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Government Spending and Economic Growth in Nigeria: Evidence from ARDL Model Analysis

[1]**Saheed Oluwaseun LAWAL** ✉
[1]Department of Economics, Faculty of Management sciences, Al-Hickman University, Kwara State, Nigeria

ABSTRACT

Purpose—This study investigates the impact of disaggregated government capital expenditure on economic growth in Nigeria. By analyzing specific components of capital expenditure, the research aims to clarify their respective effects on GDP growth.

Design/methods/approach–The study employs an autoregressive distributed lag (ARDL) model, using annual data from 1981 to 2017. Capital expenditures are decomposed into administrative services, social and community services, and economic services. Foreign direct investment (FDI) is included as a control variable. Stationarity tests and co-integration analyses were conducted to ensure model robustness.

Findings–The results reveal that current capital expenditure on economic services does not significantly influence GDP growth, while the capital-labor ratio negatively affects economic performance. Moreover, lagged values of FDI show a significant and positive impact on economic growth, suggesting a delayed effect. However, the impact of capital expenditure components on economic growth varies, with transfer payments exhibiting a negative influence.

Research implications/limitations—This study highlights that optimizing capital expenditure allocation is essential to enhance Nigeria's economic growth prospects. However, the analysis is limited by the use of aggregated national data and does not account for sectoral or regional disparities.

Originality/value–Unlike previous studies focusing on aggregated spending, this research provides a disaggregated analysis, offering deeper insights into which areas of government spending stimulate or hinder economic growth in Nigeria. The findings highlight the necessity for targeted fiscal policies to maximize growth prospects

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Introduction

Government expenditure plays a vital role in driving macroeconomic stability and promoting economic development. Through various forms of public spending, governments seek to stimulate growth, reduce unemployment, and correct market failures. Public investment in infrastructure, healthcare, education, and security are among the key interventions that can foster long-term economic prosperity.

CONTACT: ✉ sirheedlawal@yahoo.com

In the context of developing economies such as Nigeria, the scale and effectiveness of government expenditure have profound implications for economic performance. Despite significant increases in public spending over the past decades—largely financed by revenues from crude oil—Nigeria continues to grapple with high poverty rates, unemployment, inflationary pressures, and infrastructural deficits (CBN, 2015). This paradox raises questions about the efficiency and composition of government expenditure in stimulating sustainable economic growth.

Empirical observations reveal that Nigeria's total government expenditure increased dramatically from 4.85 billion Naira in 1981 to 3,831.98 billion Naira in 2015 (CBN, 2015). However, the corresponding economic outcomes have been inconsistent, with GDP growth fluctuating and key socio-economic indicators often worsening. This discrepancy underscores the importance of not only the magnitude but also the allocation and effectiveness of government spending in promoting growth.

The relationship between government spending and economic growth remains a subject of ongoing debate among economists. Classical theories advocate that increased public spending boosts aggregate demand and output, particularly during recessions. Meanwhile, neoclassical and endogenous growth theories stress that the quality, efficiency, and sectoral allocation of government expenditure are critical in determining its actual impact on economic performance (Solow, 1956; Romer, 1986).

Existing empirical studies have produced mixed results. Some suggest that government spending positively influences economic growth by enhancing human capital and infrastructure, while others report negative effects attributed to inefficiency, corruption, and the crowding-out of private sector investment (Stiglitz, 1989; Landau, 1986; Ekpo, 1996). A growing consensus suggests that the disaggregation of public expenditure into its components may provide clearer insights into its effects on economic growth.

Against this backdrop, this study aims to assess the impact of disaggregated government capital expenditure on economic growth in Nigeria. Specifically, it analyzes how different components of capital expenditure—administrative services, social and community services, and economic services—affect GDP growth. This approach allows for a more nuanced understanding of fiscal policy effectiveness beyond aggregate spending figures.

To guide the investigation, the study poses two key research questions: (1) Does total government capital expenditure significantly impact Nigeria's GDP growth? (2) How do the individual components of government capital expenditure influence economic growth? Accordingly, the following hypotheses are formulated: H_{01}: Government capital expenditure does not affect GDP growth; and H_{02}: Components of capital expenditure do not affect GDP growth.

The findings of this research are expected to provide important policy implications. Understanding which categories of government spending contribute positively or negatively to economic growth will enable policymakers to better allocate public resources, enhance fiscal efficiency, and design interventions that promote sustainable economic development in Nigeria.

This paper is organized into five main sections. Following this Introduction, Section 2 outlines the Methods, detailing the model specification, variables, estimation techniques, and data sources. Section 3 presents the Results obtained from the empirical analysis. Section 4 offers a comprehensive Discussion of the findings in the context of existing literature. Finally, Section 5 provides the Conclusion, summarizing the key insights and offering policy recommendations based on the study's outcomes

Methods

Research Design

This study adopts a quantitative research design based on a longitudinal analysis of Nigeria's economic data from 1981 to 2017. The approach emphasizes empirical evaluation using econometric modeling to examine the dynamic relationship between disaggregated government capital expenditure components and economic growth. An Autoregressive Distributed Lag (ARDL) model is employed to capture both short-run and long-run effects, accommodating variables with mixed integration orders.

Model Specification

The theoretical framework is anchored on the Solow-Swan neoclassical growth model, modified to incorporate government expenditure and foreign direct investment (FDI) as additional explanatory variables. The baseline functional relationship can be expressed as:

$$GDPGR_t = f(KLR_t, EXP_t, FDI_t)$$

Where:
- $GDPGR_t$ = Gross Domestic Product Growth Rate at time t
- KLR_t = Capital-Labor Ratio
- EXP_t = Government Capital Expenditure
- FDI_t = Foreign Direct Investment

Expressing the relationship in log-linear form for empirical estimation, the primary growth model becomes:

$$ln\ GDPGR_t = \beta_0 + \beta_1\ ln\ KLR_t + \beta_2\ ln\ EXP_t + \beta_3\ ln\ FDI\_t + \varepsilon_t$$

Where:

ε_t = Error term capturing omitted variables.

Additionally, to assess the disaggregated impact of expenditure components, the following model is specified:

$$ln\ GDPGR_t = \beta_0 + \beta_1\ ln\ KLR_t + \beta_2\ ln\ FDI_t + \beta_3\ ln\ CEADM_t + \beta_4\ ln\ CESC_t + \beta_5\ ln\ CEES_t + \varepsilon_t$$

Where:

- $CEADM_t$ = Capital Expenditure on Administrative Services
- $CESC_t$ = Capital Expenditure on Social and Community Services
- $CEES_t$= Capital Expenditure on Economic Services

Definition of Variables

Table 1. Definition of Variables

Variable	Description
GDPGR	GDP growth rate (annual %)
KLR	Capital-Labor Ratio
EXP	Total Government Capital Expenditure
CEADM	Capital expenditure on administrative services
CESC	Capital expenditure on social and community services
CEES	Capital expenditure on economic services
FDI	Net inflows of Foreign Direct Investment (% of GDP)

All variables are transformed into natural logarithms to reduce heteroscedasticity and stabilize variance.

Estimation Techniques

The empirical analysis follows several key steps:

1. Stationarity Tests: Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests are performed to determine the integration order of the variables.
2. Model Selection: Given the presence of I(0) and I(1) variables, the ARDL bounds testing approach is utilized to explore co-integration relationships.
3. ARDL Estimation: Short-run and long-run dynamics are estimated using the ARDL framework, which is robust even with small sample sizes.
4. Diagnostic Tests: Post-estimation diagnostics, including serial correlation tests, heteroscedasticity tests, and stability tests (CUSUM and CUSUMSQ), are conducted to validate model reliability.

Data Sources

The study relies exclusively on secondary data sourced from reputable government publications, including:

- Central Bank of Nigeria (CBN) Statistical Bulletin
- National Bureau of Statistics (NBS) Reports
- World Bank Development Indicators (for supplementary FDI data)

The data span from 1981 to 2017, providing sufficient coverage to capture long-term economic dynamics and policy changes.

Result

Descriptive Statistics

This section presents the descriptive statistics of the study variables. Descriptive statistics provide an initial understanding of the data distribution and variability over the study period. Table 2 summarizes the mean, maximum, minimum, standard deviation, and skewness for the key variables, offering insights into their general behavior and volatility.

Table 2. Descriptive Statistics

Variable	Mean	Max	Min	Std. Dev.	Skewness
GDPGR	3.78	33.74	–10.75	7.02	1.77
LNCEES	1.67	2.73	–0.18	1.01	–0.56
LNCESC	1.12	2.22	–0.62	0.88	–0.29
LNCET	1.26	2.42	–1.95	0.92	–1.27
LNFDI	1.34	2.52	–0.58	1.03	–0.51

The descriptive statistics show that the average GDP growth rate was 3.78%, with substantial variation over the period, reflected in a standard deviation of 7.02%. The negative skewness of LNCEES and LNCET indicates that extreme low values in government capital expenditure were more frequent than high values, suggesting instability in fiscal policy execution. Overall, the descriptive statistics highlight the volatility inherent in Nigeria's economic and fiscal indicators.

Unit Root and Co-integration Tests

Before conducting ARDL estimation, unit root tests were applied to ascertain the stationarity properties of the series. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were used, and results confirmed that while GDP growth was stationary at level, all other variables became stationary after first differencing. This justifies the use of ARDL methodology, which allows for a mixture of I(0) and I(1) variables without requiring strict co-integration.

Additionally, Johansen co-integration tests were conducted to verify the existence of a long-run relationship among variables. The trace statistics indicated no significant co-integration at conventional levels, implying that short-term relationships are more dominant during the study period.

ARDL Regression Results

Following the confirmation of variable stationarity, the ARDL regression model was estimated to explore the short-run and long-run dynamics between government capital expenditure components and economic growth. The results are summarized in Table 3.

Table 3. ARDL Regression Results

Variable	Coefficient	Std. Error	t-Statistic	p-value
GDPGR(-1)	0.24	0.18	1.30	0.21
GDPGR(-2)	0.39	0.17	2.21	0.04
D(LNCEES)	–5.22	4.45	–1.17	0.25
D(LNCESC)	0.65	4.36	0.15	0.88
D(KLR)	–5.68	1.36	–4.16	0.00
D(LNCET(-1))	–3.77	1.70	–2.22	0.04
D(LNFDI)	9.13	5.68	1.61	0.12
D(LNFDI(-1))	11.36	4.87	2.33	0.03
Constant (C)	0.50	1.52	0.33	0.75

The ARDL regression results indicate that the second lag of GDP growth (GDPGR(-2)) is positive and statistically significant at the 5% level, confirming the presence of dynamic persistence in Nigeria's economic growth path. This suggests that past growth has a lasting influence on present economic performance, consistent with endogenous growth theories where cumulative investments drive sustained output increases. Conversely, the immediate impact of capital expenditure on economic services (D(LNCEES)) is negative and statistically insignificant, implying that increased spending in infrastructure sectors has not translated into immediate economic gains. This could stem from inefficiencies in public project execution, corruption, or a mismatch between investment projects and economic needs.

Similarly, the effect of capital expenditure on social and community services (D(LNCESC)) is positive but statistically insignificant, suggesting that social sector investments, while theoretically beneficial, may take longer periods to influence economic outcomes meaningfully. The capital-labor ratio (D(KLR)) is found to have a strong negative and statistically significant impact on GDP growth, pointing to a structural inefficiency where capital accumulation does not enhance labor productivity. Such findings challenge the

traditional Solow-Swan model assumptions and highlight issues such as low technological absorption and inadequate industrial diversification in Nigeria.

The lagged value of capital expenditure on transfers (D(LNCET(-1))) also negatively and significantly affects GDP growth, indicating that public transfers, if not efficiently managed, can crowd out productive investments and reduce overall economic performance. Lastly, foreign direct investment (D(LNFDI(-1))) shows a positive and statistically significant effect, but with a one-period lag, implying that FDI requires time to integrate into the domestic economy before yielding measurable benefits. This finding emphasizes the importance of maintaining a stable, attractive environment for foreign investors to support sustainable growth trajectories.

Overall, the regression outcomes suggest that while foreign investment inflows contribute positively to economic growth, the effectiveness of government capital expenditure remains limited, largely due to structural and institutional inefficiencies.

Discussion

The findings of this study offer significant insights into the complex relationship between government capital expenditure components and economic growth in Nigeria. Consistent with the endogenous growth framework, the study confirms that past economic performance exerts a strong dynamic influence on current GDP growth. The significance of the second lag of GDP growth suggests the existence of path-dependent processes where historical investments, technological adaptations, and policy outcomes cumulatively shape present economic trajectories. This supports Romer's (1986) assertion that cumulative knowledge and capital deepen productivity and foster long-term growth.

However, the results pertaining to government expenditure components present a more nuanced picture. Capital expenditure on economic services was found to have an insignificant and negative short-run effect on economic growth. This contradicts theoretical expectations from Barro (1990) and Solow (1956), who emphasize the growth-enhancing role of infrastructure investment. Similar to the findings of Landau (1986) and Dipendra (1998), the Nigerian context reveals that infrastructural investments often fail to yield immediate benefits, likely due to inefficiencies in implementation, corruption, project delays, and maintenance deficiencies. Moreover, the lack of strategic alignment between infrastructure projects and the real needs of the economy may also dilute their effectiveness.

Likewise, capital expenditure on social and community services displayed an insignificant positive association with GDP growth. While social investments in education and health are traditionally regarded as vital for human capital formation and long-term economic prosperity (Lucas, 1988; Ahsan et al., 1996), the short-run insignificance observed here may reflect systemic challenges such as underfunded programs, low service quality, and poor policy continuity. This result echoes previous studies by Amassoma et al. (2011), who highlighted that in Nigeria, the mere allocation of funds to the social sector without corresponding improvements in service delivery fails to drive immediate growth gains.

The strongly negative and significant impact of the capital-labor ratio on GDP growth points to deeper structural inefficiencies within the Nigerian economy. In contrast to the Solow-Swan model, which posits that capital accumulation enhances output per worker, the findings suggest that increased capital intensity in Nigeria may not translate into productivity gains. This result resonates with studies such as those by Al-Yousif and Cooray (2009), indicating that without concurrent technological advancement and skills development, capital deepening alone is insufficient to stimulate growth, particularly in economies characterized by weak industrial bases and poor technology absorption capacities.

Furthermore, the negative effect of capital transfers aligns with concerns raised by World Bank (1991), emphasizing that unchecked government transfers can distort resource allocation, reduce incentives for productive activities, and ultimately dampen economic growth. Inefficient public transfers, often marred by leakages and political patronage, may create dependency dynamics rather than stimulate productive economic behavior.

In contrast, foreign direct investment exhibited a positive and significant lagged impact on economic growth. This finding is consistent with previous empirical evidence (e.g., Fan and Rao, 2003; Akpan, 2005) supporting the role of FDI in promoting technological diffusion, capital accumulation, and employment creation. The lagged nature of the effect emphasizes that FDI's contributions to economic growth are not immediate but unfold over time as foreign firms establish operations, transfer knowledge, and integrate into the domestic economy.

Taken together, these findings underscore a critical lesson: while external capital inflows (such as FDI) offer valuable growth support, the internal mechanisms of public sector spending must be critically reformed. Simply increasing the volume of government capital expenditure without addressing inefficiencies, project execution quality, and strategic targeting undermines its potential contribution to economic growth. These results align with the broader body of literature advocating for improved governance, institutional reforms, and policy coherence as prerequisites for translating public investment into sustainable economic performance.

Thus, enhancing the effectiveness of government expenditure requires not only fiscal discipline but also systemic reforms in public investment management, transparency, accountability, and a focus on productivity-enhancing sectors. Future research should therefore consider incorporating governance indicators, institutional quality measures, and sector-specific analyses to deepen understanding of how public spending interacts with growth dynamics in developing economies like Nigeria.

Conclusion

This study set out to examine the impact of disaggregated government capital expenditure components on economic growth in Nigeria over the period 1981–2017. Employing an Autoregressive Distributed Lag (ARDL) model to accommodate the mixed integration orders of the variables, the analysis explored both short-run and long-run dynamics between capital expenditure, foreign direct investment, and economic performance.

The results revealed several important findings. First, economic growth exhibited strong path dependence, where previous growth positively influenced current performance, consistent with endogenous growth theories. Second, capital expenditure on economic and social services was found to be statistically insignificant in driving short-run economic growth, suggesting that government investments have not been effectively channeled into productivity-enhancing sectors. Moreover, the capital-labor ratio displayed a strong negative effect on growth, highlighting structural weaknesses and inefficiencies in Nigeria’s capital accumulation processes. In contrast, foreign direct investment emerged as a positive contributor to economic growth, albeit with a delayed impact, affirming the critical role of external capital flows in supporting domestic economic expansion.

These findings carry significant theoretical and policy implications. From a theoretical perspective, the results challenge the assumption that capital accumulation alone guarantees economic growth, underscoring the importance of investment quality, efficiency, and technological adaptation. From a policy standpoint, the study emphasizes the urgent need for reforms in public investment management, greater transparency in fiscal operations, and the strategic prioritization of sectors that offer high growth multipliers.

While this study provides valuable insights, it is not without limitations. The use of aggregate national-level data may obscure important sectoral and regional variations in expenditure effectiveness. Additionally, the study does not explicitly account for the role of governance and institutional quality, which could significantly mediate the relationship between public spending and growth outcomes. Future research should therefore integrate measures of institutional quality, disaggregate expenditure data further at sectoral or regional levels, and explore potential non-linearities and structural breaks in the expenditure-growth relationship to build a more comprehensive understanding.

In conclusion, while foreign investment remains a vital engine for Nigeria's economic growth, optimizing the structure, targeting, and efficiency of government capital expenditure is equally critical for achieving sustainable and inclusive development.

Declarations

Author contribution statement

The lead author participated in the study's conceptualization and design, analysis, interpretation of data, and initial drafting of the paper. Each author contributed to the critical revision of the content for intellectual rigor and provided final approval for the published version. All authors are responsible for every aspect of the work.

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Data availability statement

The data supporting this study's findings are available from the corresponding author upon reasonable request. However, due to privacy and ethical considerations, the data are not publicly accessible.

Declaration of Interests Statement

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