes economic growth in Nigeria. Most of the studies have attempted to establish the empirical relationship between government expenditure and economic growth. However, the study of Ekeocha and Oduh (2012) which attempted to estimate the optimal size of government expenditure and economic growth in Nigeria had excluded some basic growth variables such as trade openness, labour force and monetary aggregate whichis captured in this work. The study of Ekeocha and Oduh (2012) did not also verify the optimal size of 23 percent obtained with the real GDP growth data of Nigeria in order to confirm the growth maximizing point of government expenditure. This is equally captured in this study.

Therefore, by determining the optimal size of government expenditure that maximizes economic growth in Nigeria using both quadratic and Threshold Autoregressive (TAR) analytical methods, this research work contributes to extant literature and fills the existing gaps in this regard. In the same vein, the determination of the optimal size of government expenditure and verification of this optimal government expenditure size *vis a vis* the real GDP growth data of Nigeria, would serve as a guide to future growth inclusion fiscal policy framework in Nigeria.

3.1 Methodology

3.1.1 Model Specification

This study attempts to determine the optimal size of government expenditure that maximizes economic growth in Nigeria using quadratic and Threshold Autoregressive (TAR) analytical methods. The study employs time series data for Nigeria over the period 1970 to 2023on government expenditure size(the ratio of government expenditure to Gross Domestic Product), trade openness (the ratio of import plus export to GDP), broad money supply growth, gross fixed capital formation growth, labour force growth, and exchange rate as independent variables, while economic growth is measured using real Gross Domestic Product growth. The choice of these variables is based on economic theory and in line with the frameworks of Scully

(1994), Ekpo (1995), Armey (1995), Vedder and Gallaway (1998), Ekeocha and Oduh (2012), and Munene (2015).

In order to estimate the optimal size of government expenditure that maximizes economic growth, this study adopts the Solow growth model using growth accounting framework. The Solow growth model examines an economy as it evolves over time and how capital accumulation and economic growth are interrelated (Abel *et al*., 2008). In fact, the Solow (1956) model posited that the rate of economic growth is a function of capital, labor accumulation and factor productivity. According to Agell, *et al*. (1997), this model assumed that total factor productivity depends on the rate of export, capital accumulation and the size of government consumption. Based on this, the relationship between output and input is described by the production function given as;

$Y_t = A_t f(K_t, L_t)$…………………..…………………………………………..……………(7)

Where A_t is the coefficient measuring the total factor productivity with the two factors of production, capital (K) and labor (L), and t is time subscript. Thus, for the quantity of output to grow, either the quantity of inputs must grow or productivity must improve or both. Therefore, according to Abel *et al.* (2008), the relationship between output growth, input growth and productivity growth of equation (7) can be expressed as growth equation as follows;

$y_t = a_t + S_K k_t + S_L l_t$………………………………………………………..………....…(8)

where, y*, a, k and l* are the percentage changes of Y, A, K and L respectively, while S_k and S_l are the shares of capital and labour inputs respectively of which $S_K + S_L = 1$(constant returns to scale).

Following the frameworks of Dar and AmirKhalkhali (2002) and Agell*et al*. (1997), this research work assumes that trade openness, growth of broad money supply, exchange rate and government expenditure size are modeled impacts on economic growth through total factor productivity (TFP). Therefore, 'A' captures other variables that impact on economic growth other than capital (K) and labour (L).

That is, $A = GEXPS + TROP + M_2G + EXR$………………………………………….…(9)

By substituting equation (9) into equation (8), the functional relationship of the model can be expressed as follows;

$Y = (GEXPS, TROP, M_2G, EXR, GFCFG, LFG)$ …………………………..…………..(10)

Equation (10) is estimated in this work using two approaches namely; the quadratic estimation method of Vedder and Gallaway (1998) and the Threshold Autoregressive Method of Hansen (1999, 2000).

3.1.2 The Quadratic Estimation Model

To determine the optimal size of government expenditures and economic growth in Nigeria that is theoretically characterized by the inverted U curve, a quadratic equation following Vedder and Gallaway (1998) is employed using Ordinary Least Squares (OLS) estimation method. This is expressed as follows from equation (10):

$RGDP = B_0 + B_1 EXR + B_2 GEXPS + B_3 GEXPS^2 + B_4 GFCFG + B_5 M_2G + B_6 LFG + B_7 TROP + ECM(-1) + \epsilon_t$………………………………...……….………………………(11)

where:

RGDPG= Real GDP growth

GEXPS= Government expenditure size (ratio of total government expenditure to GDP)

$GEXPS^2$= Square of government expenditure size

TROP= Trade openness (ratio of import plus export to GDP)

M_2G= The growth rate of broad money supply

EXR = Exchange rate of the naira *vis a vis* the dollars
GFCFG = Gross Fixed Capital Formation growth (a proxy for capital)
LFG = Growth rate of labour force (a proxy for labour)
ECM (-1) = Error Correction Model lagged one period
ϵ_t= Stochastic term
$\beta_0$to $\beta_7$are parameters to be estimated
A priori: $\beta_1, \beta_2, \beta_4, \beta_5, \beta_6, \beta_7, >0$ and $\beta_3<0$

According to Vedder and Gallaway (1998), the optimum government expenditure as a share of GDP that maximizes economic growth from the quadratic equation (11)is found by partially differentiating the RGDP equation with respect to GEXPS and setting it equal to zero or by obtaining.

$$GEXPS^* = -\frac{\beta 2}{2\beta 3} \quad (12)$$

Where GEXPS* is the optimum maximizing point of government expenditure size and economic growth.

3.1.3 The Threshold Autoregressive (TAR) Model

To validate the threshold value obtained from the quadratic model and to determine the optimal size of government expenditure size that maximizes economic growth in line with the objective of this study, the Threshold Autoregressive (TAR) estimation method is employed to carry out this analysis.

In this study, equation (11) is a quadratic equation representing the growth model based on the framework of Vedder and Gallaway (1998). Therefore, in order to employ the TAR model, equation (11) is altered into a two-regime Threshold Autoregressive (TAR) model of Hansen (1999, 2000). This is shown as follows:

$$RGDP = B_{10} + B_{11}GEXPS + B_{12}\,GFCFG + B_{13}LFG + B_{14}M2G + B_{15}TROP + U_{1t} \quad (13)$$

$q_t \leq y$

$$RGDP = B_{20} + B_{21}GEXPS + B_{22}\,GFCFG + B_{23}LFG + B_{24}M2G + B_{25}TROP + U_{2t} \quad (14)$$

$q_t > y$

Where q_t is the threshold variable and y is the threshold value. All the variables in the model are as previously defined.

Equation (13) indicates the regression equation when the threshold variable is smaller than the threshold value, while the regression equation is shown as equation (14) when the threshold variable is greater than the threshold value. Assuming that the dummy variable

$I_t(y) = (q_t \leq y)$, and that (·) is an indicator function, then when $q_t < y$, then I=1, or otherwise I = 0. In other words, $I(\cdot)$ is an indicator function which takes the value 1 when the argument in the parenthesis is true and 0 otherwise. To this end, based on the frameworks of Asimakopoulos and Karavias (2015), Mehrara and Keikha (2012), and Brooks (2004), equation (13) and equation (14) can be rewritten as follows;

$$RGDP = B_{10} + B_{11}(GEXPS)I(q_t \leq y) + B_{20} + B_{21}(GEXPS)I(q_t > y) + \delta X_{it} + U_{it} \quad (15)$$

Where X_{it} is the vector representing gross fixed capital formation growth, labour force growth, broad money supply growth and trade openness, while $U_{it}$is the error term. Equation (15) is the estimation TAR model employed to determine the optimal size of government expenditure that maximizes economic growth in Nigeria.

4.1 Stylized facts

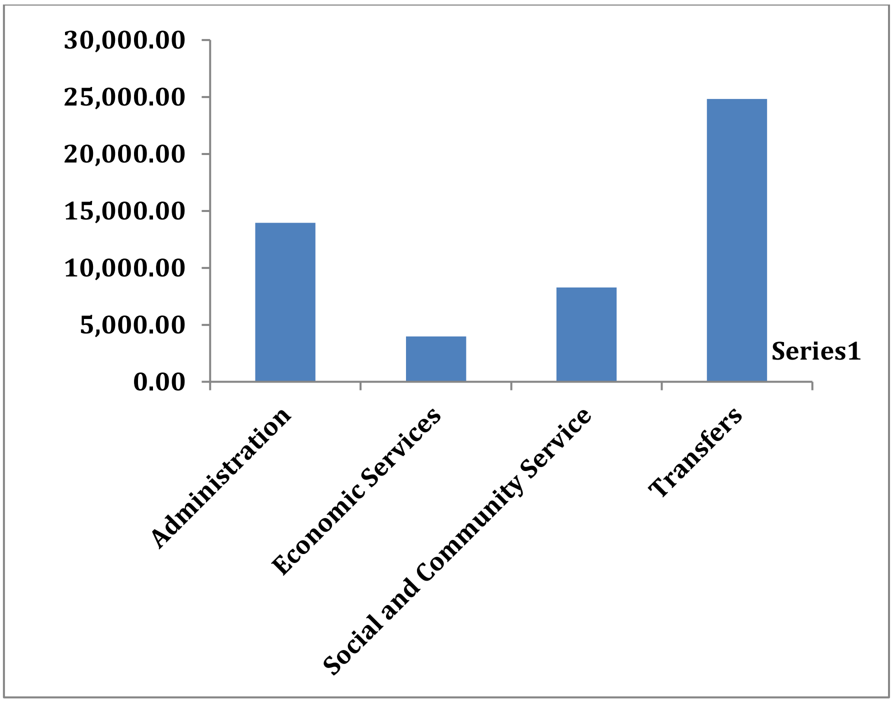

Figure 1: Federal Government Recurrent Expenditure (N'billions): 1970-2023
Source: Computed by the Researcher.

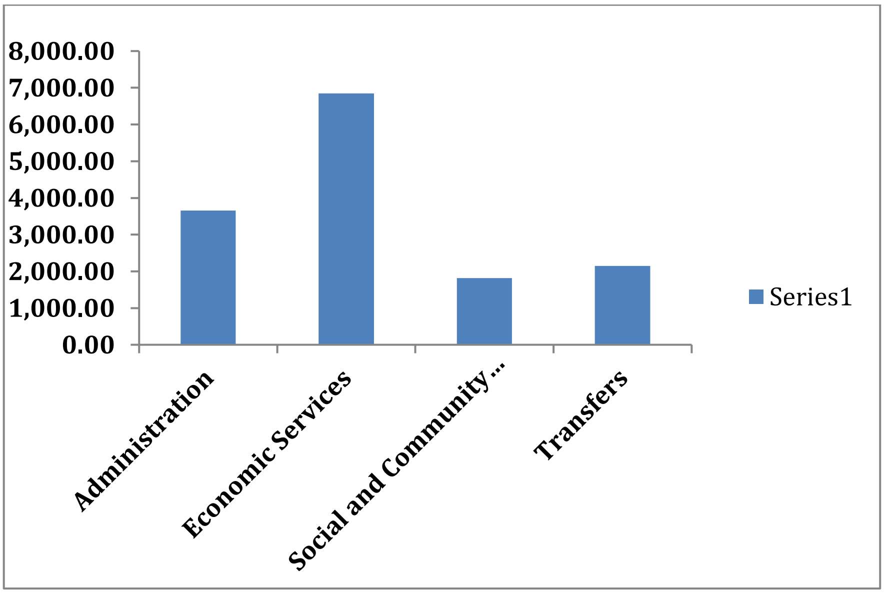

Figure 2: Federal Government Capital Expenditure (N'billions): 1970-2023
Source: Computed by the Researcher.

The composition of government recurrent expenditure from 1970 to 2023 is presented in Figure 1. The federal government recurrent expenditure over the years is categorized under administration, economic services, social and community services, and transfers. Figure 1 shows that recurrent expenditure on transfers was the highest followed by recurrent expenditure on administration, while recurrent expenditure on economic services was the least. This implies that so much money was allocated to the servicing of debt and payment of gratuities and pensions yet the debt profile of Nigeria and unpaid pensions of retired workers were still on the increase.

In the same vein, the composition of federal government capital expenditure for the period 1970 to 2023is shown in Figure 2 . It shows that some capital expenditure was allocated on transfers at the expense of capital expenditure on education, health and other social services for the period under review.

4.2 Diagnostic Test

The standard diagnostic test and stability test are applied in this work to test for the goodness of fit of the model which is used to estimate the optimal size of government expenditure that maximizes economic growth in Nigeria. The diagnostic tests employed are LM test for Serial Correlation, Heteroscedasticity test of Residuals, JarqueBera Normality test and Ramsey RESET stability test. The diagnostic tests result of Table 4.1 shows that our model is free from serial correlation, and heteroscedasticity as indicated by their probability values (Gujarati, 2009).

The Ramsey RESET stability test and the Jacque- Bera (JB) test result also confirm the stability and normality of the model respectively.

Table 4.1: Diagnostic Test Results

Test Statistic		Prob
LM Test for Serial Correlation	F- Stat = 0.8128	0.4518
Heteroscedasticity Test	F- Stat = 0,8014	0.5910
JB Normality Test(S= -0.07 and K=3.20)	JB = 0.1283	0.9378
Ramsey RESET Test	F- Stat = 0.3879	0.5370

Source: Author's Computation using E-views 9.0.

4.3 The Augmented Dickey Fuller (ADF) Test

The results of the ADF unit root test are presented in Table 4.2. The result shows that the variables are stationary at levels and first difference. A cursory look at the ADF table, shows that Government Expenditure Size (GEXPS), Labour Force Growth (LFG), and Real Gross Domestic Product Growth (RGDPG) were significant at levels, while the Square of Government Expenditure Size ($GEXPS^2$), Gross Fixed Capital Formation growth (GFCFG), Broad Money Supply growth (M2G), and Trade Openness (TROP) showed significance at first difference. This result in Table 4.2 shows that at both 0.01 and 0.05 critical values, the variables are stationary at either levels or first difference.

Table 4.2: The Augmented Dickey Fuller Unit Root Test Result

Variables	T – ADF	1% Critical Value	5% Critical Value	Prob	Order of Integration
EXR	-4.6175**	-4.1756	-3.5130	0.0030	1
GEXPS	-7.1583**	-4.1611	-3.5063	0.0000	0
$GEXPS^2$	-4.2452**	-4.2191	-3.5330	0.0014	1
GFCFG	-7.0892**	-4.1756	-3.5130	0.0000	1
M_2G	-7.4736**	-4.1923	-3.5130	0.0000	1

LFG	-6.8841**	-4.1705	-3.5107	0.0000	0
RGDPG	-5.0181**	-4.1756	-3.5130	0.0000	0
TROP	-8.1953**	-4.1756	-3.5130	0.0000	1

Source: Researcher's computation using E-views 9.0.
Trace test and the maximum Eigen value test indicate two (2) co-integrating equations at 0.05 level of significance.
*Denotes rejection of the null hypothesis at the 0.05 level.

The results of the co-integration test as presented in Table 4.3 reveal the existence of long-run or equilibrium relationship among the following variables; Government Expenditure Size (GEXPS), the Square of Government Expenditure Size ($GEXPS^2$), Gross Fixed Capital Formation Growth (GFCFG), Broad Money Supply (M_2G), Labour Force Growth (LFG), Real Gross Domestic Product growth (RGDPG) and Trade Openness (TROP). This is because the trace and the maximum Eigen value statistics indicate two (2) co-integrating equations signifying that the variables are co-integrated.

Table 4.3: Johansen Cointegration Test Result

Series: EXR, GEXPS, $GEXPS^2$, GFCFG, M2G, LFG, RGDPG, TROP

Hypothesised No of CE(S)	Trace Statistic	0.05 critical value	Hypothesized No of CE(s)	Max-Eigen value statistic	0.05 Critical Value
None*	209.7368	159.5297	None*	62.78557	52.36261
At Most 1*	146.9512	125.6154	At Most 1*	59.14564	46.23142
At Most 2	87.80558	95.75366	At Most 2	28.66455	40.07757
At Most 3	59.14103	69.81889	At Most3	26.01437	33.87687
At Most 4	33.12666	47.85613	At Most 4	17.10685	27.58434
At Most 5	16.01981	29.79707	At Most 5	6.565817	21.13162
At Most 6	9.453990	15.49471	At Most 6	6.398796	14.26460
At Most 7	3.055195	3.841466	At Most 7	3.055195	3.841466

Source: Researcher's computation using E-views 9.0.
Trace test and the maximum Eigen value test indicate two (2) co-integrating equations at 0.05 level of significance.
*Denotes rejection of the null hypothesis at the 0.05 level.

Table 4.4 : Pairwise Granger Causality Test Result

Pairwise Granger Causality Tests
Sample: 1970 2023

Null Hypothesis:	Obs	F-Statistic	Prob.
GFCFG does not Granger CauseGEXPS	46	2.76276	0.0749
GEXPS does not Granger Cause GFCFG		8.66715	0.0007
INFLA does not Granger Cause GEXPS	46	0.00886	0.9912
GEXPS does not Granger Cause INFLA		0.08445	0.9192
M2G does not Granger Cause GEXPS	46	1.00452	0.3751
GEXPS does not Granger Cause M2G		0.43820	0.6482
RGDPG does not Granger CauseGEXPS	46	1.03456	0.3645

GEXPS does not Granger Cause RGDPG		1.16169	0.3230
TROP does not Granger Cause GEXPS	46	0.32043	0.7276
GEXPS does not Granger Cause TROP		0.56675	0.5717
RGDPG does not Granger CauseGFCFG	46	0.21925	0.8041
GFCFG does not Granger Cause RGDPG		5.10070	0.0105
TROP does not Granger Cause GFCFG	46	0.96001	0.3913
GFCFG does not Granger Cause TROP		3.91566	0.0278
M2G does not Granger Cause INFLA	46	5.10515	0.0158
INFLA does not Granger Cause M2G		1.63270	0.2079
RGDPG does not Granger Cause INFLA	46	0.77445	0.4676
INFLA does not Granger Cause RGDPG		0.13105	0.8775
TROP does not Granger Cause INFLA	46	0.44941	0.6411
INFLA does not Granger Cause TROP		2.47984	0.0962

Source: Researcher's computation using E-views 9.0

The Granger Causality test is employed as an analytical tool in this study to investigate the causal relationship between government expenditure size and real gross domestic product growth in Nigeria for the period under review. The result shows the existence of a bidirectional causality relationship between government expenditure size and gross fixed capital formation. This implies that government expenditure size granger causes gross fixed capital formation and *vice versa*. The result further indicates a unidirectional causality between gross fixed capital formation and real Gross Domestic Product with the causality running from gross fixed capital formation to real Gross Domestic Product. The granger causality between gross fixed capital formation and trade openness as well as the causality between inflation and trade openness indicate the existence of a unidirectional causality respectively. A further analysis of the result shows the unidirectional causality running from gross fixed capital formation to trade openness at 0.05 level of significance. The causality running from inflation to trade openness indicates significance at 0.10 level. In terms of government expenditure size and inflation, the granger causality test result shows that there is no causality between the two variables. The test result also reveals that there is no causality existing between government expenditure size and the growth rate of real gross domestic product for the period under review.

4.5 Estimation Result of the Quadratic Model

Based on the result of the Johansen cointegration test which shows that the variables have long run relationship, an error correction model is employed to estimate the quadratic model based on the framework of Vedder and Gallaway (1998),in order to determine the optimal size of government expenditure that maximizes economic growth in Nigeria. The Ordinary Least Squares (OLS) analysis of the quadratic model is presented in Table 4.5.

Table 4.5: Empirical Result of Government Expenditure Size and Real GDP Growth
Dependent Variable: RGDPG

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-43.16599	44.11328	-0.978526	0.3340
EXR	0.161811	0.078359	2.064999	0.0458
GEXPS	8.752136	3.316286	2.639138	0.0120
$GEXPS^2$	-0.246094	0.090341	-2.724054	0.0097
GFCFG	1.629384	0.294899	5.525221	0.0000
M2G	0.850792	0.266609	3.191162	0.0028
LFG	-0.801327	0.739992	-1.082886	0.2857
TROP	0.220800	0.062475	3.534217	0.0011
ECM(-1)	-0.381187	0.180291	-2.114291	0.0413

R-squared	0.852296	Mean dependent var	25.99722
Adjusted R-squared	0.758043	S.D. dependent var	31.11798
S.E. of regression	22.90835	Akaike info criterion	9.271297
Sum squared resid	19942.12	Schwarz criterion	9.625581
Log likelihood	-208.8755	Hannan-Quinn criter.	9.404617
F-statistic	7.859693	Durbin-Watson stat	2.065502
Prob(F-statistic)	0.000069		

Source: Researcher's computation using E-views 9.0.

4.6 Discussion of Result of the Estimated Quadratic Model

(i) Exchange Rate (EXR)

The empirical result in Table 4.5 indicates that exchange rate has a positive and significant relationship with real gross domestic product growth which is used in this study as a measure of economic growth. The implication of this result is that an increase in exchange rate will boost the real gross domestic product growth. This shows that the devaluation of the naira over the period under review has actually contributed positively to the growth of real gross domestic product in Nigeria because it encouraged exports and made Nigeria's exports to be cheaper in the world market even though it has a negative effect on domestic prices especially in the case of over dependence on import.

(ii) Government Expenditure Size (GEXPS)

The result presented in Table 4.4 shows that federal government expenditure as a percentage of GDP has a positive and significant relationship with real gross domestic product growth as indicated by its coefficient. This is in line with our a priori expectations and this finding implies that federal government expenditure contributes positively to real gross domestic product in Nigeria for the period under review. More so, the size of government expenditure is statistically significant at 0.01 level. This finding is in line with the studies of Ram (1986), Levin and Renelt (1992) and Kenellar*et al.* (1998) who found a positive significant relationship between government expenditure and economic growth. This result also confirms the studies of Ranjan and Sherma (2008), Cooray (2009), Kormendi and Meguire (1986) and Ogiogio (1995), which showed a positive relationship between government expenditure size and real gross domestic product growth.

(iii) **Square of Government Expenditure Size (GEXPS^2)**

The result in Table 4.5 shows that the square of federal government expenditure as a percentage of GDP has a negative relationship with real gross domestic product growth in conformity with our a priori expectations. This finding implies that the square of government size contributes negatively to real gross domestic product in Nigeria. That is, over increasing the expenditure of the federal government can be unproductive with the attendant negative impact on real gross domestic product growth. In other words, the coefficient of this variable indicates the decreasing marginal productivity of government spending. This result validates the arguments made by Devarajan,Swaroop and Zou (1996), Vedder and Gallaway (1998), Scully (1994), Armey (1995), and Chen and Lee (2005) that increase in government expenditures beyond a threshold can have a negative impact on real gross domestic product growth
.

(iv) Gross Fixed Capital Formation Growth (GFCFG)

It is observed from Table 4.5 that gross fixed capital formation growth which is used to measure the growth rate of investment in Nigeria, displayed a positive relationship with the growth rate of real gross domestic product which is in line with our a priori expectation. According to the result, a unit increase in gross capital fixed formation growth will lead to a predicted 1.63 percent increase in real gross domestic product growth. In addition, gross fixed capital formation growth is statistically significant at 0.01 level. The result is not surprising as it simply reveals the growing evidence of a strong link between investment and economic growth.

(v) Broad Money Supply Growth (MSG)

This is a monetary aggregate included as a vector in the model to capture the effect of broad money supply growth on the real gross domestic product growth in Nigeria. The result in Table 4.5 shows that the coefficient of broad money supply growth is positive and it is statistically significant at 0.05 level. This result conforms to our a priori expectations implying that broad money supply is a significant factor influencing real gross domestic product in Nigeria. A further analysis of the result shows that an increase in broad money supply growth by one percent will increase real gross domestic product growth by 0.85 percent. This result conforms to the work of Onayemi (2013), Adesoye (2012), Onyeiwu (2012), and Liang and Huang (2011), which showed a positive relationship between money supply and real gross domestic product.

(i) Labour Force Growth (LFG)

This is used to represent labour in the growth model employed to estimate the optimal size of government expenditure and economic growth in Nigeria. The result in Table 4.4 indicates that the coefficient of labour force growth in Nigeria is negative and insignificant. This is contrary to our a priori expectations. This is quite interesting as it exposes the unproductive nature of Nigeria's growing labour force. In other words, the result shows that the growing labour force in Nigeria has not impacted significantly on real gross domestic product growth and by extension the Nigerian economy for the period under review. This actually confirms the negative correlation of -20 percent between labour force growth and real gross domestic product as indicated in the correlation matrix of Table 4.4. This implies that the Nigerian government may not have been able to maximize and harness the strength and potentials of her labour force so as to engage in the production of goods and services in order to contribute to output growth and reduction in unemployment. This explains why Nigeria is having so many idle youths resulting in high unemployment rate.

(ii) Trade Openess (TROP)

This is the sum of export and import as a ratio of GDP and it is used to measure the openness of an economy. The result in Table 4.4 indicates a positive and significant effect of trade openness on real GDP growth. This result supports our a priori expectations and reveals that an increase in trade openness by 1 percent will lead to 0.22 percent increase in real GDP growth.

(viii) Error Correction Model

The error correction model shows the speed of adjustment from disequilibrium to equilibrium. The short run relationship between real gross domestic product growth and the explanatory variables as captured by the Error Correction Mechanism introduced in the model shows that at every year, the inherent error in the model is corrected by 38 percent. In other word, it takes the speed of 38 percent for the variables to return to their equilibrium state annually. The result further shows that the coefficient of the Error Correction Model is negative and statistically significant at 0.05 level, suggesting that the dependent variable adjusts to the independent variables with a lag and about 38 percent of the discrepancy between the long term and short term of real gross domestic product growth is corrected annually (Gujarati, 2009).

(ix) Coefficient of Determination (R^2)

The coefficient of determination (R^2) as shown in Table 4.5 is 0.85. This implies that the explanatory variables can explain about 85 percent of the total variation in the dependent variable (real gross domestic product growth), while the remaining 15 percent is captured by the stochastic term. The result of the coefficient of determination also shows the goodness of fit of the model to be satisfactory.

(x) The F- Statistic

This is used to show the joint significance of the parameters. The result in Table 4.5 shows the F-statistic to be statistically significant at 0.01 level. The calculated F- statistic is 7.86 while the probability value is shown to be 0.0000. This implies that the coefficients of the independent variables used in this model are jointly significant.

(xi) Auto-correlation Test

One of the underlying assumptions of the Ordinary Least Squares is that the successive values of the error term are not correlated, but when this assumption is violated, then there is the problem of autocorrelation or serial correlation in the model. In this study, the Durbin Watson d – statistic is employed to detect the problem of serial correlation. From the result in Table 4.5, the value of the Durbin Watson d- statistic is shown to be 2.06. This implies that there is no serial correlation or autocorrelation in the model employed to estimate the optimal size of government expenditure and economic growth in Nigeria.

4.6 Determination of the Optimal Size Using the Estimated Quadratic Model

In line with the framework of Vedder and Gallaway (1998), the optimal size of government expenditure from the estimated results of Table 4.4, is determined by partially differentiating equation (11) with respect to GEXPSas follows:

$RGDPG = -43.16 + 0.16EXR + 8.75GEXPS – 0.25\ GEXPS^2 + 1.63GFCFG + 0.85M2G – 0.80LFG + 0.22TROP – 0.38ECM$ …………………………………….(16)

By calculating the first derivative of the quadratic equation gives;

$\frac{d(RGDPG)}{d(GEXPS)} = 8.75 – 2(0.25)GEXPS$……………………………………………...(17)

By Setting equation (17) equal to zero and calculating the optimal size of government expenditure
gives;

$8.75 – 2(0.25)GEXPS = 0$…………………………………………………………………..(18)

$8.75 – 0.5\ GEXPS = 0$……………………………………………………………………(19)

$0.5GEXPS = 8.75$…………………………………………………………………...(20)

$GEXPS^* = 17.5$ ……………………………………………………………………………(21)

From the result in equation (21), the optinal size of government expenditure that maximizes economic growth is 17.5. This means that any federal government spending above or below the 17.5 per cent or approximately 18 percent threshold becomes excessive or inadequate government expenditures respectively from the standpoint of growth maximization.

4.7 Estimation Result of the Threshold Autoregressive (TAR) Model

Table 4.7 : Threshold Autoregressive Estimation Result

Dependent Variable: RGDPG
Method: Threshold Regression
Sample (adjusted): 1973 2023
Included observations: 51 after adjustments
Threshold type: Bai-Perron tests of L+1 vs. L sequentially determined Thresholds
Threshold variables considered: GEXPS(-1) GEXPS(-2) GEXPS(-3)GEXPS(-4) GEXPS(-5)
Threshold variable chosen: GEXPS(-3)
Threshold selection: Trimming 0.15, , Sig. level 0.05
Threshold value used: 17.85614

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GEXPS(-3) < 17.85614 -- 38 obs				
C	-2.180609	5.266974	-0.414015	0.6815
GEXPS(-1)	0.745624	0.135855	5.488396	0.0000
GEXPS(-2)	-0.008489	0.154757	-0.054850	0.9566
17.85614 <= GEXPS(-3) -- 7 obs				
C	2.454007	6.656795	0.368647	0.7147
GEXPS(-1)	-0.954046	0.332420	-2.870002	0.0070
GEXPS(-2)	1.446359	0.307364	4.705685	0.0000
Non-Threshold Variables				
LFG	0.010917	0.091330	0.119534	0.9056
GFCFG	0.049628	0.062784	0.790458	0.4347
TROP	0.038807	0.063317	0.612898	0.5440
M2G	0.072310	0.033129	2.182679	0.0344
RGDPG	0.155539	0.073460	2.117529	0.0420
R-squared	0.822937	Mean dependent var		11.29275
Adjusted R-squared	0.770859	S.D. dependent var		6.723149
S.E. of regression	3.218279	Akaike info criterion		5.384157
Sum squared resid	352.1489	Schwarz criterion		5.825786
Log likelihood	-110.1435	Hannan-Quinn criter.		5.548792
F-statistic	15.80219	Durbin-Watson stat		2.164547
Prob(F-statistic)	0.000000			

Source: Researcher's computation using E-views 9.0

To validate the threshold value obtained from the quadratic model and to determine the optimal size of government expenditure size that maximizes economic growth, the Threshold Autoregressive (TAR) estimation method is employed to carry out this analysis. In this work, $q_t$is the threshold variable which is represented by government expenditure size (gexps).An analysis of the TAR result in Table 4.7 shows the threshold type to be Bai-Perron test of L+1 vs. L sequentially determined threshold due to the fact that the threshold value is unknown. The Akaike Information Criteria which is used in selecting the lag length of the threshold variables (GEXPS), chooses the third lag of the threshold variable as the best for the model. The TAR result of Table 4.7 indicates the threshold value to be 17.9 percent or approximately 18 percent which falls within the range of the threshold value of 17.5 percent obtained from the quadratic model estimation result of equation (21).

The threshold result of the first regime indicates that when government expenditure size (gexps) is below 17.9 percent, then federal government expenditure as a ratio of GDP has a positive and significant relationship with real GDP growth (a proxy for economic growth). It further shows that a 1% increase in government expenditure size, increases GDP growth by 0.75%. This is shown by the coefficient of gexps(-1) which is significant at 0.01 level.

In the second regime, the result in Table 4.7 shows that if the ratio of government expenditure to GDP is greater than 17.9 percent, then the relationship between government expenditure size and real GDP growth is negative due to the reduction in output. The implication is that when government expenditure size is greater than the threshold value, then the real GDP growth is on the downward sloping portion of the Armey's curve indicating a reduction in the growth rate of real GDP and by implication the Nigerian economy. A further analysis of the TAR result indicates that a 1% increase in government expenditure size beyond the threshold, decreases the GDP growth by 0.95%.

The result of the summary statistics indicates that the joint significance of the parameters as shown by the F-Statistic is statistically significant at 0.01 level. The coefficient of determination (R^2) which shows the goodness of fit of the model is 82 percent, while the Durbin Watson d-statistic indicates the absence of serial correlation in the model. The cumulative sum (CUSUM) stability test of the model as shown in Figure 3, indicates the significance of the model at 0.05. The result shows that the model is within the critical bounds of the 0.05 confidence interval of parameter stability.

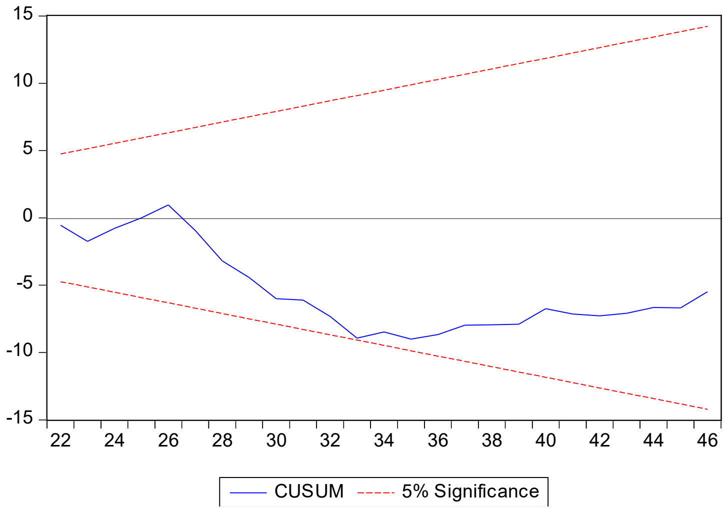

Figure 3: The Cumulative Sum (CUSUM) Stability Test Result
Source: Author's computation using E-views 9.0

4.8 CONCLUSION

Over the past years, there has been a significant expansion of government intervention in the Nigerian economy evidenced by the measure of government spending as a percentage of GDP. Conceptually, there are different ways of looking at the size of government expenditure, but many of the theoretical and empirical literature represent the size of government expenditure by government spending as a percentage of GDP, hence this study adopts federal government expenditure as a percentage of GDP in the measurement of government expenditure size.

The core functions of government involve, the protection of people and property, establishment of the rule of law and the sanctity of contract, the provision of basic infrastructural facilities, among others. However, growing above these functions, the expenditure of government is likely to be detrimental to economic growth. To this end, many studies have shown that there is a negative relationship between government expenditure size and economic growth after a certain point of government participation in the economy is reached. For instance, Armey (1995), and Vedder and Gallaway (1998), empirically verified that rising levels of government expenditures can increase the real GDP growth until it reaches a critical level; while excessive increments of government expenditure could harm output growth. Therefore, inspired by these studies, this work tries to ascertain the existence of a non linear relationship between government expenditure size and economic growth in Nigeria, measured by real GDP growth. Actually, this study empirically determines the optimal size of federal government expenditure that maximizes economic growth in Nigeria from 1970 to 2023 using quadratic and a two-regime Threshold Autoregressive (TAR) models.

Using the quadratic and Threshold Autoregressive (TAR) models, this study found the optimal size of federal government expenditure that maximizes economic growth to be 17.5 percent and 17.9 percent respectively or approximately 18 percent, beyond which government expenditure retards economic growth. Further investigation of the quadratic estimation model validates the non-linear relationship between government expenditure size and economic growth in Nigeria. The study therefore adds to the existing literature on the non-linear relationship between government expenditure size and economic growth and thus the Armey's Curve syndrome. The Armey's curve provides the double check possibility of calculating the optimal government expenditure size and thus could be used as a policy tool in determining the efficient levels of government expenditure in Nigeria.

Thus, the study shows that government expenditure constitutes a veritable tool for the achievement of economic growth, but excessive government expenditure could be harmful to economic growth in Nigeria.

4.9 RECOMMENDATIONS

i. Capital and recurrent expenditures of the federal government should be geared towards productive services such as economic service, and social and community services instead of spending more on transfers.

ii. The federal government of Nigeria should play down on deficit financing so as to reduce the debt profile of the country that is increasing alarmingly with its attendant effect on domestic economy. The government should look inward in terms of revenue generation and cut down on frivolous spending and the financing of investments that are not self liquidating.

iii. Having established the threshold value of government expenditure size that maximizes economic growth in Nigeria, government expenditure size should be maintained within the growth maximizing range of approximately 18 percent. The Armey's curve should be adopted by the federal government of Nigeria as a policy guide towards the maintenance of a growth inducing expenditure of government.

iv. This study affirms the strong link between domestic investment and economic growth, and thus recommends the need for government to encourage more domestic investment by providing a conducive atmosphere and incentives to investors in order to boost output growth in Nigeria.

REFERENCES

Abel, A.B., Bernanke, B.S. and Croushore, D.(2008). *Macroeconomics*. New York: Addison Wesley, 23-50.

Abizadeh S. and Yousefi M. (1988). Growth of Government Expenditure: The case of Canada. *Public Finance Quarterly,* 16:78-100.

Abu, N. and Abdullahi, U. (2010). Government Expenditure and Economic Growth in Nigeria, 1970-2008: A Disaggregated Analysis. *Business and Economics Journal*, 4: 2-4.

Abu-Bader, S. and Abu-Qarn, A.S.(2003). Government Expenditures, Military Spending and Economic Growth: Causality Evidence from Egypt, Israel, and Syria. *Journal of Policy Modeling,* 25(6): 567-583.

Adesoye, A. B. (2012), Price, Money and output in Nigeria: A Co-integration-Causality Analysis, *African Journal of Scientific Research*, 8(1):118-140

Afonso, António, Ludger Schuknecht, and Vito Tanzi (2005). Public Sector Efficiency: An International Comparison. *Public Choice,* 123: 321–347.

Afonso, António, and João Tovar Jalles (2011). Economic Performance and Government Size. European Central Bank.Working Paper Series, 1399.

Agell J., Lindh T. and Ohlsson H. (1997). Growth and Public Sector; A Critical Review Essay. *European Journal of Political Economy.*13: 432-110.

Aigbokhan, B. E. (1996). Government Size and Economic Growth: The Nigerian Experience. Proceedings of the 1996 Annual Conference of the Nigerian Economic Society.55-97.

Aigbokhan, Ben, E (1997). Fiscal Decentralization, Wagner's Law and Government Size: The Nigeria Experience. *Journal of Economic Management,*4(2): 31-40.

Ajie, H. A, Akekere, J and Ewubare, D.B (2008), *Praxis of Public Sector Economics.* Port Harcourt: Pearl Publishers. 231-266.

Akpan, P.E. and Atan, J. A.(2020). Government expenditure and Private Consumption in Nigeria. An Empirical Investigation , *international Journal of Economics and Management Studies,*7(1).

Akpan, F. Usenobong and Abang, E.Dominic (2016), Composition of Public Expenditure and Economic Performance in Nigeria(1970-2012). *Fiscal Policy Management(Essays in*

*Honour of Prof Akpan H. Ekpo,*Department of Economics, University of Uyo.

Akpan, N. I. (2005), Government Expenditure and Economic Growth in Nigeria, A Disaggregated Approach. *Central Bank of Nigeria Financial Review*. 43(1): 55-70.

Akpan, P.E. and Udofia, L.E.(2016).The Effect of Economic Policies on Private Consumption Expenditure in Nigeria. *International Journal of Social Sciences*, 10(2): 43-65.

Alm J. and A. Embaye (2010). Explaining the Growth of Government Spending in South Africa: *Economic Society of South Africa,* 14(7/8): 53-77.

Altunc, O. F. and Aydm, C, (2013). The relationship between optimal size of government and economic growth: Empirical evidence from Turkey, Romania and Bulgaria. *Procedia - Social and Behavioral Sciences,* 92, 66-75.

Anyanwu, J. C. and Oaikhenan, H. E. (1995). *Modern Macroeconomic Theory and Application in Nigeria.* Onitsha: Joanee Educational Publishers Ltd.165-207

Aragon, F.M.(2008).The Flypaper Effect Revisited. *London School of Economics and Political Science.*

Aregbeyen, O. (2006), Cointegration, Causality and Wagner's Law: A Test for Nigeria, 1970-2003. *Central Bank of Nigeria Economic and Financial Review*.June, 44(2):166-208.

Argy, Victor (1994), *International Macroeconomics: Theory and Policy*. New York: Routeledge Publishers. 285-286.

Armey, D. (1995). The Freedom Revolution: The New Republican House Majority Leader Tells Why Big Government Failed, Why Freedom Works, and How We Will Rebuild America, Washington, D.C: Regnery Publishing Inc, 70-134.

Aschauer, D.A. (1989), Is public Expenditure Productive? *Journal of Monetary Economics*, 23(2): 177-200.

Asimakopoulos, S. and Karavias, Y. (2015). The Impact of Government Size on Economic Growth: A Threshold Analysis. *Granger Center Discussion Paper, University of Nottingham.*1-7.

Auld, D.A. L. and F.C. Miller (1982). *Principles of Public Finance: A Canadian Text* (2nd ed.). Methuen.

Babatunde, M.A. (2007), A Bound Testing Analysis of Wagner's law in Nigeria: 1970-2006. *Proceedings of Africa Metrics Conference*.

Baghestani, H and R. McNown (1994). Do Revenues or Expenditures Respond to Budgetary Disequilibria? *Southern Economic Journal,* 61(2): 33-60.

Bai, Jushen and Perron, Pierre (1998). Estimating and Testing Linear Models with Multiple Structural Changes. Econometrica, 66:47-78.

Barro, R.J. and Salai, Martin (1995). Public Finance in Model of Endogenous Growth; A Cross – Country Study of growth.www.google.com, 12/02/2018.

Barro, R. J, (1990). Government Spending in a Simple Model of Endogenous Drowth, *Journal of Political Economy*, 98, 103.126.

Barro, Robert J. (1989) Economic Growth in a Cross Section of Countries" *NBER Working Paper 3120*.6(5):112-138.

Baumol, William J.(1967).The Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis. *American Economic Review*, *57*(3) : 415-426.

Baxter, M. and king, R.(1993), Fiscal Policy in General Equilibrium, *American Economic Review*, 83:315.

Bhatia, H. L. (1982). Public Finance. New Delhi: Vikas Publishing, 51-101.

Borcherding T. and Deacon W. (2004): The Relative Size of the determination of Intergovernmental Grants: *Public Choice*, New York: MIT Press, 115-135.

Bose, N., Hague, M, E and Osborn, D. R.(2007). Public Expenditure and Economic Growth: A disaggregated Analysis for Developing Countries. *The Manchester School*, 75(5), 533-556.

Brooks, Chris (2004). *Introductory Econometrics for Finance*. Cambridge: Cambridge University Press, 559 – 575.

Buchanan, James.(1967). *Public Finance in Democratic Processes*. Chapel Hill, North Carolina: University of North Carolina Press, 119-141.

CBN(2013).Central Bank of Nigeria Statistical Bulletin.

Chen, S.T., and Lee, C.C.(2005). Government Size and Economic Growth in Taiwan: A Threshold Regression Approach, *Journal of Policy Modeling*, 27(9): 1051-1066.

Chobanov, D. and Mladenova, A.(2009). What is the Optimum Size of Government? *Economic Policy Review, Institute for Market Economics.*

Cooray A, 2009. Government Expenditure, Governance and Economic Growth. *Comparative Economic Studies,* 51(3): 401-418.

Dalamagas B. (2000). Public Sector and Economic Growth, the Greek Experience. *Applied Economics Journal,* 32(3): 119-145.

Dar, A. A. and Amirkhalkhali, S. (2002). Government Size, Factor Accumulation, and Economic Growth: Evidence from OECD Countries. *Journal of Policy Modeling*, 24: 679-692.

Davies, A. (2008). Human Development and the Optimal Size of Government. *Journal of Socio Economics*.5(3):77-110.

Devaragan, S, Swaroop, V. and Zou. H (1996): The Composition of Public Expenditure and

Economic Growth. *Journal of Monetary Economics*, 37:313-344

Ditimi, A., Nwosa, P. I. and Oliya, S.A. (2011). "An Appraisal of Monetary Policy and its Effect on Macroeconomic Stabilization in Nigeria". *Journal of Emerging Trends in Economics and Management Sciences,* 2(3): 232-237.

Dutta, Achyut (2006): Government and Economic Growth in India: Impact of Size and Composition of Expenditure. *Economic and Social Affairs, Population Division, New York.*

Egbe, Onoja Joan (2015). The Dynamic Analysis of the Effect of Government Size on Inflation in Nigeria. *International Journal of Economics and Management Studies,* 2(1):8-16.

Ekeocha, Patterson Chukwuemeka and Oduh, Moses (2012). Determining the Optimal Size of Federal Government in Nigeria: An Empirical Investigation. Being a Paper presented at the 68th International Institute of Public Finance (IIPF) Dresden, Germany August 16th – 19th.

Ekong, C.N and Onye, K.U.(2012). On the Feasibility of a Common Currency in West Africa: Evidence from a Multivariate Structural VAR. *Journal of Economic Theory*, 4(4):120-131.

Ekong, Christopher N.(2016). Nigeria's Economic Recession: Navigating a Breakout.Being a Paper Presented at a Symposium Organized by the Department of Economics, University of Uyo, Uyo. Akwa Ibonm State.1-15.

Ekpo, A.H; Asiama, J. P and Akosah, N.K.(2014). The Impact of Fiscal Dominance on Monetary policy in Ghana. *The West African Economic Review*, 2(2): 9-33.

Engen, E., and Skinner, J. (1991). Fiscal Policy and Economic Growth. *NBER,5(2):12-33*.

Essien E.A. (1997), Public Sector Growth, An Econometric Test of Wagner's Law. *CBN Economic and Financial Review*,35(3): 20-65.

Ezirim, B. C. and Muoghalu, M. I. (2006). Explaining the Size of Public Expenditure in Less Developed Countries: Theory and Empirical Evidence from Nigeria. *ABSU Journal of Management Sciences,*2(2): 134 – 154.

Ezirim, B. C., Muoghalu, M. I. and Elike, U.(2008). Inflation versus Public Expenditure Growth in the US: An Empirical Investigation. *North American Journal of Finance and Banking Research*, 2 (2): 26-40.

Fajingbesi, A. A. and Odusola, A. F. (1999). Public Expenditure and Growth. A Paper Presented at a Training Programme on Fiscal Policy Planning Management in Nigeria, Organized by NCEMA, Ibadan, Oyo State.

Fatas, A., J., Von Hagen, A., Hughes Hallet, A. and Siebert, R. S. (2003) Stability and Growth in Europe: Towards a Better Pact, *Centre for Economic Policy Research, 2*1-55.

Folster, S. and Henrekson M. (2001). Growth Effects of Government Expenditure and Taxation in Rich Countries. *European Economic Review,*45(8): 1501-1520.

Francesco Forte and Cosimo Magazzino (2011). Optimal Size Government and Economic Growth in EU Countries. *Economia Politica*, 28(3): 223-341.

Friedman, M. (1978). The Limitations of Tax Limitation. *Policy Review*, 5: 1-14.

Friedman, Milton (1997). If Only the U.S. Were as Free as Hong Kong, *The Wall Street Journal,* 8:14-36.

Gali, J., Lopez- Salido, J. and Valles, J.(2004), Understanding the Effect of Government Spending on Consumption, *ECB Working Paper,* 338-356.

Gamkhar, Shama and Anwar Shar (2007). The Impact of Intergovernmental Fiscal Transfers: A Synthesis of the Conceptual and Empirical Literature, in Robin Broadway and Anwar Shah, eds., Intergovernmental Fiscal Transfers: principles and Practice. *The World Bank*,: 60-85.

Garrett, T.A. and Rhine, R.M.(2006). On the Size and Growth of Government. *Federal Reserve Bank of St. Louis*, 88(1): 13-30.

Gray, C., Lane, T. and Varoudakis, A. (2007). Fiscal Policy and Growth in ECA: Lessons for Eastern Europe and Central Asia. *Washington DC: The World Bank:* 5(11): 110-150..

Grier, K.B. and G. Tullock (1989). An Empirical Analysis of Cross-National Economic Growth, 1951-1980. *Journal of Monetary Economics,* 24: 259 – 276.

Grossman P. (1988). Growth in Government and Economic Growth: the Australian Experience; *Australian Economics Papers,*7(3): 220-255.

Gujarati, D. N. (2009). *Basic Econometrics,* New York: McGraw Hill Companies Inc., 117-280.

Gunalp, B. and O. C. Dincer (2005). The Optimal Government Size in Transition Countries" *Working Paper Series,* 8(3): 77-101. http://ssrn.com/abstract=832605, 10/03/2018.

Gunalp, Burak. (2005) The Optimal Government Size in Transition Countries. Chicago University: Chicago Press, 131-165.

Gunlap, B. and Dincer, O., 2010. The Optimal Government Size in Transition Countries. *Progress in Economics Research*, 15: 153-169.

Guseh, J. (2007). Government Size and Economic Growth in Developing Countries: A Political-Economy Framework. *Journal of Macroeconomics*, 19(1): 175-192.

Gwartney, J., Lawson, R. and Holcombe, R. (1998).The Size and Functions of Government and Economic Growth. *Joint Economic Committee*, 2: 1-6.

Gwartney, James; Randall Holcombe, and Robert Lawson (1998): The Scope of Government and the Wealth of Nations" *Cato Journal*, 18 (2).12-28.

Gwartney,J., Lawson, R and Holcombe, R.(1998). The Size and Functions of Government and Economic Growth. *Joint Economic Committee,* 9 (6): 91-155.

Halcoussis, Dennis (2005).*Understanding Econometric.* United States: Thomson Corporation, 243-270.

Hansen, B. E.(2000) Sample Splitting and Threshold Estimation Technique. *Econometrica*, 68(3): 575–603.

Hansen, B. E. (1999). Threshold Effects in Non-Dynamic Panels: Estimation, Testing, and Inference. *Journal of Econometrics*, 93: 345.68.

Hines, James R. and Thaler, Richard H.(1995). The Fly Paper Effect. *The Journal of Economic Perspectives*, *9*(4): 217-226.

Hsieh, Edward and Kon S. Lai (1994). Government Spending and Economic Growth: The G-7 Experience. *Applied Economics Journal,4(7):213-250.*

Johansen , S. and K. Juselius (1990). "Maximum Likelihood Estimation and Inference on Cointegration with Applications to the Demand for Money". *Oxford Bull Economic Statistics,* 52: 169-210.

Karras, G. (1996). The Optimal Government Size: Further International Evidence on the Productivity of Government Services. *Economic Inquiry*, 34: 193.203.

Karras, G. (1997). On the Optimal Government Size in Europe: Theory and Empirical Evidence, *The Manchester School of Economic and Social Studies, Blackwell Publishing,* 65(3): 280-294.

King, R. and Plosser, C. (1985). *Money, Deficit and Inflation*. Carnegie Rochester Conference Series on Public policy, 22: 147-196.

Komain J, Brahmasrene T. (2007).The Relationship between Government Expenditures and Economic Growth in Thailand. *Journal of Economics and Economic Education Research,*.22(7): 210-235.

Kormendi, R. C. and Meguire, P. (1986). Government Debt, Government Spending and Private Sector Behavior: A Reply. *American Economic Review*, 76 (1):191-203.

Kormendi, Roger C. (1983). Government Debt, Government Spending, and Private Sector Behavior. *American Economic Review*. 73(5): 994-1010.

Kremer, S., Bick, A., and Nautz, D. (2013). Inaction and Growth: New Evidence from a Dynamic Panel Threshold Analysis. *Empirical Economics* 44(2): 861-878.

Kristov, Lorenzo; Lindert, Peter and McClelland, Robert (1992). Pressure Groups and Redistribution. *Journal of Public Economics*, *48*(2):135-63.

Landau, D. (1986). Government and Economic Growth in the Less Developed Countries: An Empirical Study. *Economic and Culture*. 35: 35-76.

Landau,D. (1983).Government Expenditure and Economic Growth; A Cross-Country Study. *Southern Economic Journal,* 49 (3): 783-792.

Lavrov, E. and Kapoguzov, E. (2006), Economic Growth: Theories and Problems, www.google.com,22/04/2018.

Liang, F., and Huang, W. (2011). The Relationship between Money Supply and the GDP of United States, *Hong Kong Baptist University, working Paper.*

Lin, S. (1994). Government Spending and Economic Growth. *Applied Economics*, 26(1): 83-94.

Liu Chih-H. L, Hsu C. and Younis M. Z. (2008). The Association between Government Expenditure and Economic Growth: The Granger Causality Test of the US Data, 1974-2002. *Journal of Public Budgeting, Accounting and Financial Management,* 20(4): 439-452.

Livio, Di Matteo (2013). Measuring Government in the Twenty-first Century: An International Overview of the Size and Efficiency of Public Spending. Frazer Institute.www.frazerinstitute.org.12/03/2018.

Loizides J. and Vamvoukas G. (2005). Government Expenditure and Economic Growth: Evidence from Trivariate Causality Testing. *Journal of Applied Economics,* 8(1):125-152.

Maddala, C.S.(2007). *Introduction to Econometrics*. India: John Wiley and Sons, 537-567

Mankiw, N. Gregory, Romer, D. and Weil, D.N. (1992). A Contribution to the Empirics of Economic Growth. *The Quarterly Journal of Economics*, 57 (2): 407-437.

Marx, K. (2000), *Theories of Surplus Value*. New York: Amherst, Prometheus Books, 211-239.

McCallum, Bennett T. (1996). Neoclassical vs Endogenous Growth Analysis: An Overview. *NBER Working Paper 5844*.

McDermott, J. (1999), Mercantilism and Modern Growth. *Journal of Economic Growth*,4(1): 55 80.

Mehara, M and Keikha, Alizera (2012). Government Size and Economic Growth in Iran. *International Journal of Economic Research*, 3(2):52-60.

Meltzer, Allan H. and Richard, Scott F. (1983). Tests of a Rational Theory of the Size of Government. *Public Choice*, 41(3): 403-418.

Mishkin, Frederic S. (2010). *The Economics of Money, Banking and Financial Markets,* Boston: Pearson Education Inc, 169-188.

Mitchell, Daniel. J. (2005). The Impact of Government Spending on Economic Growth. *The Heritage Foundation*, 1831.

Mehrara, Mohsen and Keikha, AliReza (2012). Government Size and Economic Growth In Iran *International. Journal. of Economic. Research,* 3(2): 52-60.

Mueller, Dennis C.(2003). *Public Choice III*. Cambridge: Cambridge University Press, 117-139.

Muhammad, I. J. A. and Attiya, Y. J. (2013). Inflation, Economic Growth and Government Expenditure of Pakistan: 1980-2010. *Procedia Economics and Finance,* 5: 58 – 67.

Munene, J.M. (2015). The Optimal Size of Government Expenditure and Economic Growth in Kenya 1963-2012. Being an unpublished Masters Degree Research Project, Department of Economics, Kenyatta University.1-40.

Musgrave A. (1989). *Public Finance and Public Choice: Two Contrasting Visions of the State.* New York: MIT Press, 113-170.

Musgrave, R. and Musgrave, P. B. (1982). *Public Finance in Theory and Practice*. Auckland: McGraw-Hill, 41-85.

Musgrave, R. and Musgrave, P.B. (1984). *Public Finance in Theory and Practice*. New York: McGraw-Hill, 150-175.

Niskanen W. (1978). Deficits, Government Spending, and Inflation: What is the Evidence? *Journal of Monetary Economics,* 3(2)*:* 22-37.

Niskanen, William (2001). Bureaucracy, in William Shughart and Laura Razzolini, eds., *The Elgar Companion To Public Choice*. Northhampton: Edward Elgar, 231-257.

Niskanen, William (1971). *Bureaucracy and Representative Government*. Chicago: Aldine-Atherton, 301-320.

North, Douglass C. (1987). Institutions, Transaction Costs and Economic Growth. *Economic Inquiry*, 25(3): 419–428.

Nurudeen, Abu and Usman, Abdullahi (2010).Government and Economic Growth in Nigeria 1970 – 2008: A Disaggregated Analysis. *Business and Economic Journal*, 4: 1-11.

Nworji, I. D., Okwu, A. T., Obiwuru, T. C. and Nworji, L. O.(2012). Effects of Public Expenditure on Economic Growth in Nigeria: A disaggregated Time Series Analysis. *International Journal of Management Sciences and Business Research,* 1(7): 2226-8235.

Oates, Wallace E.(1988). On the Nature and Measurement of Fiscal Illusion. *American Economic Review*, *75*(4): 748-757.

Ogbonna, BigBen Chukwuma (2014) Inflation Dynamics and Government Size in Nigeria. *International Journal of Economics*, *Commerce and Managemen.,* 2(12):1-22.

Ogiogio, G. O. (1995). Government Expenditure and Economic Growth in Nigeria. *Journal of Economic Management,* 2(1):18-40..

Ojarike, O. J., Ezie, O. and Torka, T. M.(2015). Public Expenditure Growth and Inflation in Nigeria: The Causality Approach. *SSRG International Journal of Economics and Management Studies*, 2(1): 26-36.

Okpabi, A.S.,Ijuo, O. A.,and Edesin, A.S.(2021). Government Expenditure and Economic Growth in Nigeria. IOSR Journal of economics and Finance, 12(1): 28-35.

Oladipo S.O and Akinbobola T.O. (2011), Budget Deficit and Inflation in Nigeria, *Journal of Emerging Trends in Economics and Management Sciences,* 2 (1):1-22.

Olaiya, S.A, Nwosa, P.I and Amassoma D. (2012), A Trivariate Causality Test among Economic Growth, Government Expenditure and Inflation Rate: Evidence from Nigeria, *Research Journal of Finance and Accounting,* 3(1): 21-40.

Olugbenga, A. O. and Owoye, O. (2007). Public Expenditure and Economic Growth: New Evidence from OECD Countries. www.google.com, 09/02/2018.

Onayemi, S. O. (2013), Price stability Effect of Monetary Policy and Output Growth in Nigeria: A time Series Analysis. *Journal of African Macroeconomic Review,4(1):25.*

Onyeiwu, Charles (2012). Monetary Policy and Economic Growth of Nigeria, *Journal of Economics and Sustainable Development,* 3(7):35-60.

Osipian, A. (2007), *Economic Growth: Education as a Factor of Production*, Kramatorsk: KEHI Press, 239-255.

Oyinlola O. (1993). Nigeria's National Defence and Economic Development: An Impact Analysis. *Scandinavian Journal of Development Alternatives,* 12(3)*:*110-145.

Oziengbe, S.A. (2013). The Relative Impacts of Federal Capital and Recurrent Expenditures on Nigeria's Economy (1980-2011), *American Journal of Economics,* 3(5): 210-221.

Ozurumba, B. A. (2012). Fiscal Deficits and Inflation in Nigeria: The Causality Approach. *International Journal of Scientific and Technology Research,* 1(8): 6 – 12.

Peacock, Alan T., and Jack Wiseman (1961). *The Growth of Public Expenditures in the United Kingdom*. Princeton: Princeton University Press, 304-335.

Peden, E.A. (1991). Productivity in the United States and its Relationship to Government Activity: An Analysis of 57 Years, 1929-1986. *Public Choice*, 69: 153-173.

Pevcin, P. (2004). Does Optimal Size of Government Spending Exist? University of Ljubljana.

Rahn R.and Fox H.(1996). What is the Optimum Size of Government? *Vernon K. Krieble Foundation.*

Ram, Rati (1986) Government Size and Economic Growth: A New Framework and Some Evidence from Cross-Section and Time-Series Data. *The American Economic Review.* 76(1):191-203.

Rei, Odawara(2010) A Threshold Approach to Measuring the Impact of Government Size on Economic Growth, Department of Economics, The George Washington University,www.google.com 03/03/2018.

Reid, G. (1989), Classical Economic Growth: An Analysis in the Tradition of Adam Smith, in Rodden, J. (2003), Reviving Leviathan: Fiscal Federalism and the Growth of Government. *International Organization,* 57: 695-729.

Rodrik D. (1998). Trade Policy and Economic Performance in Sub-Saharan Africa. *National Bureau of Economic Research Working Papers, 6562,.*

Rostow, W. and Kennedy, M. (1990), *Theorists of Economic Growth from David Hume to the Present*. New York: Oxford University Press, 423-466.

Rother, Philipp C.(2004), Fiskal Policy and Inflation Volatility, *European Central Bank*

Working Paper. 317.

Scully, G. (2000). The Growth-Maximizing Tax Rate. *Pacific Economic Review,* 5(1): 255-280.

Scully, G. (1998). Measuring the Burden of High Taxes. *National Center for Policy Analysis Policy Report*, 215.

Scully, Gerald W (1994). What Is the Optimal Size of Government in the United States? *National Center for Policy Analysis, Policy Report*, 159-180.

Seo, M.H. and Shin, Y. (2014). Dynamic Panels with Threshold Effect and Endogeneity. *London School of Economics Research Lab Working Paper Series,* 577.

Shin, D.C.(1978). Does Rapid Economic Growth Improve the Human Lot? Empirical Evidence.
Social Indicators Research, 8:199-221.

Smeti, M. (1993) The Estimation of Optimal Activity of Iran Government. *Journal of Economic Research,* 62: 111-149.

Song, Han and Casey, B. Mulligan. (2006), Inflation and the Size of Government: A Review, *Federal Reserve Bank of St. Louis,* 5: 245-267.

Srinivasan, P. (2013). Causality between Public Expenditure and Economic Growth: the Indian Case. *International Journal of Economics and Management,* 7(2): 335-347.

Suleiman, A. S. Aruwa (2009): Public Finances and Economic Growth in Nigeria: Fiscal Policy Implications in Crises Era. www.academia.com, 22/03/2018.

Surjaningsih, N., Diah, G.A. and Utari, Budi Trisnanto (2012) The Impact of Fiscal Policy on The Output and Inflation. *Bulletin of Monetary Economics and Banking, 368-376.*

Tong, H. (1990). Nonlinear Time Series: A Dynamic Systems Approach. Oxford: Oxford University Press, 355-380.

Tsay, Ruey S. (1989). Testing and Modeling Threshold Autoregressive Processes. Journal of the American Statistical Association, 84: 231-240.

Umo, Joe U. (2007). *Economics: An African Perspective*. Second Edition. Lagos: Millennium Text Publishers Ltd., 95-129.

United Nation (2011), Tashkent: UWED, UNDP, 2nd ed., available at: http://www.undp.uz/en/publications /publication.php?id=317 (Accessed 15 May 2017).

United Nations Department of Economic and Social Affairs (2011). World Population Prospects: The 2010 Revision. *Department of Socioeconomics*, United Nations.

United Nations (2001), World Public Sector Report - Globalization and the State. *Department of Economic and Social Affairs*, 359-275.

Vaish, M.C. (2002).*Macroeconomic Theory*, Twelve Edition. New Delhi.Vikas Publishing Ltd., 105-128.

Vedder, R.K. and Gallaway, L. E. (1995). *The Impact of the Welfare State on the American Economy*. Paper Prepared for Joint Economic Committee Study, December, 55-102.

Vedder, R. K.. and Gallaway, L. E. (1998). *Government Size and Economic Growth*. Paper Prepared for the Joint Economic Committee of the US Congress, 1-15.

Woodford, Michael (1995). Price Level Determinacy without Control of a Monetary Aggregate. *Carnegie Rochester Conference Series on Public Policy*, 43(3): 1-46.

Woodford, Michael (1994). Monetary Policy and Price Level Determination in a Cash-in-Advance Economy. *Economic Theory*, 4(3): 345-380.

World Bank(1990). Revenue Mobilization and Tax Policy.Washington DC: World Bank, 338.

World Bank(1995). Macroeconomic Stability in a Decentralized Economy.Washington DC: World Bank, 289-310.

World Bank(2000). Beyond Economic Growth. Washington DC: World Bank, 156.

World Bank(2002). China National Development and Sub National Finance. Washington DC: World Bank, 234-266.

World Bank Development Index (2012), 240-286.

Xue, Jin (2010). Argument for and Against Economic Growth. Second Conference on EconomicDegrowth for Economic Sustainability and Social Equity. Department of Development and Planning, Adborg University, Denmark, 331-377.

Zhu, Z, Chiou-Wei, S. and Kuo, Y.(2010). Government Size and Economic Growth: An Application of the Smooth Transition Regression Model. *Applied Economics*, 17(14): 1405-1415.