**Analysis of Capital and Current Expenses for Agriculture and Infrastructure in Nigeria during 1985-2023: An Econometric Case Study**

**ABSTRACT**

*This study investigates the impact of government expenditure on economic growth in Nigeria, focusing on capital and recurrent expenditures in the agriculture and infrastructure sectors. Using time series data from 1985 to 2023, the research employs the* *Fully Modified Ordinary Least Squares (FMOLS) method to analyse the relationships between Real Gross Domestic Product (RGDP) and four key expenditure components: Government Capital Agriculture Expenditure (GCAEX), Government Capital Infrastructure Expenditure (GCIEX), Government Recurrent Agriculture Expenditure (GRAEX), and Government Recurrent Infrastructure Expenditure (GRIEX). The findings reveal that GCIEX and GRIEX have a strong positive and statistically significant impact on economic growth, with coefficients of 57.98 and 139.16, respectively. GCAEX also shows a positive and significant effect, albeit with a smaller coefficient (67.72). In contrast, GRAEX, while positive, is statistically insignificant, suggesting inefficiencies in recurrent spending. The study underscores the importance of prioritizing capital investments in infrastructure and agriculture to drive sustainable economic growth. Policy recommendations include enhancing the efficiency of recurrent expenditures, increasing targeted investments in productive sectors, and improving governance to maximize the impact of public spending on economic development.*

*Key Words: Real Gross Domestic Product, Government Spending on Health, Government Spending on Education, Fully Modified Ordinary Least Squares (FMOLS)*

*Jel Code: H5, H51, H52, C12*

**INTRODUCTION**

Economic growth stands as a cornerstone of economic policy and research, driven by its profound implications for improving living standards, reducing poverty, and fostering national development. It serves as a vital barometer of a nation’s economic health, reflecting an expansion in the production of goods and services over time. Rooted in the foundational theories of classical economists such as Adam Smith and David Ricardo, economic growth is underpinned by the interplay of labour, land, capital accumulation, and technological progress. These factors collectively drive economic expansion, enabling nations to achieve higher levels of productivity and prosperity. Economic growth is typically measured by increases in real gross domestic product (GDP), which captures the inflation-adjusted value of goods and services produced within an economy (Rafiy et al., 2018). Beyond mere income growth, economic development is a broader and more inclusive objective requires sustained economic growth to facilitate structural transformations such as industrialization, urbanization, and enhanced living standards. Growth therefore, encompasses not only rising incomes but also transformative shifts in the economic structure, often accompanied by demographic changes and evolving sectoral contributions (Ajayi, 2024).

In the African context, economic growth has historically been driven by agriculture, trade, and human resources. The continent, endowed with abundant natural resources, has witnessed periods of growth fuelled by rising commodity prices, expanding services, and increased manufacturing activity. The late 1990s and early 2000s marked a pivotal era as many African nations implemented economic reforms, leading to improved macroeconomic stability and accelerated growth rates. From 2000 onwards, Africa experienced a notable surge in GDP growth, propelled by favourable commodity prices, enhanced governance frameworks, and growing foreign investment (Reents & Gern, 2024). However, persistent challenges such as inadequate infrastructure, climate change, political instability, sluggish investment growth, and over-reliance on imports have constrained the sustainability of this growth. These obstacles have given rise to the "resource curse" phenomenon, wherein resource-rich developing nations often underperform compared to their resource-scarce counterparts, highlighting the complexities of managing natural resource wealth (Akinlo, 2012).

The role of government in the economy has long been a contentious issue in economic discourse. While some scholars advocate for limited government intervention, others argue that the state plays an indispensable role in ensuring stable growth, mitigating recessions, and addressing unemployment. Government expenditure, encompassing consumption, investment spending, and transfer payments, is a critical instrument for achieving socioeconomic objectives. It includes allocations to key sectors such as education, healthcare, defence, national security, and social welfare programs (Churchill, Yew, & Ugur, 2015). These expenditures are broadly categorized into recurrent and capital expenditures. Recurrent expenditures cover operational costs, including salaries, wages, and administrative expenses, while capital expenditures involve long-term investments in infrastructure, technology, and human capital development. The endogenous growth model underscores the significance of government spending on human capital and infrastructure as pivotal drivers of sustained economic growth and development (Nwosa, 2014).

In Nigeria, government expenditure has been a central feature of economic policy, its effectiveness has often been undermined by inefficiencies, misallocation of resources, and systemic corruption. For instance, despite substantial investments in infrastructure, the country continues to grapple with chronic challenges such as erratic electricity supply, dilapidated transportation networks, and limited access to clean water (Raheem, Ayana, & Fashedemi, 2014). Similarly, while global healthcare expenditure has risen with low- and middle-income countries allocating an average of 6% of GDP to healthcare millions of individuals are still pushed into extreme poverty due to exorbitant out-of-pocket healthcare costs (WHO, 2019). The COVID-19 pandemic further exposed the fragility of healthcare systems worldwide, underscoring the urgent need for increased and efficient public spending in this sector.

Agriculture, another critical domain of public spending, has historically been the backbone of Nigeria’s economy, prior to the oil boom of the 1970s, agriculture accounted for over 25% of GDP and served as a major source of foreign exchange earnings and raw materials for agro-allied industries (CBN, 2018). However, decades of neglect, underinvestment, and over-reliance on oil revenues have stymied the sector’s potential. Despite employing approximately 60% of the labour force, agriculture in Nigeria remains predominantly subsistence-based, with rural poverty rates significantly exceeding urban rates (Madu & Yusof, 2015). This disparity underscores the imperative for increased government expenditure on agricultural development to enhance productivity, ensure food security, and stimulate broader economic growth.

Economic growth is not an isolated phenomenon; it is intricately linked to various macroeconomic variables, among which government expenditure occupies a central role. Public spending exerts a dual influence on economic growth: it can stimulate aggregate demand in the short term and enhance productive capacity in the long term. Keynesian economists posit that government expenditure, particularly during economic downturns, can act as a countercyclical tool, boosting demand, creating employment, and revitalizing economic activity. Conversely, endogenous growth theorists emphasize the role of government investment in human capital, infrastructure, and technological innovation as critical enablers of long-term growth (Romer, 1990; Lucas, 1988).

In Nigeria, the relationship between government expenditure and economic growth has been complex and often fraught with challenges. While capital expenditures on infrastructure and agriculture hold significant potential to drive growth, inefficiencies, mismanagement, and corruption have frequently diluted their impact. For example, despite considerable investments in infrastructure, Nigeria’s developmental outcomes remain suboptimal, characterized by persistent power shortages, inadequate transportation systems, and limited access to basic services (Nwachukwu & Emoh, 2011). Similarly, the agricultural sector, though vital, has been hampered by underinvestment and poor policy implementation, limiting its contribution to economic growth (Olomola et al., 2015).

The COVID-19 pandemic further underscored the critical importance of efficient and strategic public spending. The economic disruptions triggered by the pandemic, including supply chain interruptions and plummeting oil prices, precipitated a 6.10% contraction in Nigeria’s GDP during the second quarter of 2020 (NBS, 2020). This stark downturn highlighted the need for resilient economic frameworks capable of withstanding external shocks. Policymakers must prioritize investments in critical sectors such as healthcare, education, infrastructure, and agriculture to foster sustainable and inclusive growth.

The interplay between government expenditure and economic growth is multifaceted and context dependent. While public spending holds immense potential to catalyse growth, its efficacy hinges on the efficiency, targeting, and quality of expenditures. For Nigeria and other developing nations, addressing inefficiencies in public spending and prioritizing investments in human capital and infrastructure are paramount to achieving sustained economic growth and development. This study seeks to delve deeper into these dynamics, offering insights into how government expenditure in key sectors can be optimized to drive economic growth. By examining the relationships between public spending and growth outcomes, this research aims to inform policy decisions that enhance the effectiveness of government expenditure in fostering economic prosperity

The motivation for this study stems from Nigeria’s persistent economic challenges, characterized by a steady decline in growth rates and underperformance relative to its potential. According to Iheonu (2024), Nigeria’s economic trajectory has been marred by a series of adverse events that have significantly hampered growth. A pivotal moment was the sharp decline in crude oil prices in 2016, which precipitated a dramatic drop in oil revenues. During this period, crude oil production in the Niger Delta was also curtailed, exacerbating the fiscal strain. With a significant reduction in excess crude oil reserves, Nigeria was unable to sustain the GDP growth rates achieved in prior years. Data from the Central Bank of Nigeria (CBN) reveal that the average price of crude oil plummeted from 100.4perbarrelin2014to100.4perbarrelin2014to43.81 in 2016. Consequently, Nigeria’s GDP growth rate fell by 1.61%, with the oil sector’s contribution declining from 9.61% in 2015 to 8.42% in 2016.

The COVID-19 pandemic further compounded Nigeria’s economic woes, disrupting both domestic and international supply chains and leading to significant volatility in the prices and availability of goods and services. According to the National Bureau of Statistics (NBS, 2020), Nigeria’s real GDP contracted by 6.10% year-on-year in the second quarter of 2020. This sharp contraction was driven by widespread disruptions in economic activity and a collapse in oil prices, exacerbated by lockdown measures implemented at national and global levels to curb the spread of the virus.

In response to these challenges, successive Nigerian governments have implemented various policies aimed at stimulating economic growth and reducing the economy’s over-reliance on oil exports. For instance, the export promotion strategy of 1981–1985 sought to diversify the economy by reducing dependence on crude oil exports. More recently, the National Development Plan (NDP) 2021–2025, launched by the administration of President Muhammadu Buhari, was designed to unlock the potential of all sectors of the Nigerian economy for sustainable growth and development. This plan succeeded the Economic Recovery and Growth Plan (ERGP) 2017–2020, which had similar objectives. Despite these efforts, economic growth has consistently underperformed, marked by periods of stagnation and decline. The persistence of these challenges raises critical questions about the effectiveness of existing policies and the structural barriers impeding Nigeria’s economic progress.

The urgency of addressing these issues is further underscored by Nigeria’s lagging performance relative to its peers in sub-Saharan Africa. According to the International Monetary Fund (IMF, 2024), the average economic growth rate for sub-Saharan Africa is projected to remain at 3.6% in 2024, while Nigeria’s growth rate is estimated at 3.19%, falling below the regional average. A comparative analysis of Ghana and Nigeria’s economic performance in 2024 highlights this disparity. The World Bank reports that Ghana’s GDP surged by 5.9% in the first half of 2024, up from 2.8% in the same period in 2023, driven by an 8.1% growth in the industrial sector, particularly in oil and gas. In contrast, Nigeria, constrained by its heavy reliance on oil exports, recorded a growth rate of only 2.98% in the first quarter of 2024, down from 3.46% in the fourth quarter of 2023 (NBS, 2024). This divergence underscores the need for Nigeria to address the structural bottlenecks that hinder its economic performance.

Against this backdrop, this study seeks to investigate the impact of key macroeconomic variables on Nigeria’s economic growth, with a specific focus on government spending in the agriculture and infrastructure sectors. By analysing the interplay between capital and recurrent expenditures in these sectors, the study aims to reveal whether public spending influences GDP growth. Utilizing time series analysis and empirical evidence, this research will offer insights into the effectiveness of government expenditure in driving sustainable economic development. The findings are expected to inform policy decisions aimed at optimizing public spending to achieve inclusive and resilient economic growth in Nigeria.

The study thus have the following specific objectives:

* examine the relationship between government agricultural capital expenditure on economic growth in Nigeria.
* assess the extent to which government agricultural capital expenditure on economic growth in Nigeria.
* investigate the relationship between government infrastructure recurrent expenditure on economic growth in Nigeria; and
* evaluate the effect of government infrastructure recurrent expenditure on economic growth in Nigeria

**2. LITERATURE REVIEW**

**Conceptual Review**

**Economic Growth**

Economic growth is a fundamental concept in economics, reflecting an economy's capacity to produce goods and services that enhance the well-being of its population, particularly in the face of increasing numbers and diversity. According to Sadiq and Duromaiye (2022), economic growth is characterized by a sustained increase in per capita income over time, signifying an expansion in the productive capabilities of an economy. This perspective aligns with the definition provided by Kuznets 2022 (as cited in Todaro, 1995), who describes economic growth as a long-term rise in an economy's ability to supply a growing and increasingly diverse array of economic goods and services to its population. At its core, economic growth is often quantified through Gross Domestic Product (GDP), which represents the total market value of goods and services produced within an economy over a specific period.

However, as Roser (2021) notes, definitions of economic growth that focus solely on the production of "goods and services" often overlook a critical nuance: not all goods and services contribute equally to economic growth. Luna (2020) emphasizes that economic growth is specifically concerned with economic goods and servicesthose that are scarce and in demand, as opposed to free goods like sunlight, which are abundant and do not require production. This distinction underscores the importance of focusing on value creation and resource allocation in understanding economic growth.

Amadeo (2021) further refines this concept by defining economic growth as an increase in the value of an economy's output, which generates higher profits for businesses and improves overall economic conditions. Importantly, Amadeo highlights that accurate measurement of economic growth requires adjusting for inflation, ensuring that growth reflects real increases in production rather than nominal price changes. Similarly, Kayode (2021) defines economic growth as an increase in the production of economic goods and services over time, measurable in both nominal and real terms. While GDP and Gross National Product (GNP) are the most used metrics, alternative indicators are sometimes employed to capture broader dimensions of economic progress.

The International Monetary Fund (IMF, 2012) provides a comprehensive definition, describing economic growth as the increase or improvement in the inflation-adjusted market value of goods and services produced by an economy over time. Statisticians typically measure this growth as the percentage rate of increase in real GDP, which adjusts for inflation to provide a more accurate reflection of economic performance. This definition underscores the dual nature of economic growth: it reflects both the quantity of goods and services produced and their real value to the economy.

Afees and Kazeem (2019) expand on this by framing economic growth as a steady process through which an economy's productive capacity increases over time, leading to higher levels of national income. They argue that growth is meaningful only if it translates into tangible improvements in the well-being of the population, which requires that the rate of economic growth outpaces population growth. This perspective is echoed by Ayres and Warr (2019), who posit that economic growth occurs when resources are reorganized in ways that create greater value. Importantly, they note that economic growth is concerned with the quantity of goods and services produced, not the methods of production. Growth can be measured in nominal terms, which include inflation, or in real terms, which adjust for inflation to provide a clearer picture of economic progress.

**Government Expenditures on Agriculture**

Government expenditure on agriculture refers to the total financial resources allocated or spent by the government on the agricultural sector with the objective of enhancing productivity and output. As a critical component of socioeconomic investment, public spending in this sector aims to drive agricultural development and economic sustainability. In Nigeria, Nosike et al. (2019) define government agricultural expenditure as the total funds disbursed to achieve planned budgetary objectives for the sector. Atayi et al. (2020) further emphasize that such expenditure encompasses all government financial commitments toward agriculture, covering various aspects such as crop gene banks, livestock management, agricultural research, technological advancements, and extension services (Mogues et al., 2018).

Keji et al. (2020) assert that government spending on agricultural growth is defined as budgetary allocations specifically directed toward increasing agricultural output. This includes initiatives such as the development of improved crop varieties, seed production and distribution, the acquisition of fertilizers and mechanized farming equipment, and investments in agricultural research and development. These expenditures play a crucial role in fostering economic expansion by enhancing sectoral productivity and sustainability.

Matthew et al. (2016) highlight that government expenditure on agriculture is derived from various levels of governance local, regional, and national and encompasses costs associated with new crop development, seed production, fertilizer procurement, mechanized farming, pest and disease control, environmental protection, irrigation projects, and agricultural research. Additionally, international organizations, particularly the World Bank through its Agricultural Development Projects (ADP), contribute significantly to public agricultural investments.

Public spending on agriculture is instrumental in driving economic progress by addressing food security, increasing raw material production, enhancing foreign exchange earnings, and supporting small-scale agricultural enterprises. Targeted investment in agricultural productivity not only meets the rising demand for food and consumer goods but also serves as a catalyst for broader economic development in Nigeria. Effective and well-managed agricultural expenditure is therefore essential for sustaining long-term growth and enhancing national economic resilience.

**Government Expenditure on Infrastructure**

Government expenditure on infrastructure entails the allocation of financial resources toward the development, maintenance, and enhancement of physical structures and facilities that underpin economic activities and public services, including agriculture. These investments encompass critical projects such as roads, bridges, railways, airports, seaports, energy systems, water supply, and telecommunications networks.

A broad consensus in economic research underscores the necessity of robust national income growth for achieving sustainable development goals, as emphasized by the United Nations Development Programme (UNDP, 2015). Enhancing infrastructure quality is integral to this process, given its role in fostering economic expansion and improving societal welfare most notably in the realm of poverty alleviation. Consequently, infrastructure spending is often deemed a pivotal driver of long-term economic progress.

However, divergent views exist regarding the impact of government spending on economic growth. Some scholars argue that extensive government expenditures, particularly when associated with an overly large public sector, may stifle economic activity and impede growth (Mitchell, 2005). It is important to distinguish between government investment in infrastructure and excessive government intervention in the economy, as the latter may lead to inefficiencies and resource misallocations.

Governments finance infrastructure projects through various mechanisms, including tax revenues, borrowing, public-private partnerships (PPPs), and grants from international institutions. The scale of infrastructure investment is influenced by economic conditions, national priorities, and existing infrastructure deficits. In recognition of its economic significance, many governments prioritize infrastructure development as a strategic tool for stimulating growth, generating employment, and addressing structural deficiencies in key sectors. As such, infrastructure investment remains a cornerstone of broader economic development policies aimed at fostering long-term prosperity.

**Empirical Review**

Okoroigwe (2024) analysed the relationship between government expenditure and economic growth in Nigeria from 2016 to 2022, employing multiple regression and correlation analysis. Key variables included government spending on health, security, agriculture, and education, alongside gross domestic product (GDP). The findings indicate that public expenditure in these sectors has a significant positive impact on GDP. The study recommends a strategic allocation of resources, emphasizing investments in infrastructure, education, and health while ensuring the efficiency of spending initiatives to optimize economic growth.

Sharmiladevi (2023) examined the influence of agriculture, forestry, and fishing value-added on international business, capital flow, and economic growth in India from 2000 to 2022. Using the Autoregressive Distributed Lag (ARDL) approach, the study incorporated variables such as agriculture value-added, foreign direct investment, trade openness, stock of net FDI, and economic growth. The results from the Bound test confirmed a long-term co-integrating relationship among the variables. The research suggests further examination of firm-level dynamics to understand the impact of inward FDI on agricultural performance.

Abubakar et al. (2020) investigated the impact of state government expenditure on agricultural growth in Kogi State, Nigeria, from 2000 to 2018. Using a Vector Autoregressive (VAR) model, the study employed variables such as crop production, capital expenditure, and recurrent expenditure. The findings revealed no significant relationship between agricultural growth and government capital expenditure in Kogi State. The research advocates increasing agricultural spending to meet the 10% Maputo Declaration benchmark and ensuring timely fund disbursement for agricultural activities, which are highly time-sensitive in Nigeria.

Alabi and Abu (2020) assessed the effect of agricultural public expenditure on agricultural productivity in Nigeria between 1981 and 2014. Utilizing Co-integration, Error Correction Model, and the System of Equations Approach, the study found that while recurrent and total agricultural public expenditure did not significantly impact productivity, capital agricultural expenditure had a positive impact that materialized with a lag. The research revealed that 23% of the agricultural budget remained unimplemented, with capital expenditure consistently falling below the recommended 60% threshold for optimal agricultural performance. The study underscores the need for improved budget execution through expedited approval and implementation.

Anderu and Omotayo (2020) explored the relationship between agricultural output growth and government spending in Nigeria from 1981 to 2017, employing ARDL and Bounds co-integration techniques. Variables examined included industrial value, interest rate, agricultural output, GDP, exchange rate, government expenditure, inflation rate, and gross capital formation. The findings indicate that government spending exerts both short-run and long-run effects on agricultural output. The study recommends strengthening agricultural financing across financial institutions and increasing investments in critical infrastructure to enhance market access for agricultural produce.

Babatunde (2018) assessed the impact of government infrastructure spending on Nigeria’s economic growth using primary and secondary data. Secondary data covered annual expenditures on selected infrastructure and GDP from 1980 to 2016, analysed using unit root and co-integration tests. The study employed a vector error correction model for secondary data and a weighted least squares method for primary data collected from 242 respondents through statistical random sampling. The findings suggest that spending on transport, communication, education, and health infrastructure significantly contributes to economic growth. However, expenditures on agriculture and natural resources infrastructure exhibited a negative impact, suggesting that the private sector plays a more dominant role in these areas than the government.

Chinedu et al. (2018) examined sectoral allocations of government expenditure and their effects on economic growth in Nigeria between 1980 and 2017. Utilizing the Error Correction Model, the study incorporated variables such as real GDP, defence expenditure, transportation and communication, health, agriculture, and education. The results confirmed a positive impact of sectoral government spending on economic performance. The study recommends the establishment of additional anti-corruption agencies to expedite the prosecution of misappropriated public funds while advocating increased public expenditure in key sectors such as defence, education, health, and agriculture to drive economic development.

Shakirat (2018) investigated the role of infrastructure spending in economic growth in Nigeria using primary and secondary data from 1980 to 2016. The study employed unit root and co-integration tests, including Augmented Dickey-Fuller and Phillip-Perron models, with a vector error correction model applied to a 37-year annual time series dataset. Findings indicate that investments in transport, communication, education, and health infrastructure have significant positive effects on economic growth. Conversely, spending on agriculture and natural resources infrastructure negatively impacts growth, reinforcing the notion of fiscal illusion, wherein government investment in these sectors is overshadowed by private sector contributions.

De (2018) explored the relationship between government expenditure on agriculture and its allied sectors and agricultural output in Meghalaya, India, from 1984-85 to 2013-14 using the ARDL model. Variables included education, agricultural GSDP, transportation, rural development, and health. The study concluded that judicious government spending has substantial potential to accelerate agricultural development. It recommends enhanced budgetary allocations and rigorous monitoring to ensure effective implementation, contributing to improved agricultural productivity.

Mattew and Mordecai (2016) evaluated the impact of agricultural inputs on economic growth in Nigeria from 1986 to 2014 using a Vector Auto Regression (VAR) model. Key variables included agricultural output, per capita income, and public agricultural expenditure. The results indicated that per capita income responded positively to agricultural output shocks throughout the ten-year period. However, public agricultural expenditure initially showed a negative impact but became positive after two years. The study emphasizes the need for economic diversification away from crude oil dependency and recommends enhanced financial support for the agricultural sector, including low-interest credit facilities for farmers to stimulate food production, employment generation, and poverty reduction.

Edame and Fonta (2014) provided empirical insights into government infrastructure spending in Nigeria using co-integration and error correction models. The study identified key factors influencing public expenditure, including urbanization rates, government revenue, population density, external reserves, and governance structure. The results revealed that infrastructure spending in Nigeria remained stable between 1970 and 2006, as confirmed by Chow and switching regression tests. The study suggests that targeted infrastructure investments can have predictable and positive effects on economic growth. Furthermore, effective budget execution and policy reforms are crucial to enhancing the efficiency and impact of public expenditure in the infrastructure sector.

**Theoretical Framework**

**The Wagner Theory on Government Expenditure**

Wagner's Law, formulated by the German economist Adolph Wagner in 1911, is a foundational concept in public finance that posits a long-term relationship between economic development and the growth of government expenditure. Wagner observed that as nations industrialize and develop economically, there is a consistent tendency for government activities to expand both in scope and in scale, leading to an increase in public expenditure that outpaces the growth of national output. This phenomenon is often referred to as the "law of increasing state activity."

Key Tenets of Wagner's Law

Wagner argued that there is a functional relationship between the growth of an economy and the growth of government activities. As economies grow and industrialize, the demand for public goods and services increases. This is due to the complexity of a modern economy, which requires more regulation, infrastructure, education, and social services. As a result, government expenditure tends to grow at a faster rate than national output, leading to an increasing share of the public sector in the economy.

According to Wagner, social progress is the fundamental cause of the relative growth of government expenditure. As societies become more complex and citizens demand higher standards of living, there is an increased need for government intervention in various sectors such as education, healthcare, social security, and public infrastructure. This, in turn, leads to an expansion of government functions and, consequently, higher public spending.

Wagner's Law also implies that the government plays a crucial role in ensuring economic stability and addressing market failures. In the area of Economic growth, market imperfections, externalities, and public goods become more prominent, necessitating government intervention. This intervention often takes the form of increased public expenditure on social services, infrastructure development, and regulatory oversight.

Wagner identified that the expansion of state functions occurs both intensively and extensively. Intensive expansion refers to the increase in government activities within existing functions, such as more spending on education or healthcare. Extensive expansion refers to the introduction of new government functions, such as environmental regulation or social welfare programs that were not previously part of the government's responsibilities.

The law particularly applies to industrializing economies, where the transition from an agrarian to an industrial economy leads to urbanization, increased economic complexity, and a higher demand for public goods. Wagner observed that in such economies, the government is often required to provide a broad range of services to support economic development, including infrastructure, legal systems, and social safety nets.

**3. METHODOLOGY**

This study employed ex-post facto research design, involving the collection and analysis of existing data. Variables such Real Gross Domestic Product (RGDP) and four components of Government expenditure, Government Capital Agriculture Expenditure (GCAEX), Government Capital Infrastructure Expenditure (GCIEX), Government Recurrent Agriculture Expenditure (GRAEX), and Government Recurrent Infrastructure Expenditure (GRIEX) were utilized, with data sourced from the Central Bank of Nigeria statistical bulletins, providing reliable time series data. The data analysis employed the time series data.

**Model Specification**

The data analysis employed the Fully Modified Ordinary Least Squares (FMOLS) test, allowing for the examination of relationships and dynamics among the variables under investigation. The theoretical foundation is anchored on the Wagner Theory, which posit that Wagner argued that there is a functional relationship between the growth of an economy and the growth of government activities. According to Wagner, social progress is the fundamental cause of the relative growth of government expenditure. As societies become more complex and citizens demand higher standards of living, there is an increased need for government intervention in various sectors such as education, healthcare, social security, and public infrastructure.

The Wagner’s model states that expansion of government expenditure accelerates sustainable economic development based on the theoretical framework and using the Cobb-Douglas economic production function the model for this study is adapted from the work of Oluwatoyin, et al. (2019) and Edwin, et al. (2014). The model is specified as:

Y = f (GE) ……………………………………………………………………………. (1)

Jerono (2009), defined total public expenditure as a function of summation of all individual government expenditure in all components.

GE= f (government expenditure in all components) ………………………………… (2)

In this study combining the two models will yield a richer econometric model that will facilitate estimation. The government expenditure (GE) is defined as the four components; this modification will help us investigate the impact of government expenditure on economic development in Nigeria.

Modifying the Adolph Wagner theory and adapting the model framework represented as:

*RGDP=f(*GCAEX,GCIEX,GRAEX,GRIEX*,µ) ………………………………………… (*3)

It is expressed explicitly as



Where;

RGDP = Real Gross Domestic Product per Capita,

GCAEX= Government Capital Agriculture Expenditure,

GCIEX= Government Capital Infrastructure Expenditure,

GRAEX= Government Recurrent Agriculture Expenditure,

GRIEX= Government Recurrent Infrastructure Expenditure,

= Intercept or autonomous parameter

= Coefficients of Government spending variables, Government Capital Agriculture Expenditure (GCAEX), Government Capital Infrastructure Expenditure (GCIEX), Government Recurrent Agriculture Expenditure (GRAEX), Government Recurrent Infrastructure Expenditure (GRIEX)

**4. RESULTS AND DISCUSSION**

**Descriptive Statistics**

This section presents the descriptive statistical analysis of key economic indicators, including Real Gross Domestic Product (RGDP), Government Consumption Expenditure (GCAEX), Gross Capital Investment (GCIEX), Government Revenue from Exports (GRAEX), and Government Revenue from Imports (GRIEX). The analysis includes measures of central tendency, dispersion, and normality.

**Table 1: Summary of Descriptive Statistics**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | RGDP | GCAEX | GCIEX | GRAEX | GRIEX |
| Mean | 42379.22 | 33.99583 | 97.27134 | 26.78770 | 64.31188 |
| Median | 37218.27 | 30.98220 | 56.60000 | 17.10952 | 17.42568 |
| Std. Dev. | 21107.56 | 33.49899 | 120.8148 | 27.73191 | 76.18200 |
| Skewness | 0.313370 | 0.757030 | 1.566859 | 0.731582 | 0.906032 |
| Kurtosis | 1.458731 | 3.192185 | 5.135936 | 2.240616 | 2.441134 |
| Jarque-Bera | 4.383163 | 3.688075 | 22.77214 | 4.302727 | 5.693521 |
| Probability | 0.111740 | 0.158177 | 0.000011 | 0.116325 | 0.058032 |
| Observations | 38 | 38 | 38 | 38 | 38 |

Source: Author’s Computation, using E- views 12, 2025

Table 1 summarizes the descriptive statistics for the selected economic indicators over 38 observations. The mean RGDP is 42,379.22, while the median is 37,218.27, indicating a moderately skewed distribution. The mean values for GCAEX, GCIEX, GRAEX, and GRIEX are 33.99, 97.27, 26.78, and 64.31, respectively. The medians are lower than the means for all variables, suggesting the presence of right skewness in the data distribution.

The standard deviation measures the spread of the data. RGDP has a high standard deviation (21,107.56), reflecting substantial economic fluctuations. GCIEX also exhibits high variability (120.81), suggesting significant investment volatility. The standard deviations for GCAEX (33.49), GRAEX (27.73), and GRIEX (76.18) indicate varying levels of dispersion among government expenditures and revenues.

Skewness values indicate the asymmetry of the data distribution. All variables exhibit positive skewness, with GCIEX having the highest skewness (1.57), suggesting the presence of extreme positive values. Kurtosis values indicate the peakedness of the distribution. GCIEX has the highest kurtosis (5.13), suggesting a leptokurtic distribution, while RGDP has the lowest kurtosis (1.45), indicating a relatively flatter distribution.

The Jarque-Bera test assesses the normality of the data distribution. A probability value below 0.05 suggests non-normality. The probability value for GCIEX is 0.000011, confirming significant deviation from normality. The probability values for RGDP (0.1117), GCAEX (0.1581), GRAEX (0.1163), and GRIEX (0.0580) indicate that these variables do not significantly deviate from normality at a 5% significance level.

This analysis highlights significant variations in economic indicators, particularly in gross capital investment and government revenue components. The findings suggest the presence of skewness and potential non-normality in investment patterns, which may influence macroeconomic modelling and policy decisions. Future research should incorporate additional diagnostic tests to validate these results and explore their economic implications.

**Correlation analysis**

This study examines the correlation matrix between Real Gross Domestic Product (RGDP) and selected expenditure components: (GCAEX), (GCIEX), (GRAEX), and (GRIEX). The correlation coefficients and their corresponding probabilities provide insights into the strength and significance of the relationships among these variables.

**Table 2: Correlation Matrix**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Correlation | |  |  |  |  |  |
| Probability | RGDP | GCAEX | GCIEX | GRAEX | GRIEX |  |
| RGDP | 1.000000 |  |  |  |  |  |
|  | ----- |  |  |  |  |  |
|  |  |  |  |  |  |  |
| GCAEX | 0.743212 | 1.000000 |  |  |  |  |
|  | 0.0000 | ----- |  |  |  |  |
|  |  |  |  |  |  |  |
| GCIEX | 0.763046 | 0.662004 | 1.000000 |  |  |  |
|  | 0.0000 | 0.0000 | ----- |  |  |  |
|  |  |  |  |  |  |  |
| GRAEX | 0.860029 | 0.711086 | 0.597323 | 1.000000 |  |  |
|  | 0.0000 | 0.0000 | 0.0001 | ----- |  |  |
|  |  |  |  |  |  |  |
| GRIEX | 0.919508 | 0.724335 | 0.670272 | 0.914283 | 1.000000 |  |
|  | 0.0000 | 0.0000 | 0.0000 | 0.0000 | ----- |  |

Source: Author’s Computation, using E- views 12, 2025

RGDP exhibits a strong positive correlation with all expenditure components, with the highest correlation observed between RGDP and GRIEX (0.9195, p = 0.0000). This suggests that government revenue investment expenditure has a substantial impact on economic growth. GRAEX also maintains a strong correlation with RGDP (0.8600, p = 0.0000), highlighting the importance of government recurrent expenditures in supporting economic activity. GCAEX and GCIEX are positively correlated with RGDP at 0.7432 and 0.7630, respectively, both statistically significant at p = 0.0000.

GCAEX and GCIEX share a moderate correlation of 0.6620 (p = 0.0000), suggesting that changes in government capital agricultural expenditures are somewhat aligned with government capital infrastructure expenditures. GRAEX shows a moderate positive correlation with GCIEX (0.5973, p = 0.0001), indicating that increases in recurrent expenditure are associated with infrastructure decisions. GRIEX exhibits strong positive correlations with GRAEX (0.9143) and GCAEX (0.7243), both significant at p = 0.0000, reinforcing the notion that government revenue infrastructural expenditure is closely tied to other fiscal activities.

The findings suggest that government expenditure components significantly influence economic growth, with investment and recurrent expenditures demonstrating particularly strong linkages to RGDP. The high correlation between RGDP and GRIEX underscores the critical role of government revenue investments in stimulating economic performance. These results emphasize the need for sound fiscal policies that optimize the allocation of government expenditures to maximize economic growth potential.

**Unit Root Test Results**

The presented table provides the results of the Augmented Dickey-Fuller (ADF) test conducted to assess the stationarity properties of the variables. Stationarity is a critical property in time series analysis, as non-stationary data can lead to spurious regression results. The ADF test is employed to determine whether a unit root exists in each series, thereby guiding the appropriate econometric modelling techniques.

**Table 3: Summary of Unit Root Test Result**

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | ADF Values | Critical Values | Order of Int. |
| RGDP | -3.941635 | -3.552973 | I(0) |
| GCAEX | -3.022917 | -2.943427 | I(0) |
| GCIEX | -4.620724 | -3.540328 | I(0) |
| GRAEX | -4.420352 | -3.536601 | I(0) |
| GRIEX | -7.004199 | -2.948404 | I(1) |

Source: Author’s Computation, using E- views 12, 2025

The ADF test statistic for RGDP is -3.941635, which is lower than the 5% critical value of -3.552973. This result leads to the rejection of the null hypothesis, indicating that RGDP is stationary at level form, i.e., I(0). The computed ADF test statistic for GCAEX is -3.022917, which exceeds the 5% critical value of -2.943427. As the test statistic is lower than the critical value, we reject the null hypothesis and conclude that GCAEX is stationary at I(0). For GCIEX, the ADF test statistic is -4.620724, which is more negative than the 5% critical value of -3.540328. This implies that GCIEX is stationary at levels, I(0), confirming the absence of a unit root.

The ADF test statistic for GRAEX stands at -4.420352, which is more negative than the 5% critical value of -3.536601. This result suggests that GRAEX is stationary at I(0), and no further differencing is required to achieve stationarity. The ADF test statistic for GRIEX is -7.004199, which is significantly lower than the 5% critical value of -2.948404. However, the order of integration is determined to be I(1), implying that GRIEX is non-stationary at levels but becomes stationary after first differencing. The stationarity analysis indicates that four of the examined variables (RGDP, GCAEX, GCIEX, and GRAEX) are stationary at levels, I(0), suggesting their suitability for econometric modelling without differencing. However, GRIEX exhibits non-stationarity at levels and requires first differencing to achieve stationarity, I(1).

**Co-integration test**

The Engle-Granger residual-based co-integration test is a statistical method used to determine whether two or more time series variables are co-integrated. Co-integration implies that while the individual variables may be non-stationary (i.e., they have a unit root and their statistical properties change over time), a linear combination of them is stationary. This is particularly important in economic research because it suggests a long-term equilibrium relationship between the variables, even if they may deviate from this equilibrium in the short run.

**Table 4: Results of Engle and Granger (Residual Based) Co-integration Test**

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | ADF Test Statistic | 95% Critical ADF Value | Remarks |
| Residual | -3.653824 | -2.628961\* | Co-integrated |

*Note: \* significant at 1%*

*Source: Researcher’s Computation Using EViews-12 (2025)*

The ADF test statistic of -3.653824 is more negative than the 95% critical value of -2.628961. This allows us to reject the null hypothesis of a unit root in the residuals at the 5% significance level. Since the residuals are stationary, we conclude that the original time series variables are co-integrated. This suggests that there is a stable, long-term relationship between the variables, which is a crucial finding in economic research. It implies that any short-term deviations from this equilibrium will eventually correct themselves, bringing the variables back into alignment.

**Model Estimation and Results Evaluation**

The table presents the results of a Fully Modified Ordinary Least Squares (FMOLS) regression, a method commonly used in econometrics to address issues such as endogeneity, autocorrelation, and heteroskedasticity in time series data. FMOLS is particularly useful when dealing with non-stationary variables and cointegrated relationships, as it provides efficient and consistent estimates of long-run coefficients. Below is a detailed breakdown of the results:

**Table 5: Method: Fully Modified Ordinary Least Squares (FMOLS)**

**Dependent Variable: RGDP**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| GCAEX | 67.7187 | 60.93264 | 1.11137 | 0.0247 |
| GCIEX | 57.97844 | 15.44539 | 3.753771 | 0.0007 |
| GRAEX | 121.7262 | 117.7459 | 1.033804 | 0.309 |
| GRIEX | 139.1615 | 45.59563 | 3.05208 | 0.0045 |
| C | 22064.12 | 1975.016 | 11.17161 | 0 |
| R-squared | 0.878516 |  | |  |
| Adjusted R-squared | 0.86333 |  | |  |
| F-statistic | 64.15565 |  | |  |
| Prob(F-statistic) | 0.0000 |  |  |  |

*Source: Researcher’s Computation Using EViews-12 (2025)*

The R-squared value of 0.8785 indicates that approximately 87.85% of the variation in the dependent variable is explained by the independent variables in the model. This high value suggests that the model fits the data well and captures a significant portion of the underlying relationship.

The adjusted R-squared, which accounts for the number of predictors in the model, is 0.8633. This value is slightly lower than the R-squared but still indicates a strong explanatory power, reinforcing the robustness of the model.   
The F-statistic tests the overall significance of the model. The high value of 64.16 and a p-value of 0.0000 indicate that the model is statistically significant at the 1% level. This means that the independent variables, collectively, have a significant impact on the dependent variable.

The intercept term is highly significant, indicating that even when all explanatory variables are zero, the baseline value of the dependent variable is 22,064.12 units. This term captures the effect of omitted variables and serves as a reference point for the model.

**Post Estimation checks**

Figure 1: Normality test

Source: Authors’ computation, (Eviews-12) 2025

The outcome depicted in Figure 1 reveals that the probability value of the Jarque-Bera test, at 0.248910, suggests that the hypothesis of normal distribution can be accepted. Since the reported p-value (0.248910) is greater than 0.05, we fail to reject the null hypothesis. This means that the dataset does not show significant deviation from a normal distribution, and normality can be reasonably assumed.

**Discussion of Findings**

The estimated coefficients and their respective significance levels provide critical insights into the relationships between the explanatory variables and the dependent variable. The positive and statistically significant coefficient for GCAEX at the 5% significance level suggests that an increase in government capital expenditure (GCAEX) contributes meaningfully to the dependent variable. The magnitude of the coefficient (67.72) indicates that for every one-unit increase in GCAEX, the dependent variable increases by approximately 67.72 units, ceteris paribus.

Similarly, GCIEX exhibits a strong positive association with the dependent variable, with a coefficient of 57.98 and a highly significant p-value of 0.0007. The statistical significance at the 1% level underscores the robustness of this relationship. Government consumption expenditure (GCIEX) has been widely acknowledged in the literature as a crucial determinant of aggregate demand, particularly in Keynesian frameworks (Ram, 1986; Ramey, 2011). The positive impact suggests that increased government consumption spending stimulates economic activities, thereby positively influencing the outcome variable. However, excessive government consumption expenditure without corresponding productivity gains may lead to fiscal imbalances.

The coefficient for GRAEX is positive but statistically insignificant (p-value > 0.05), suggesting that while the estimated effect is large in magnitude, it lacks statistical support for a meaningful impact in the long run. This result could indicate inefficiencies in government recurrent expenditure (GRAEX), where increased spending does not necessarily translate into enhanced economic outcomes. The insignificance of GRAEX may imply misallocation of resources, inefficiencies, or leakages in recurrent government spending.

On the other hand, GRIEX demonstrates the most substantial impact, with a coefficient of 139.16 and statistical significance at the 1% level (p-value = 0.0045). This finding suggests that government investment expenditure (GRIEX) plays a pivotal role in shaping long-term economic outcomes. The results corroborate empirical evidence from studies such as Tanzi and Davoodi (1997) and Gupta et al. (2005), which emphasize the importance of targeted government investment in productive sectors such as infrastructure, education, and healthcare. The significant impact of GRIEX suggests that policy measures should prioritize capital investments to achieve sustainable economic growth and development.

The findings highlight the differential impacts of various government expenditure components on the dependent variable. GCIEX and GRIEX emerge as the most influential factors, exhibiting large coefficients and strong statistical significance. These results underscore the necessity for policymakers to prioritize government consumption and investment spending, ensuring that these expenditures are efficiently allocated to sectors with high economic multipliers. In particular, targeted investment in infrastructure, human capital development, and technological advancements could yield substantial long-term benefits.

While GCAEX remains significant, its comparatively smaller coefficient suggests that its impact is moderate relative to GCIEX and GRIEX. This finding implies that while capital expenditures contribute positively, their effectiveness may depend on factors such as the quality of investment projects, governance efficiency, and the absorptive capacity of the economy.

The insignificance of GRAEX calls for a re-evaluation of recurrent government spending policies. Measures aimed at improving efficiency in public administration, reducing wasteful expenditures, and enhancing fiscal discipline could improve the effectiveness of recurrent expenditures.

**Conclusion and Recommendations**

The study provides empirical evidence on the differential impacts of government expenditure components on economic growth in Nigeria. Government capital expenditures in infrastructure (GCIEX) and agriculture (GCAEX) exhibit significant positive effects, highlighting their critical role in fostering long-term economic development. Similarly, government investment expenditure (GRIEX) emerges as the most influential factor, with a substantial coefficient and high statistical significance, underscoring the importance of capital investments in driving economic growth. However, recurrent expenditures (GRAEX) show no significant impact, suggesting inefficiencies in their allocation and utilization. These findings align with the Wagnerian theory, which posits that as economies grow, government expenditures expand to meet increasing demands for public goods and services. The results also resonate with endogenous growth theories, emphasizing the role of human capital and infrastructure investments in sustaining economic progress. Overall, the study highlights the need for strategic fiscal policies that prioritize productive capital expenditures while addressing inefficiencies in recurrent spending to achieve sustainable economic growth in Nigeria. Based on these findings, the following recommendations are proposed:

Recommendation for GCAEX (Government Capital Agriculture Expenditure):

1. The Federal Ministry of Agriculture and Rural Development (FMARD) should prioritize investments in mechanized farming, irrigation systems, and agricultural research and development. Specifically, FMARD should collaborate with the National Agricultural Seeds Council (NASC) to ensure the widespread distribution of high-yield seeds and modern farming equipment. Additionally, FMARD should establish a Monitoring and Evaluation Unit to track the implementation and outcomes of capital projects, ensuring transparency and accountability in fund utilization. This will enhance agricultural productivity, food security, and rural development, ultimately contributing to economic growth.
2. Given the strong positive association between government capital infrastructure expenditure (GCIEX) and economic growth, the Federal Ministry of Works and Housing should focus on strategic infrastructure projects such as road networks, railways, and energy systems. To ensure efficient execution, the ministry should partner with the Infrastructure Concession Regulatory Commission (ICRC) to leverage public-private partnerships (PPPs) for funding and implementation. Furthermore, the National Planning Commission (NPC) should develop a long-term infrastructure development plan that aligns with Nigeria’s economic goals, ensuring that projects are prioritized based on their potential to stimulate economic activities and reduce regional disparities.
3. The statistically insignificant impact of government recurrent agriculture expenditure (GRAEX) highlights inefficiencies in resource allocation and utilization. To address this, the Office of the Accountant-General of the Federation (OAGF) should implement a Performance-Based Budgeting System for recurrent expenditures in the agricultural sector. This system should be enforced by the Budget Office of the Federation (BOF), ensuring that funds are tied to measurable outcomes such as increased crop yields, farmer training programs, and reduced post-harvest losses. Additionally, the Economic and Financial Crimes Commission (EFCC) should intensify oversight to curb leakages and misappropriation of recurrent funds, ensuring that resources are effectively channelled to achieve tangible results.
4. The significant positive impact of government recurrent infrastructure expenditure (GRIEX) underscores the importance of maintaining and upgrading existing infrastructure. The Federal Ministry of Finance, Budget, and National Planning should allocate a dedicated portion of the annual budget to recurrent infrastructure maintenance, managed by the Federal Roads Maintenance Agency (FERMA) and the Transmission Company of Nigeria (TCN). These agencies should adopt a Preventive Maintenance Framework to reduce the long-term costs of infrastructure degradation. Additionally, the Bureau of Public Procurement (BPP) should ensure competitive bidding processes for maintenance contracts, minimizing costs and improving service delivery. This approach will sustain the economic benefits of infrastructure investments and prevent the deterioration of critical assets.

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Details of the AI usage are given below:

1. Deepseek

2.Grammerly

3.

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