



PUBLIC EXPENDITURE AND ECONOMIC GROWTH NEXUS IN NIGERIA: A VECTOR ERROR CORRECTION APPROACH

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Abstract

This study investigates the relationship between aggregate government spending and economic growth in Nigeria, with particular emphasis on the long-run relationships. Using annual time-series data from the Central Bank of Nigeria (CBN) Statistical Bulletin spanning the period 1981–2023, the analysis employs techniques such as the unit root test, the Johansen cointegration test, and the Vector Error Correction Model (VECM) to determine the existence of a long-run equilibrium relationship among the variables. The findings reveal a significant negative long-run effect of aggregate expenditure on economic growth, highlighting inefficiencies in public spending. The variance decomposition shows a moderate contribution of aggregate expenditure to GDP growth over the ten-period forecast. The findings challenged the Keynesian hypothesis in the long run and underscored the necessity for directing public spending towards productive sectors to achieve sustainable economic growth, as put forth by Barrow. These results align with existing empirical literature emphasising the importance of efficient and targeted government spending. The study concludes by recommending enhancing public spending efficiency and focusing on productive expenditures in critical sectors such as infrastructure, education, and healthcare to foster sustainable economic growth.

Keywords: Long-run relationship, government expenditure, economic growth, real gross domestic product, Vector Error Correction Model

1. INTRODUCTION

The association between public expenditure and economic growth in Nigeria has drawn the attention of researchers. Public expenditure, notably spending on infrastructure, education, health, and other sectors, is often considered significant for economic growth. However, the effectiveness of such expenditures in galvanising steady growth is contentious, particularly in developing economies like Nigeria. Previous studies presented divergent results on this relationship. For instance, while some studies have highlighted the positive influence of capital expenditure on growth, other studies indicate that recurrent expenditure can cripple progress by crowding out private investment or deepening fiscal deficits. Also, the suitability of Wagner's Law, which states that economic growth is fostered by an increase in public expenditure, and Keynesian theory, which contends that it is the reverse, thus public spending stimulates economic growth. These approaches were extensively evaluated in the Nigerian context, and they yielded mixed results.



Recently, many studies have adopted cointegration techniques to assess the linkage. The results highlighted a long-run connection between public expenditure and economic growth, though with varying complexities and nuances. For example, while recurrent expenditures may yield short-term benefits, they lack the significant impact of capital investments in infrastructure and human capital development. In Nigeria, fluctuating oil revenues and challenges in public expenditure management have contributed to inefficient allocation and utilisation of public funds, leading to questions about their growth-enhancing potential (Ismaila & Imoughele, 2015; Onifade et al., 2020; Usman et al., 2011b). This intractable debate emphasises the need for implementing strategic fiscal policies that emphasise productive expenditure, which signals transparency and accountability in public spending.

This study assesses the long-run relationship between public expenditure and economic growth in Nigeria. Although the topic was widely studied, few of these studies have used cointegration techniques in the recent Nigerian context. Most of the studies relied on Ordinary Least Squares (OLS), which, to all intents and purposes, may not capture long-term dynamics. To address this gap, the study applies the Johansen cointegration alongside the Vector Error Correction Model (VECM) to enable a deeper insight. This study is justified by the glaring mismatch between rising public expenditure and the slow pace of long-run economic growth in Nigeria. Therefore, the study attempts to provide empirical evidence on the long-run relationship between public expenditure and economic growth, as well as to guide policymakers in formulating appropriate fiscal policies capable of enhancing productive spending and achieving sustainable economic development.

Despite persistent increases in government expenditure on capital projects, recurrent services, transportation, education, and healthcare over the years, Nigeria has continued to experience slow and unstable economic growth in the long run. Ideally, sustained public expenditure is expected to stimulate productivity, improve infrastructure, enhance human capital development, and ultimately promote long-run economic growth. Accordingly, the prolonged weak growth performance despite rising public spending raises concerns about the effectiveness of public expenditure as a long-run growth-enhancing mechanism. This disconnect creates uncertainty as to whether public expenditure significantly influences long-run economic growth or whether factors such as inefficiency, misallocation of resources, corruption, and poor policy implementation undermine its expected impact. It is against this backdrop that this study seeks to investigate the long-run relationship between public expenditure and economic growth in Nigeria.

1.1 Research Hypothesis

H₀₁ There is no significant Long-run Equilibrium Relationship between Aggregate Public Expenditure and Economic Growth in Nigeria.



2. LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Public Expenditure

Public expenditure is a major fiscal policy instrument for achieving macroeconomic stability and accelerating economic growth. Most developing and even developed countries of today use public expenditure to improve income distribution, direct the allocation of resources in desired areas, and influence the composition of national income (Aluthge et al., 2021; Onuoha & Okoye, 2020).

The structure of public expenditure in Nigeria is officially classified into recurrent and capital expenditures (Agu et al., 2015; Akpan, 2005; Modebe et al., 2012; Olaoye & Oladipo, 2019). The recurrent or consumption expenditures are mostly limited to the year in which the expenditure is incurred. They comprised expenses made by the government in the purchase of current general goods and services and for the day-to-day running of government (Abubakar, 2016; Haliru, 2023). This includes the purchase of everyday goods such as materials, rents, salaries and wages, consumables, and so forth. On the other hand, capital or investment expenditures are expenses incurred by the government for the purpose of increasing future consumption and production. They comprised investment spending on capital projects which have long-term benefits, such as the building of roads, bridges, schools, hospitals and all expenditures that can stimulate the growth process of an economy. The benefits flowing from capital expenditures extend beyond the year of payment. In the same vein, recurrent expenditure was always manifestly embedded in the capital expenditure.

Public expenditure can also be categorised into exhaustive expenditure and transfer expenditure. Exhaustive expenditure is incurred when the government actually consumes and makes purchases of factor inputs, while transfer expenditure does not involve purchases of factor inputs by the government (Egbetunde & Fasanya, 2014).

In addition, public expenditure can be classified into productive and non-productive expenditures. Productive expenditures help in improving the productive capacity of an economy, such as investments in roads, education, assets, infrastructure, human capital, etc. It increases an economy's capacity to produce income, while non-productive expenditures are consumed in the process of rendering service and involve expenditures on administration, defence, debt interest, pensions, salaries, etc. Generally, non-productive expenditures support social functioning but do not directly add to output or generate future income (Asaleye et al., 2021; Chu et al., 2020; Devarajan et al., 1996).

Total public expenditure in Nigeria, as reflected in recurrent or capital components, can further be decomposed or disaggregated into the following components (Usman et al., 2011b):

- I. Expenditure on building human capital- public expenditure on education and health



- II. Expenditure on building infrastructure- public expenditure on transport, power and communication
- III. Expenditure on administration, which is necessary for the functioning of the government

In Nigeria, public expenditures can be disaggregated into the following sectors (Etim et al., 2021; Musa & Ismail, 2023):

- A. Administration (General Administration, Defence, Internal Security, National Assembly).
- B. Economic Services (Agriculture, Construction, Transport & Communication, and others).
- C. Social and Community Services (Education, Health, and others).
- D. Transfers (public debt charges, pensions & gratuities, net depreciation on the revaluation of investments, transfer to contingency fund and others).

2.1.2 Economic Growth

Economic growth is the rate of increase in the nationwide output, usually calculated using the annual percentage rise (Ismaila & Imoughele, 2015; Ivic, 2015; Mokoena et al., 2020; Nyoni, T; Bonga, 2018). Economic growth also represents the increase of per capita gross domestic product (GDP) (Musa & Ismail, 2023). In concrete terms, it refers to the quantity of goods and services produced. Economic growth is also a process of increasing the size of national economies and the macroeconomic indicators, especially the GDP per capita, in an ascending form. Todaro & Smith (2009) explained that economic growth is a steady process by which the productive capacity of the economy is increased over a given period with the view of expanding the rising level of national output and income.

Economic growth can be positive, zero or negative (Haller, 2012). Positive economic growth is recorded when the annual average rate of output is higher than the average growth rate of the population. Zero economic growth takes precedence when the annual average rate of output is equal to the rate of population growth, while a negative growth rate appears when the average rate of population growth is higher than the average rate of output and other macroeconomic indicators, especially the GDP. Even though economic growth does not necessarily mean that each person within the economy is better off than before or benefits equally from the growth, the final purpose of economic growth is to stimulate economic development that will ultimately increase the welfare of human beings.

Economic growth can be distinguished from economic development. While economic growth is mainly concerned with how countries can advance their economies, economic development is the process of prolonged and sustained increases in the real national income of a country, accompanied by positive changes in the economic, technological, political and social structures of the society such that the real income per capita of the country increases over a long period of time (Nnamocha & Anyanwu, 2020). In summary, economic growth is adjudged to be an essential instrument for the sustainable development of any country. It engenders an improved



standard of living for the people through the development of infrastructure, education, health and agricultural productivity.

2.2 Theoretical Review

The classical growth theorists strongly advocated minimal government intervention in economic activities. Rooted in the doctrine of laissez-faire, they argued that unrestricted market forces ensure optimal resource allocation and economic efficiency. Government involvement, beyond core functions such as the administration of justice, defence, and maintenance of law and order, was viewed as potentially distortionary and detrimental to growth (Bingilar & Oyadonghan, 2020; Keita, 2016; Nworji & Oluwalaiye, 2012).

In a similar vein, neoclassical growth theories reinforced the classical scepticism toward government intervention. As noted by Nyasha and Odhiambo (2019), the neoclassical school posits that public expenditure may hinder economic growth through the crowding-out effect, whereby government spending displaces private investment. These models further assume that fiscal policy has a limited long-run influence on real output, as economies naturally adjust toward equilibrium. In contrast, the endogenous growth theory, also known as the New Growth Theory, emerged in the 1980s as a critique of the neoclassical framework. It emphasises that economic growth is driven by internal factors such as human capital development, innovation, and knowledge accumulation. Unlike exogenous models, this theory assigns a central role to government policy in shaping long-run growth trajectories. Fiscal interventions, particularly through targeted public expenditure, can enhance productivity and stimulate sustained economic growth (Alper & Demiral, 2016; Hrnjic & Brankovic, 2017; Sharipov, 2012).

Wagner's Law of Increasing State Activities provides a contrasting viewpoint by suggesting that causality runs from economic growth to government expenditure. Wagner argued that as economies industrialise and expand, public spending naturally increases to meet rising social and administrative demands. This "demand-following" hypothesis implies that government expenditure is endogenous to economic growth (Esener & İpek, 2018; Keho, 2017; Mishra & Mohanty, 2021; Odo et al., 2016; Olanrewaju & Funlayo, 2021; Olayiwola et al., 2021).

Conversely, the Keynesian hypothesis posits that government expenditure is a key driver of economic growth. John Maynard Keynes argued that active fiscal policy is necessary to address unemployment and economic instability. Through increased public spending and taxation policies, governments can stimulate aggregate demand, enhance output, and promote employment. This "supply-leading" hypothesis assumes that causality runs from government expenditure to economic growth, positioning fiscal policy as an exogenous tool for economic management (Esener & İpek, 2018; Idris & Bakar, 2017; Iftikar-ul-husnain, 2011; Pula & Elshani, 2017; Srinivasan, 2013).



In summary, while classical and neoclassical theories caution against excessive government intervention, Keynesian and endogenous growth theories underscore the growth-enhancing potential of public expenditure. Accordingly, Barro's endogenous growth framework provides a balanced and theoretically relevant foundation for analysing how the composition and efficiency of government spending influence both short-run dynamics and long-run economic growth.

Accordingly, this study adopts the endogenous growth model developed by Barro (1990) and Barro & Xavier (1992) as its theoretical framework. Barro's model distinguishes between productive and unproductive government expenditure, arguing that only the productive expenditure, such as spending on education, health, and infrastructure, contributes positively to long-run economic growth. Unproductive expenditure, by contrast, may hinder growth. The model further highlights that fiscal policy, including both government spending and taxation, can exert both temporary and permanent effects on economic growth. The choice of this theory reinforces the study and hypothesis formulated that administrative expenditure in Nigeria falls into the unproductive category.

2.3 Review of Empirical Studies

Empirical studies on the relationship between public expenditure and economic growth have generally distinguished between productive and non-productive expenditure, particularly in relation to their long-run implications for economic development. While some studies argue that productive expenditure, such as investment in infrastructure, education, and healthcare, stimulates economic growth, others maintain that recurrent or consumption expenditure may hinder growth due to inefficiency and the crowding-out effect. These divergent positions are rooted in both Keynesian and endogenous growth theories on one hand and neoclassical arguments on the other.

At the global level, empirical evidence largely supports the growth-enhancing role of productive public expenditure. Barro (1990), Barro and Sala-I-Martin (1992) and Bleaney et al (2001) established that government spending on socio-economic infrastructure positively affects long-run economic growth by improving labour productivity and reducing production costs. However, the studies equally argued that government consumption or recurrent expenditure exerts a negative effect on long-run growth. This distinction between productive and non-productive expenditure has remained central in the empirical literature.

Similarly, Tamilselvan and Manjula (2019) using time series data from Oman between 1974 and 2015, examined the causal relationship between public expenditure and GDP through the Johansen cointegration test, Vector Error Correction Model (VECM), and Wald test. The findings revealed a long-run unidirectional causality running from public expenditure to GDP, thereby supporting the Keynesian argument that government expenditure stimulates economic growth. The study differs from Barro & Sala-I-Martin (1992), which warned against excessive



recurrent expenditure, as the Oman study generally found public expenditure to be growth-enhancing in both the short and long run.

In Africa, empirical findings remain mixed depending on the composition of expenditure and the methodology employed. In Tanzania, Paul and Furahisha (2017) examined the relationship between government expenditure and economic growth within the frameworks of Wagner's Law and Keynesian theory. Using the Phillips-Perron unit root test and Johansen cointegration technique, the study established a long-run equilibrium relationship between government expenditure and economic growth. The findings recommended increased capital expenditure allocation to productive sectors capable of stimulating economic growth. This position aligns with endogenous growth theory, which emphasises the importance of productive public expenditure.

Also in Tanzania, Mwamkonko (2021) investigated whether changes in the structure of public expenditure could enhance long-run growth. Using Johansen's maximum likelihood cointegration technique, the study found that expenditure on physical and human capital positively influenced economic growth, while government consumption expenditure negatively affected growth. The findings corroborate the earlier position of Barro & Sala-I-Martin (1992) that recurrent or consumption expenditure tends to exert adverse long-run effects on economic growth.

In Ethiopia, Mulugeta (2022) employed Johansen cointegration and the Vector Error Correction Model (VECM) to examine the relationship between government expenditure and economic growth between 1980 and 2018. The study found that expenditure on health positively and significantly affected economic growth in both the short and long run, while agricultural expenditure negatively affected growth. Capital expenditure showed insignificant positive long-run effects but negative short-run effects. These findings reveal that not all forms of public expenditure produce uniform growth outcomes, thereby reinforcing the argument that the effectiveness of government expenditure depends on its allocation and efficiency.

Studies conducted in West Africa equally revealed divergent findings. Onuoha and Agbede (2019), using panel data from selected West African countries and employing Pedroni's panel cointegration and Panel Vector Error Correction Model (PVECM), found that infrastructure, health, and education expenditures positively influenced economic growth, although only infrastructure spending was statistically significant. Defence expenditure and education expenditure exhibited insignificant effects. The study recommended increased public investment in infrastructure, health, and education to promote sustainable growth across West African economies.

In Nigeria, empirical evidence remains divided between studies supporting the positive growth



effects of public expenditure and those highlighting inefficiencies associated with recurrent and administrative expenditure. Usman et al. (2011a) analysed the impact of public expenditure on economic growth using a multivariate time series model. The Augmented Dickey-Fuller (ADF) and Phillips-Perron tests confirmed stationarity among the variables, while the cointegration and Vector Error Correction analyses established a long-run relationship between public expenditure and economic growth. However, the study found that public expenditure did not significantly influence growth in the short run.

Similarly, Ejem et al. (2019) investigated the relationship between recurrent expenditure and economic growth using Johansen cointegration and Ordinary Least Squares (OLS). The findings revealed a positive and significant relationship between recurrent expenditure and economic growth, except for administrative expenditure, which exhibited a negative relationship. This finding contrasts with studies that generally support recurrent expenditure as growth-enhancing and suggests that administrative expenditure may become counterproductive when characterised by inefficiency and excessive overhead costs.

Matthew et al. (2019) also examined the impact of recurrent and capital expenditure on economic growth in Nigeria using the Johansen cointegration test, Vector Error Correction Model, and Granger causality analysis. The study found that recurrent expenditure positively influenced GDP per capita in the long run, while capital expenditure negatively affected economic growth. This finding contradicts studies such as Mwamkonko (2021) and Barro & Sala-I-Martin (1992), which argued that capital expenditure is more growth-enhancing than recurrent expenditure.

Further evidence from Nigeria was provided by Badiru et al. (2022), who investigated the impact of social and economic infrastructure expenditure on economic growth using Johansen cointegration and Vector Error Correction techniques. The findings revealed a long-run relationship among infrastructure expenditure, exchange rate, and economic growth, while infrastructure spending exerted a positive effect on growth. The study recommended increased investment in roads, transportation, communication, education, and healthcare as critical drivers of sustainable growth.

Ebipre and Eniekezimene (2020) examined the effect of government expenditure on economic growth in Nigeria using Government Capital Expenditure, Government Recurrent Expenditure, and Credit to the Private Sector as proxies. Employing OLS estimation, the study found that recurrent expenditure positively affected GDP in both the short and long run, whereas capital expenditure negatively influenced growth. The findings attributed the poor performance of capital expenditure to inefficiency, corruption, and misappropriation of public funds. These findings differ from studies that identified capital expenditure as a major driver of growth.



Kolawole (2020), however, focused specifically on the impact of capital expenditure on infrastructure development in Nigeria using the ARDL model. The study found that government capital expenditure positively influenced infrastructure development in the long run, while foreign direct investment and official development assistance were insignificant. Similarly, Aluthge et al. (2021), using the ARDL model, found that capital expenditure significantly enhanced economic growth in both the short and long run, whereas recurrent expenditure remained insignificant. The study recommended improved efficiency in recurrent expenditure and greater emphasis on productive capital projects.

Likewise, Okpabi et al. (2021) employed Johansen cointegration and Error Correction techniques to analyse public expenditure and economic growth in Nigeria. The findings showed that both recurrent and capital expenditure positively influenced economic growth in the long run, although they exerted insignificant negative effects in the short run. The study aligned with Keynesian and endogenous growth theories by emphasising the importance of public expenditure in stimulating long-run growth.

Furthermore, Olaifa and Benjamin (2020) investigated the relationship between capital expenditure and private investment in Nigeria. Using the ADF unit root test and Johansen cointegration approach, the study found that capital expenditure on physical assets and defence crowded out private investment, whereas expenditure on human capital and debt servicing positively affected private investment. The findings suggest that the composition of capital expenditure matters significantly in determining its effect on economic growth and private sector performance.

Finally, Abomaye-Nimenibo and Samuel (2020), using the ADF unit root test and Johansen cointegration technique, found that both recurrent and capital expenditures exerted positive and significant effects on Nigeria's economic growth. The study therefore supports the Keynesian proposition that government expenditure stimulates economic activities and economic growth.

Overall, the empirical literature reveals no consensus regarding the relationship between public expenditure and economic growth. While many studies support the Keynesian and endogenous growth arguments that productive government expenditure enhances economic growth, others argue that recurrent and administrative expenditures may hinder growth when characterised by inefficiency, corruption, and excessive consumption spending. Methodological differences also contribute to variations in findings, as studies adopted diverse techniques, including Johansen cointegration, ARDL, OLS, VECM, and panel estimation methods. Nevertheless, the majority of studies emphasise the importance of efficient allocation of public expenditure toward productive sectors such as infrastructure, education, healthcare, and human capital development as a pathway to sustainable economic growth.



3. METHODOLOGY

This study was premised on a longitudinal ex-post facto research design aimed at ascertaining the public expenditure and economic growth nexus in Nigeria. Real Gross Domestic Product (RGDP) was used as a proxy for economic growth. The study employed secondary data for its analysis. The time-series data used in this study were sourced from the published Statistical Bulletins of the Central Bank of Nigeria (CBN), covering the period from 1981 to 2022.

Table 1: Data Description

S/N	Variable	Description
1	RGDP (Real Gross Domestic Product)	Used as a proxy for economic growth
2	AE (Aggregate Expenditure)	Refers to capital and recurrent expenditures aggregated

Compiled by the author. All data on the variables are annual.

Time series tools of analysis were adopted using the Eviews econometric package. This study used correlational analyses alongside unit root tests to analyse the nature of the relationships between the variables and ensure the data's suitability for further analysis. This combined approach provides a comprehensive understanding of both the interconnections and the statistical properties of the data. Testing for unit roots was the first step in time-series analysis. It was required to verify whether the variables under analysis were stationary or non-stationary (Nwanne, 2015; Nwude & Boloupremo, 2018). The properties of standard estimation and testing techniques in time series analysis depended on the assumption that the variables under consideration were stationary. Regression analysis conducted on non-stationary series can produce misleading results referred to as “spurious regression”.

Consequently, if the variables are stationary, classical econometric methods are sufficient to study the equilibrium. However, if the variables were found to be non-stationary in their levels, then cointegration tests would be required (Asiagwu et al., 2023; Okpabi et al., 2021). The Johansen cointegration test and the Vector Error Correction Model (VECM) were employed to determine whether a long-run relationship exists among the variables. The Johansen cointegration technique is appropriate because it is designed to determine whether a long-run equilibrium relationship exists among two or more non-stationary time series variables, while

VECM incorporates an Error Correction Term (ECT), which measures the speed at which short-run disequilibrium adjusts back to long-run equilibrium after a shock or disturbance (Küçükefe, 2020). This is particularly important in macroeconomic studies because changes in government expenditure may have temporary short-run effects while still converging toward a long-run economic growth equilibrium over time (Kyissima et al., 2017).

The model uses bivariate analysis that involves the examination of the relationship between two variables. It is a fundamental step in understanding the association between pairs of economic variables. The bivariate econometric model typically deals with two variables often denoted as Y (dependent variable) and X (independent variable). The regression equation for a bivariate model is represented as:

$$Y = \beta_0 + \beta_1 X + \varepsilon \text{ ----- (3.9)}$$

Where:

Y is the dependent variable.

X is the independent variable.

β_0 is the intercept (the value of Y when X is zero).

β_1 is the slope coefficient (the change in X for a one-unit of Y).

ε is the error term, representing unobserved factors that affect Y but are not included in the model.

The equation captures the linear relationship between the dependent and independent variables, acknowledging that there might be random errors (ε) in the observed data. The goal of regression analysis is to estimate the values of β_0 and β_1 based on the data employed.

The time series data was retrieved from secondary sources, largely obtained from the published materials in the Central Bank of Nigeria's (CBN) statistical bulletins from 1981 to 2022.

The model employed by the study can be specified in the Vector Error Correction Model (VECM) as:

$$\Delta Y_t = \pi_0 Y_{t-1} + \Gamma_1 \Delta Y_{t-1} + \dots + \Gamma_{p-1} \Delta Y_{t-p+1} + \varepsilon_t - \alpha_1 \varepsilon_{t-1} - \dots - \alpha_{q-1} \varepsilon_{t-q+1} + \beta_1 \Delta X_{1t} + \dots + \beta_k \Delta X_{kt} + \dots \text{----- (1)}$$

$$\Delta \ln RGDP_t = \sigma + \sum_{i=1}^{k-1} \beta_i \Delta \ln RGDP_{t-i} + \sum_{j=1}^{k-1} \varphi_j \Delta \ln AE_{t-i} + \lambda_1 ECT_{t-1} + \varepsilon_{it} \text{ (2)}$$

Where: RGDP = Real Gross Domestic Product

AE = Aggregate expenditure

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

Tables 2 and 3 present descriptive statistics of the variables of the study. The mean, median, standard deviation, variance, minimum, maximum, skewness and kurtosis were used to describe the data.



Table 2: Descriptive Statistics on Real Gross Domestic Products

	RGDP
Mean	38589.74
Median	28701.91
Maximum	74639.47
Minimum	16048.31
Std. Dev.	20854.23
Skewness	0.527287
Kurtosis	1.639848
Jarque-Bera	5.183742
(Probability)	(0.074880)
Observations	42

Source: Author's computation

Table 2 presents the descriptive statistics of the data for the variables of the study. The table shows that Real Gross Domestic Product (LNRGDP) during the period has a mean (average) of RGDP ₦38,589.74 with a standard deviation (measure of dispersion) of RGDP ₦20,854.23 and a minimum value of RGDP ₦16,048.31 and RGDP of ₦74,639.47 as the maximum value. The skewness that measured the asymmetry of the distribution revealed positive skewness for the variable, indicating a right-tailed distribution, while kurtosis, which measures the tailedness of the distribution, revealed positive kurtosis for the variable, suggesting heavier tails than a normal distribution. The findings of the normality test and Jarque-Bera statistic indicate a departure from normality; values greater than expected for a normal distribution. This revealed low p-values (less than 0.05) suggest rejection of the null hypothesis of normal distribution.

Table 3: Descriptive Statistics on Aggregate Government Expenditures

	AE
Mean	2767.979
Median	1018.100
Maximum	13988.71
Minimum	9.600000
Std. Dev.	3615.657
Skewness	1.504860
Kurtosis	4.540087
Jarque-Bera	20.00299
(Probability)	(0.000045)
Observations	42

Source: Author's computation

Table 3 presents the descriptive statistics of the data for the variables of the study. The table shows that aggregate expenditure (AE) during the period has a mean (average) of AE ₦2,767.979 with a standard deviation (measure of dispersion) of AE ₦3,615.657 and a minimum



value of AE ₦9.600000 and AE of ₦13,988.71 as the maximum value. The skewness that measured asymmetry of the distribution revealed positive skewness for the variable, indicating a right-tailed distribution, while kurtosis that measured tailedness of the distribution revealed positive kurtosis for the variable, suggesting heavier tails than a normal distribution. The result of the normality test, the Jarque-Bera statistic, indicates departure from normality; values greater than expected for a normal distribution. These revealed low p-values (less than 0.05) suggest rejection of the null hypothesis of normal distribution.

Table 4 Unit Root Test of Stationarity

Variables	ADF with trend				
	Test Statistic				
	At level	Critical Value	1st difference	Critical Value	
RGDP	-2.254449	-3.536601	-3.583322	-3.526609	I(1)
AE	3.013268	-3.540328	-3.088984	-3.540328	I(1)

ADF represents the Augmented Dickey Fuller test for stationary with trend at level and first difference

The result of the ADF unit root test as shown in Table 4, suggests that all variables were non-stationary at level. The hypothesis of a unit root cannot be rejected at the level of each of the study variables. This is because time series data is generally believed to be non-stationary. The hypothesis of a unit root was therefore tested on the first differences of the variables. The results showed that the variables are non-stationary at level except at first difference; thus, they were consequently integrated of order 1, I(1). This indicates that the variables are integrated at first difference I (1), and they may exhibit some long-run relationship; this justifies the use of Johansen cointegration. Using the first difference of each variable, the hypothesis of a unit root was rejected for the variables Real Gross Domestic Product (RGDP) and Aggregate Expenditure (AE).

Table 5: Series: Real Gross Domestic Product and Aggregate Expenditure

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.233234	14.87465	18.39771	0.1453
At most 1 *	0.100838	4.251693	3.841466	0.0392
trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.233234	10.62296	17.14769	0.3423
At most 1 *	0.100838	4.251693	3.841466	0.0392

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level.

Source: Author's computation using EViews 9.0



The result of the Johansen cointegration test indicates the presence of one cointegrating equation at the 0.05 level of significance, as confirmed by both the Trace and Max-Eigen statistics. This suggests that Real Gross Domestic Product (RGDP) and Aggregate Expenditure (AE) maintain an equilibrium relationship in both the short run and the long run. The long-run cointegrating vectors and coefficients were obtained by normalising the cointegrating vector on RGDP, as presented in Table 5.

Table 6: Johansen Normalised

Variable	Coefficient	Standard Error	Z	P> Z
Normalized cointegrating coefficients				
RGDP	1			
AE	7.882576	1.79697		
Adjustment coefficients				
D(RGDP)	-0.027366	0.03074	0.89004	0.03453
D(AE)	-0.026984	0.00884	3.05248	0.00289

Source: Author's computation using Eviews 9.0

The normalisation of the cointegration vector produced the long-run elasticities by normalising with respect to Real Gross Domestic Product (RGDP). The result shows that aggregate expenditure (AE) has a negative and statistically significant long-run impact on RGDP, with a long-run elasticity of 7.882576. This implies that a decline in aggregate government expenditure reduces economic growth in Nigeria.

Table 7: Vector Error Correction Estimates on long-run equilibrium relationship between aggregate government expenditure and the economic growth of Nigeria

Cointegrating Eq:	CointEq1
RGDP(-1)	1.000000
AE(-1)	-26.30314 (3.53517) [-7.44042]
C	29076.19

Source: Author's computation using E-view 9.0

Table 7 shows the VECM estimates of long-run coefficients revealed that the aggregate expenditure (AE) in the long run has a negative and statistically significant impact on Real Gross Domestic Product (RGDP), on average, ceteris paribus. The long-run coefficient is -26.3

between aggregate expenditure and real gross domestic product, a proxy for economic growth in Nigeria. A unit change in aggregate expenditure will lead to a -26.3% decrease in real gross domestic product in Nigeria in the long run. This suggests that aggregate expenditure in the long run has a negative causal effect on real gross domestic product in Nigeria.

Impulse Response Function and Variance Decomposition

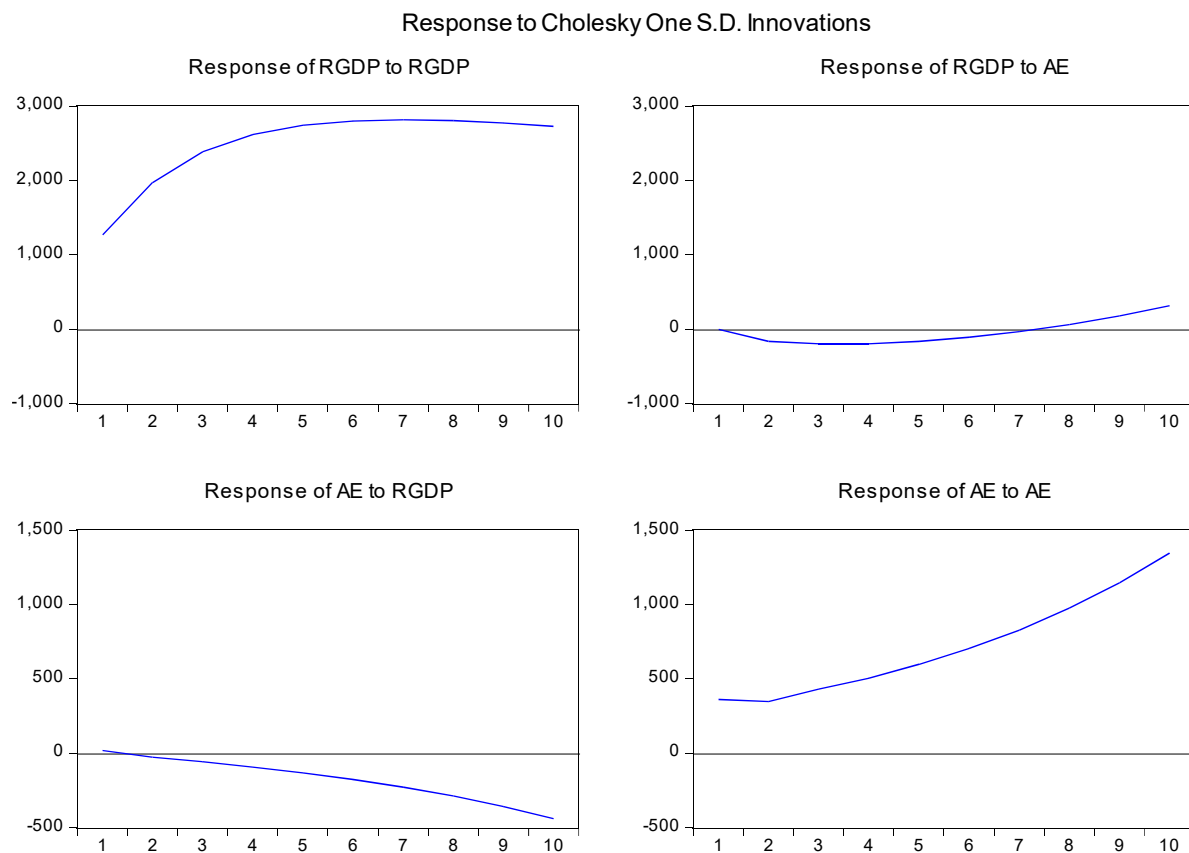


Figure 1: Impulse Response Function Between Real Gross Domestic Product and Aggregate Expenditure compiled by the authors.

The impulse response function (IRF) analysis quantifies the reaction of every variable in the model to an exogenous shock to the model. The reaction is measured for every variable at a certain time after shocking the system. The impulse response analysis is therefore a tool for inspecting the interrelation of the model variables.



Effect of Real Gross Domestic Product Shock: real gross domestic product response to shocks in the short run was positive and at the peak from the first period to the second period. The response declines from the third period throughout the tenth period but remains positive. As for aggregate expenditure response to shocks in real gross domestic product, the response was negative from the first period through to the tenth period.

Effect of aggregate expenditure Shock: aggregate expenditure response to shocks in the short run was positive and at the peak from the first period to the fourth period, throughout the period. As for real gross domestic product response to shocks in aggregate expenditure, the response was positive from the first period, declined through the fifth period and became negative through the tenth period.

Table 8: Variance Decomposition between Government Spending and Economic Growth

Variance Decomposition of LNRGDP			
Period	S.E.	RGDP	AE
1	1267.359	100.0000	0.000000
4	4262.489	99.42476	0.575240
7	6443.429	99.65200	0.347995
10	8043.005	99.56897	0.431029
Variance Decomposition of AE			
Period	S.E.	RGDP	AE
1	361.0787	0.247163	99.75284
4	839.3422	1.846888	98.15311
7	1531.592	4.842383	95.15762
10	2613.173	7.588537	92.41146

Source: Author's computation using E-view 9.0

Table 5 shows the variance decomposition of Real Gross Domestic Product (RGDP) shocks in the 1-variable VECM model, and real gross domestic product shocks are treated as an exogenous variable. The estimates of the variance decomposition show that the aggregate expenditure (AE) has a moderately significant contribution to increases in real gross domestic product shocks, and this is consistent for the 10 years chosen in this analysis for both the short run and the long run. Real Gross Domestic Product (RGDP) was a contributor to aggregate expenditure.

Impulse Response Function (IRF) Analysis

RGDP Response to AE Shocks: The positive short-run response of RGDP to AE shocks supports the Keynesian perspective, where government expenditure temporarily stimulates economic performance. However, the subsequent decline and eventual negative response in later periods reflect possible wastages in fiscal spending or unsustainable reliance on government expenditure. Aggregate expenditure response to RGDP Shocks suggested a positive and sustained response to



RGDP shocks, indicating that economic growth might encourage increased fiscal outlays, potentially indicative of pro-cyclical fiscal behaviour.

Variance Decomposition

The results indicate that AE contributes marginally to variations in RGDP (less than 1% to 0.57% in the long run), underscoring its limited effectiveness in driving economic growth. Conversely, RGDP significantly contributes to AE variations, suggesting a growth-driven fiscal adjustment mechanism rather than an expenditure-driven growth model.

4.2 Discussion of Findings

The results of this study demonstrate that in the long run, public expenditure negatively influences the economic growth of Nigeria, deviating from the Keynesian hypothesis and many empirical studies. Apparently, the results suggest inefficiencies and unproductive spending practices, emphasising the need for institutional reforms in public expenditure management. All the same, the findings align with Barro's (1990) endogenous growth model, which differentiates between productive and unproductive government expenditure. The findings also support Barro's argument that only productive government spending has a positive influence on long-run growth, while unproductive spending, which often features in the recurrent expenditures of the country, hinders growth due to its inherent wastages and mismanagement.

Many empirical studies from across the world agreed or disagreed with these findings. For instance, Tamilselvan and Manjula (2019) revealed a long-run association between public expenditure and GDP growth in Oman, with one-way causality running from public expenditure to GDP. Their findings confirmed the Keynesian model, which posited that public expenditure drives economic growth. Similarly, Paul and Furahisha (2017) in Tanzania revealed a long-run equilibrium relationship between government spending and economic growth, aligning with Wagner's Law, which argues that public expenditure grows proportionally to the rate of economic growth. However, while these studies revealed a positive impact of government spending, the Nigerian scene exhibited a different situation, which, overall, suggests that the composition and prudent management of public spending are critical determinants of its effectiveness.

Mwamkonko (2021) further supported the argument that the structure of public expenditure is critical for achieving growth. His research showed that public spending on physical and human capital positively influences economic growth, while expenditure on consumption suggests a negative effect. This finding corroborates current research, which suggests that much of Nigeria's public spending might be wastefully allocated toward non-productive sectors, thus negatively impacting growth. Similarly, Mulugeta (2022) in Ethiopia demonstrates that spending on education positively influenced economic growth, while expenditure on agriculture and other



sectors revealed negative effects. This selective impact of expenditure categories suggests that targeted investments, rather than aggregate spending increases, are necessary to drive economic growth.

In Nigeria, numerous empirical studies provide results which align with or contradict the present findings. Usman et al. (2011b) revealed that public spending had no significant influence on short-run growth but exhibited a long-run relationship with economic growth. This result partially aligns with the current finding of this study on a long-run negative influence. Similarly, Ejem et al. (2019) investigated that recurrent expenditure exhibited a positive relationship with economic growth, although administrative expenditure revealed a negative relationship. However, the study by Matthew et al. (2019) revealed that while recurrent expenditure and gross fixed capital formation positively affect GDP per capita in the long run, capital expenditure and electricity consumption show a negative impact. These mixed results suggest that the wasteful extravagance in managing public expenditure in Nigeria may result from poor implementation, corruption, and misallocation rather than a fundamental economic principle rejecting government spending as a growth stimulant.

The study conducted by Badiru et al. (2022) also indicates that expenditure on social and economic infrastructure has a positive long-run influence on economic growth in Nigeria, thus confirming that targeted investment in infrastructure can drive sustainable growth. This result contrasts with the negative impact found in the current study. Onuoha and Agbede (2019) also found that while infrastructure spending significantly impacts growth, education and health expenditure have indirect and insignificant effects. This reinforces the idea that the composition of spending, rather than total expenditure, determines its effectiveness. Similarly, Kolawole (2020) and Aluthge et al. (2021) emphasise that capital expenditure positively influences economic growth, advocating for better resource allocation to infrastructure projects.

Despite some disagreements in empirical findings, there was a general consensus on the need for ensuring efficiency and prudence in government spending. Studies by Ebipre and Eniekezimene (2020) and Okpabi et al. (2021) emphasised the importance of reallocating government spending toward capital investment as well as reducing wasteful recurrent expenditures. The leakages in capital expenditure, as highlighted by these studies, resonate with the findings of the current study, which suggest that government expenditure in its current form does not translate into long-term economic growth.

The theoretical underpinnings of these findings oppose the Keynesian perspective that increased government spending ultimately leads to higher economic growth. On the contrary, the results support the endogenous growth model, which argued that it is productive expenditure which essentially contributes to long-term economic growth. The wastages in public expenditure in



Nigeria show that transparency, accountability and effective resource management should corroborate the efficacy of increasing public expenditure.

5. CONCLUSION AND RECOMMENDATIONS

In conclusion, the study highlights the long-run relationship between public expenditure and economic growth in Nigeria. The findings opposed Keynesian doctrine by showing that current government spending negatively affects economic growth in the long run. This supports the endogenous growth theory of Barro, which differentiates productive and unproductive expenditures. The empirical literature presents a mix of supportive and contradictory findings, indicating that the effectiveness of public spending mainly depends on its composition and implementation. Given the inefficiencies that were so manifest, there is a need for institutional reforms to ensure that government expenditure is strategically allocated to sectors that accelerate economic growth.

The study recommends as follows:

- i. The government should prioritise productive public expenditure by allocating more resources to infrastructure, education, healthcare, and other growth-enhancing sectors capable of generating sustainable long-run economic growth.
- ii. Policymakers should improve efficiency in public expenditure management through stronger fiscal discipline, transparency, accountability, and monitoring mechanisms to reduce waste and corruption in government spending.
- iii. The government should reduce excessive recurrent and non-productive expenditures while increasing investment in capital projects that possess long-term economic benefits and stronger multiplier effects.
- iv. Performance-based budgeting and public expenditure tracking systems should be adopted to ensure that public funds are properly utilised for projects that directly promote economic growth and development.
- v. Institutional and structural reforms should be implemented to address systemic inefficiencies in the allocation and implementation of public expenditure before expanding government spending in critical sectors of the economy.

This study was limited by the components of public expenditure used for analysis. Future studies should employ more tools on public expenditure components or other macroeconomic variables. This will produce more robust results that would turn over a new leaf on the long-run relationship linking aggregate government expenditure and economic growth in Nigeria

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