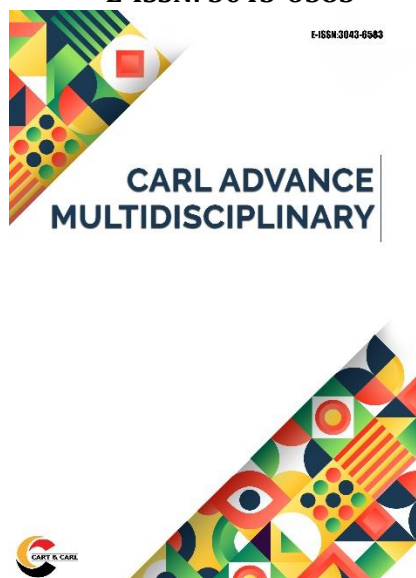




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Relationship between External Debt and Capital Expenditure in Nigeria (1993 - 2023)

Abstract

This study investigates the relationship between external debt and capital expenditure in Nigeria, focusing on how debt indicators influence public investment capacity and macroeconomic stability. Using annual time-series data covering 31 observations, the descriptive statistics reveal wide variability among key fiscal and macroeconomic indicators. The mean capital expenditure (₦1071.27 billion) suggests moderate investment activity over the years, while external debt (mean ₦16,857.05 billion) and domestic debt (mean ₦8,422.80 billion) highlight Nigeria's growing dependence on borrowing to fund developmental projects. The standard deviation of external debt (₦12,867.97 billion) and domestic debt (₦12,238.47 billion) indicates significant fluctuations in debt accumulation, reflecting fiscal volatility. The debt servicing variable recorded a mean of ₦255.13 billion but a sharp maximum of ₦7,800 billion, suggesting a heavy repayment burden that likely crowds out capital spending. Additionally, the Human Development Index (HDI) maintained an average of 0.49, implying slow progress in social and infrastructural development despite increased debt accumulation. Exchange rate and inflation rate averages of ₦210.46 and 17.82% respectively reflect macroeconomic instability accompanying debt growth. Skewness and kurtosis results show that debt servicing, domestic debt, and exchange rate are highly skewed and leptokurtic, indicating the presence of extreme fluctuations in fiscal data. The Jarque-Bera test confirms non-normal distribution for most macroeconomic variables, supporting the need for robust econometric estimation in further analysis. Overall, the descriptive analysis demonstrates that Nigeria's external borrowing has grown substantially but has not consistently translated into proportional capital expenditure or improved development outcomes. This suggests inefficiencies in debt utilization and highlights the importance of transparent debt management, prioritization of capital projects, and effective fiscal reforms to ensure that external borrowing contributes meaningfully to sustainable economic growth.

Keywords: Multinational Corporations (MNCs), Social Responsibility, Sustainable Development, Environmental Sustainability, Economic Sustainability

Introduction

The persistent rise in Nigeria's external debt profile has generated serious concern among economists, policymakers, and international development partners. External borrowing, when judiciously managed, serves as an essential fiscal instrument to finance infrastructural projects, enhance productive capacity, and stimulate long-term economic growth. In many developing economies, the inadequacy of domestic revenue and savings necessitates the reliance on external debt to bridge the fiscal and investment gap. Nigeria, like most resource-dependent economies, has consistently resorted to foreign borrowing to fund capital projects and sustain budgetary operations. However, the question that continues to dominate scholarly debate is whether external debt accumulation has translated into tangible increases in capital expenditure and infrastructural development.



Capital expenditure (CAPEX) represents the portion of public spending devoted to the creation or acquisition of fixed assets such as roads, energy infrastructure, schools, hospitals, and other developmental facilities. It is a vital component of government expenditure that drives productive investment, generates employment, and supports long-run economic growth. As emphasized by Ogunmuyiwa (2011), sustainable capital formation is a key determinant of national productivity and competitiveness. Yet, despite persistent external borrowing, Nigeria's infrastructural gap remains wide, public utilities are underfunded, and capital budgets are frequently underspent. This paradox suggests possible inefficiencies in debt utilization and misalignment between borrowing objectives and developmental outcomes.

The Nigerian government has a long history of external indebtedness dating back to the 1970s, when rising oil revenues encouraged ambitious infrastructural projects financed through foreign loans. The global oil price collapse of the early 1980s, coupled with fiscal mismanagement and corruption, led to an unsustainable debt burden. By the mid-1990s, Nigeria's external debt exceeded USD 30 billion, consuming a significant portion of national revenue through debt servicing obligations. Although the 2005 Paris Club debt relief reduced the stock considerably, subsequent borrowing trends show a renewed upward trajectory. According to the Debt Management Office (DMO, 2023), Nigeria's total public debt reached over ₦87 trillion, of which a substantial portion is externally sourced. This raises renewed concerns about the implications of growing external liabilities for public investment and long-term fiscal sustainability.

Literature Review

Several studies have examined the debt-growth nexus in developing economies, but fewer have focused specifically on the debt-capital expenditure relationship. According to Iyoha (1999) and Ogunmuyiwa (2011), excessive debt accumulation can negatively affect public investment through debt overhang and crowding-out effects. Conversely, Ezeabasili *et al.* (2011) and Ajayi & Oke (2012) found that moderate levels of external borrowing, if directed toward capital projects, can enhance infrastructure and economic productivity. In the Nigerian context, Onyele and Nwoko (2016) observed that external

debt had a mixed influence on capital expenditure due to poor project implementation and corruption. Omolehinwa and Naiyeju (2015) also argued that the debt crisis of the 1980s constrained Nigeria's fiscal space, leading to underfunded capital budgets. This study extends previous literature by employing recent data and modern econometric tools to evaluate the dynamic link between external debt and capital expenditure in Nigeria.

Several theoretical perspectives attempt to explain the debt-expenditure relationship. The Keynesian public investment theory posits that borrowing can positively influence capital formation if loan proceeds are directed toward productive sectors, thereby enhancing multiplier effects in the economy. In contrast, the Debt Overhang Hypothesis (Krugman, 1988) suggests that excessive debt accumulation discourages domestic and foreign investment because future resources are expected to be diverted to debt servicing rather than growth-enhancing activities. Similarly, the Crowding-Out Theory argues that debt servicing commitments can constrain government capacity to fund capital projects, leading to stagnation in public investment. These contrasting views make it imperative to empirically assess how Nigeria's external borrowing has influenced capital expenditure outcomes over time.

Empirical evidence from prior studies presents mixed findings. Iyoha (1999) reported that excessive external debt had a detrimental effect on growth and capital investment in Sub-Saharan Africa due to debt overhang. Ezeabasili, Isu, and Mojekwu (2011) found that external debt contributed positively to Nigeria's economic growth only when efficiently managed and directed toward capital formation. Conversely, Ajayi and Oke (2012) and Onyele and Nwoko (2016) identified a negative association between rising debt levels and capital expenditure, attributing this to mismanagement, poor project execution, and corruption in the public sector. These contradictions underscore the need for updated empirical investigation using recent data and robust econometric techniques to clarify the true nature of the relationship in Nigeria's evolving fiscal environment.

In the context of sustainable development, external borrowing should ideally complement domestic resources to achieve infrastructural transformation, enhance human development, and reduce poverty. However, when loan funds are misallocated to recurrent expenditure or diverted through inefficiencies, the expected development

dividends become elusive. Nigeria's experience reflects this dilemma: while total debt continues to rise, the proportion of capital expenditure in the national budget remains relatively low, often below 30 percent. Furthermore, heavy debt servicing obligations—averaging over ₦255 billion annually as shown in the descriptive results—have consistently eroded fiscal space for developmental spending. This structural imbalance has deepened infrastructural decay and limited progress in human development indicators such as the Human Development Index (HDI), which remains around 0.49 on average.

Given these realities, it becomes imperative to systematically assess the relationship between external debt and capital expenditure in Nigeria. Understanding this linkage provides crucial insights for fiscal policy design, debt management strategies, and sustainable development planning. This study therefore investigates the extent to which external debt influences capital expenditure in Nigeria between 1981 and 2023. Specifically, it aims to determine whether external borrowing stimulates or constrains capital investment, to identify the nature of the relationship (short-run or long-run), and to draw policy implications for prudent debt utilization. The findings will contribute to the existing literature by providing contemporary empirical evidence and offering recommendations for effective fiscal governance and responsible debt management.

Materials and Method

Research Design

The study adopts an ex-post facto research design, which is appropriate for examining historical data and determining causal relationships among economic variables that cannot be directly manipulated by the researcher. This design enables the investigation of the relationship between external debt and capital expenditure in Nigeria using data already recorded over time. The ex-post facto approach is particularly suitable for macroeconomic and fiscal policy analysis because it relies on existing quantitative records, allowing for objective assessment of the impact of past fiscal behavior on current economic outcomes.

In this study, annual secondary data were collected and analyzed, covering the period 1981–2023. This 43-year span was deliberately chosen to capture multiple

economic cycles, policy reforms, structural adjustment programs, oil price shocks, and external borrowing episodes that have shaped Nigeria's fiscal history. The long-time horizon ensures that the model reflects both short-term fluctuations and long-term trends in the interaction between public debt and government capital expenditure.

The ex-post facto design provides a framework for testing theoretical propositions concerning debt sustainability and fiscal performance without altering the economic environment. It enables the researcher to identify patterns, associations, and possible causal linkages by applying econometric and statistical tools to historical data. In this context, variables such as external debt (EXTD), domestic debt (DOMSTD), debt servicing (DEBTSERV), exchange rate (EXCHR), inflation rate (INFR), and Human Development Index (HDI) were analyzed alongside capital expenditure (CAPEX) as the dependent variable.

By employing this design, the study effectively assesses how fluctuations in Nigeria's debt structure and macroeconomic indicators have influenced the country's public investment over the years. Furthermore, the ex-post facto design minimizes researcher bias, as it depends on verifiable and published records from reputable sources such as the Central Bank of Nigeria (CBN) Statistical Bulletin, the Debt Management Office (DMO), and the World Bank Development Indicators (WDI).

Model Specification

$$\text{CAPEX}_t = \beta_0 + \beta_1 \text{EXTDEBT}_t + \beta_2 \text{GDP}_t + \beta_3 \text{INF}_t + \mu_t$$

Where:

CAPEX_t = Capital Expenditure at time t

EXTDEBT_t = External Debt Stock

GDP_t = Gross Domestic Product

INF_t = Inflation Rate

μ_t = Error term

Estimation Techniques: The analysis includes: Descriptive Statistics, Unit Root Test (ADF), Johansen Co-integration Test, and VECM/OLS Regression.

Data Sources: Data are sourced from the Central Bank of Nigeria (CBN), Debt Management Office (DMO), and National Bureau of Statistics (NBS).

Results and Discussion

Table 1 presents the descriptive statistics of the variables used in this study — namely Capital Expenditure (CAPEX), Human Development Index (HDI), External Debt (EXTD), Domestic Debt (DOMSTD), Debt Servicing (DEBTSERV), Exchange Rate (EXCHR), and Inflation Rate (INFR). The statistics provide a preliminary overview of the data behavior, including their mean, median, range, dispersion, and normality properties over the study period (31 years). The interpretation of these descriptive results provides important insights into the structure, volatility, and fiscal implications of Nigeria's debt and capital expenditure patterns.

Table 1: Descriptive Statistics

	CAPEX	HDI	EXTD	DOMSTD	DEBTSERV	EXCHR	INFR
Mean	1071.272	0.490000	16857.05	8422.796	255.1319	210.4642	17.82355
Median	759.3000	0.490000	15855.23	2320.300	1.770000	132.0000	12.88000
Maximum	3184.000	0.565000	38219.85	59120.86	7800.000	1483.000	72.84000
Minimum	54.50000	0.415000	1016.720	273.8000	0.650000	21.89000	5.390000
Std. Dev.	910.6665	0.045461	12867.97	12238.47	1400.271	268.1058	15.49668
Skewness	0.825786	6.51E-16	0.128761	2.549124	5.294613	3.581456	2.383914
Kurtosis	2.593310	1.797500	1.365068	10.56695	29.03307	17.58431	7.890351
Jarque-Bera	3.736900	1.867758	3.538290	107.5324	1020.226	341.0120	60.25331
Probability	0.154363	0.393026	0.170479	0.000000	0.000000	0.000000	0.000000
Sum	33209.44	15.19000	522568.6	261106.7	7909.090	6524.390	552.5300
Sum Sq. Dev.	24879403	0.062000	4.97E+09	4.49E+09	58822801	2156421.	7204.409
Observations	31	31	31	31	31	31	31

The Human Development Index (HDI) recorded a mean of 0.49 with a minimal standard deviation (0.045), implying that Nigeria's human development performance has been consistently low and relatively stagnant over time. This figure situates the country within the medium human development category, suggesting that increases in public spending and debt accumulation have not significantly improved living standards. The narrow gap between the maximum (0.565) and minimum (0.415) values further indicates slow progress in health, education, and income dimensions of welfare. This outcome supports Iyoha (1999), who argued that the benefits of external borrowing in developing countries are often neutralized by poor governance and weak institutional capacity.

External debt (EXTD) has a mean of ₦16,857.05 billion and a substantial standard deviation of ₦12,867.97 billion, reflecting the country's heavy reliance on external

The mean value of capital expenditure (₦1071.27 billion) indicates that Nigeria has maintained a moderate level of public investment over the years. However, the large standard deviation (₦910.67 billion) suggests wide fluctuations in capital spending, reflecting inconsistent budgetary implementation and fiscal instability. The maximum value of ₦3184 billion and a minimum of ₦54.5 billion show the substantial disparity between periods of high capital investment and periods of fiscal austerity. Such volatility in capital expenditure often results from changes in government policies, oil price shocks, and revenue shortfalls, which affect the allocation of funds for capital projects. As Ogunmuyiwa (2011) observed, fluctuations in capital expenditure tend to undermine infrastructure development and weaken the long-term growth trajectory of the economy.

borrowing and the significant variations in its debt profile across the years. The minimum value of ₦1016.72 billion and the maximum of ₦38,219.85 billion confirm Nigeria's gradual accumulation of debt, especially in the post-2005 period following the Paris Club debt relief. This continuous rise demonstrates renewed dependency on foreign financing for infrastructural development and budget support. However, the mild positive skewness (0.1287) and low kurtosis (1.365) indicate that external debt values are fairly symmetrically distributed, suggesting that debt accumulation has been gradual rather than erratic. Nevertheless, the growing debt stock raises questions about sustainability and efficiency in the utilization of borrowed resources, consistent with the concerns expressed by Ajayi and Oke (2012) regarding Nigeria's debt management practices.

Domestic debt (DOMSTD) recorded a mean of ₦8422.80 billion with a relatively high standard deviation of ₦12,238.47 billion, signifying a broad dispersion around the mean and highlighting the volatility of internal borrowing. The maximum of ₦59,120.86 billion compared to a minimum of ₦273.8 billion reflects the government's increasing preference for domestic borrowing as an alternative to external debt. This rise is attributable to the expansion of the domestic debt market, increased issuance of treasury bonds, and reliance on local financial institutions for deficit financing. However, the high skewness (2.55) and kurtosis (10.56) values reveal that domestic debt data are not normally distributed and are dominated by extreme observations, particularly in recent years when borrowing increased sharply to finance budget deficits. These results align with Onyele and Nwoko (2016), who observed that excessive reliance on domestic borrowing in Nigeria crowds out private investment and limits funds available for productive sectors.

Debt servicing (DEBTSERV) demonstrates a mean of ₦255.13 billion and an exceptionally high standard deviation of ₦1400.27 billion, suggesting significant variations and fiscal pressure across the period. The minimum value of ₦0.65 billion and the maximum of ₦7800 billion indicate periods of very low and very high debt repayment obligations. The extremely high skewness (5.29) and kurtosis (29.03) reveal a leptokurtic distribution with extreme peaks, meaning that a few years experienced abnormally high debt servicing costs relative to the rest of the sample. Such high servicing obligations imply that a large share of government revenue was channeled toward repayment, potentially crowding out capital expenditure. This observation supports the Debt Overhang Hypothesis as discussed by Krugman (1988) and later emphasized by Ezeabasili *et al.* (2011), who found that high debt servicing ratios tend to reduce fiscal capacity for investment and slow economic growth in Nigeria.

The exchange rate (EXCHR) variable has a mean of ₦210.46 to the US dollar, with a standard deviation of ₦268.11, reflecting the volatility of Nigeria's currency throughout the study period. The minimum exchange rate of ₦21.89 and maximum of ₦1483 highlight the rapid depreciation of the naira, especially following exchange rate liberalization and recent foreign exchange shortages. The positive skewness (3.58) and high kurtosis (17.58) indicate that extreme exchange rate fluctuations are common, likely influenced by oil price shocks, policy changes, and speculative pressures. Exchange rate instability increases

the cost of servicing foreign debt and reduces the fiscal space for capital spending, reinforcing findings by Omolehinwa and Naiyeju (2015) that macroeconomic instability weakens fiscal discipline in Nigeria.

Inflation (INFR) recorded a mean rate of 17.82% and a standard deviation of 15.49%, signifying considerable volatility in price levels. The range between the minimum (5.39%) and maximum (72.84%) reflects episodes of high inflation, particularly during periods of currency devaluation and fiscal expansion. The skewness (2.38) and kurtosis (7.89) reveal that inflation data are positively skewed and leptokurtic, suggesting irregular spikes in price levels. Persistent inflation undermines capital project costs, erodes the value of public investments, and distorts debt repayment dynamics. As noted by Ajayi and Oke (2012), inflationary pressures in Nigeria often coincide with high debt accumulation and weak capital investment performance.

The Jarque-Bera test statistics show that CAPEX, HDI, and EXTND have p-values greater than 0.05, indicating approximate normality. In contrast, DOMSTD, DEBTSERV, EXCHR, and INFR exhibit significant deviations from normality ($p < 0.05$), confirming the presence of non-linearities and fiscal shocks within the data. These findings justify the need for further econometric modeling using transformations and co-integration techniques to capture both the short-run and long-run dynamics between external debt and capital expenditure.

Conclusion and Recommendations

The study concludes that while external debt can stimulate capital expenditure and promote development when used judiciously, unsustainable debt accumulation and mismanagement can have adverse fiscal implications. The study recommends that:

- i. The government should ensure borrowed funds are strictly used for capital projects with measurable economic returns.
- ii. Strengthen institutional mechanisms for debt transparency and accountability.
- iii. Develop domestic revenue mobilization strategies to reduce overreliance on external borrowing.
- iv. Establish an independent debt audit committee to track project implementation.

- v. Align debt management strategies with long-term national development plans.

The study contributes to empirical literature by providing recent econometric evidence on how external debt influences capital expenditure in Nigeria, highlighting both short- and long-run effects. It also offers policy guidance on optimizing debt utilization for infrastructural growth.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Credit Authorship Contribution Statement

Ogbu, U. F.: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Visualization, Project administration, Writing - original draft, Review & Editing. **Ofurum, C.** and **Egbe, S. :** Supervision, Methodology, Validation, Formal analysis, Data curation, Visualization.

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