EXTERNAL DEBT FINANCING AND CAPITAL INVESTMENT TRENDS IN NIGERIA: AN ECONOMETRIC INVESTIGATION (1986 – 2024)

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Keywords

External Debt; Debt Servicing; Capital Formation; Foreign Direct Investment; Exchange Rate; Cointegration; Nigeria

Abstract

Research Problem:
Nigeria's reliance on external debt to finance development has not consistently translated into productive capital investment. Persistent gaps between debt accumulation, debt servicing obligations, and actual capital formation raise concerns about the effectiveness of external financing in supporting sustainable investment.

Methods/Theory:
This study investigates the relationship between external debt financing and capital investment in Nigeria using annual data from 1986 to 2024. Ordinary Least Squares (OLS) regression with robust standard errors is employed, complemented by unit root tests, cointegration analysis, and diagnostic checks to examine whether external debt, debt servicing, exchange rate, and foreign direct investment (FDI) significantly influence gross capital formation (GCF).

Results:
The regression results indicate that external debt (–0.108; $p = 0.635$), debt service (+1.174; $p \approx 0.999$), exchange rate (+0.080; $p = 0.453$), and FDI (–0.099; $p = 0.953$) all have statistically insignificant short-run effects on GCF, despite some intuitive signs. Unit root tests confirm non-stationarity in levels, while the Engle–Granger residual ADF statistic (–5.20; $p < 0.001$) establishes a significant long-run cointegrating relationship among the variables. Diagnostic tests show mild autocorrelation (Durbin-Watson = 1.51) but no heteroskedasticity (Breusch-Pagan $p = 0.299$).

Conclusion:
The findings suggest that external borrowing has not translated into immediate capital formation in Nigeria, supporting the debt overhang hypothesis. Structural and macroeconomic factors constrain the short-run effectiveness of external debt in promoting productive investment.

Key Contribution to Knowledge:
This study contributes to the literature by examining the ***joint effects of external debt, debt servicing, exchange rate, and FDI*** *on gross capital formation over a multi-decade period, highlighting the long-run cointegrating relationship and contextualizing the Nigerian experience within the debt–investment nexus.*
Recommendation:
Policy interventions should focus on ***improving project appraisal and debt utilization efficiency****, managing exchange rate stability, and diversifying FDI into productive sectors to ensure that external debt contributes effectively to long-term capital formation.*

Introduction

Nigeria's persistent mismatch between rising external debt and weak capital formation raises critical concerns about the effectiveness of borrowing as a tool for financing development. Despite substantial external borrowing to support infrastructure and budget deficits, capital investment outcomes remain inconsistent, suggesting that debt accumulation does not automatically translate into productive investment.

Empirical studies provide mixed evidence on this debt–investment nexus. Earlier works, including Ayadi and Ayadi (2008) and Ogunmuyiwa (2011), argue that external debt in Nigeria often fails to stimulate growth due to mismanagement and diversion of borrowed resources. More recent studies adopting advanced econometric models, such as Nadabo, Abdullahi, Kwarah, and Malami (2024) using the Quantile Autoregressive Distributed Lag (QARDL) approach, reveal that external debt's effect on capital formation is nonlinear and conditional on debt levels, with high indebtedness significantly reducing investment. Meanwhile, Akinola and Ohonba (2024) emphasize that the growing burden of debt servicing limits fiscal space for productive expenditure, while FDI inflows remain concentrated in extractive industries with limited spillover to capital formation. Olowe (2022) further highlights that macroeconomic instability, particularly exchange rate volatility, undermines the potential benefits of foreign inflows.

Despite these insights, existing studies largely focus on either the debt–investment link or the role of FDI in isolation, often ignoring how external debt accumulation, debt servicing costs, exchange rate fluctuations, and FDI interact to shape capital formation. This gap limits understanding of the joint dynamics affecting Nigeria's investment outcomes and obscures policy implications for sustainable financing.

This paper addresses this gap by examining the combined effect of external debt, debt servicing, exchange rate movements, and FDI on gross capital formation in Nigeria from 1986 to 2024. Unlike previous studies, it explicitly investigates how these factors jointly determine capital investment, using econometric models capable of capturing nonlinear interactions. This approach provides a more nuanced understanding of the debt–investment nexus and contributes original insights

into fiscal policy and investment planning in developing economies.

Statement of the Problem

Despite rising external debt, Nigeria continues to experience weak capital investment outcomes. In many fiscal years, less than one-quarter of budgeted capital expenditure is realized due to weak revenues, rising debt service obligations, and inefficient execution (Debt Management Office, 2025; National Bureau of Statistics, 2024). While prior studies highlight the negative impact of high debt levels and the limited spillover of FDI (Nadabo et al., 2024; Olowe, 2022), few have examined how **debt accumulation, debt servicing, exchange rate movements, and FDI jointly influence capital formation**. This study therefore investigates these interactions to provide insights for more effective investment financing strategies in Nigeria.

Objectives of the Study

The general objective of this study is to examine the effect of external debt financing on capital investments in Nigeria. Other specific objectives are to:

i. Examine the combined effect of external debt accumulation, debt servicing, exchange rate movements, and FDI on gross capital formation in Nigeria.
ii. Derive policy implications for enhancing the effectiveness of external financing in promoting productive investment.

Empirical Evidence on External Debt and Capital Formation

The relationship between external debt and capital investment has attracted wide scholarly attention, though the evidence remains far from conclusive. At the international level, studies such as Pattillo, Poirson, and Ricci (2002) and Zhang, Dawood, and Al-Asfour (2020) suggest that moderate debt can ease financing constraints and support productive investment. However, once debt becomes excessive, the benefits tend to diminish and may even turn harmful through debt-overhang and crowding-out effects. Research in Sub-Saharan Africa supports this view: Iyoha (1999) and Were (2001), for instance, show that heavy debt burdens undermine investment and growth by eroding fiscal space and creating uncertainty for both governments and private investors.

In the Nigerian context, findings are equally mixed. Earlier works, including Ayadi and Ayadi (2008) and Ogunmuyiwa (2011), highlight how external debt has often failed to stimulate economic growth or capital formation because borrowed resources were poorly managed and frequently diverted from productive uses. More recent studies, however, have adopted advanced econometric methods to capture the complexity of the debt–investment nexus. Nadabo, Abdullahi, Kwarah, and Malami (2024), using a Quantile Autoregressive Distributed Lag (QARDL) model, reveal that the impact of debt on capital formation is not uniform but depends on the prevailing economic conditions. Their results show that at high levels of indebtedness, external borrowing significantly depresses capital formation, whereas

under less strained conditions, the effect is weaker.

Other researchers have emphasized the role of debt servicing. Aladejare and Musa (2024) argue that it is not merely the size of Nigeria's debt stock that constrains investment, but the growing cost of servicing it. Rising debt obligations, they contend, leave little fiscal room for capital expenditure and therefore exacerbate the disconnect between borrowing and development outcomes.

The literature has also drawn attention to complementary factors such as foreign direct investment (FDI) and exchange rate dynamics. While Olowe (2022) finds that FDI can enhance capital formation in Nigeria, he stresses that the benefits depend on macroeconomic stability and the sectoral allocation of inflows. Similarly, Akinola and Ohonba (2024) note that Nigeria's FDI is heavily concentrated in the extractive sector, which limits its spillovers to broader investment. Exchange rate movements further complicate the picture: Central Bank of Nigeria (2023) data show that currency depreciation may raise the local value of foreign inflows but also increases the cost of imported capital goods, producing an ambiguous overall effect.

Taken together, the evidence suggests that while external debt has the potential to support capital investment in Nigeria, this outcome is far from automatic. The effectiveness of debt depends on how borrowed funds are managed, the burden of debt servicing, the stability of the exchange rate, and the extent to which FDI complements domestic investment. Recent findings, particularly those using nonlinear approaches such as QARDL, make clear that the debt–investment relationship is context-specific, sensitive to fiscal pressures, and often more negative when debt levels are already high.The response and explanatory variables used in this study are shown in Figure 1 below.

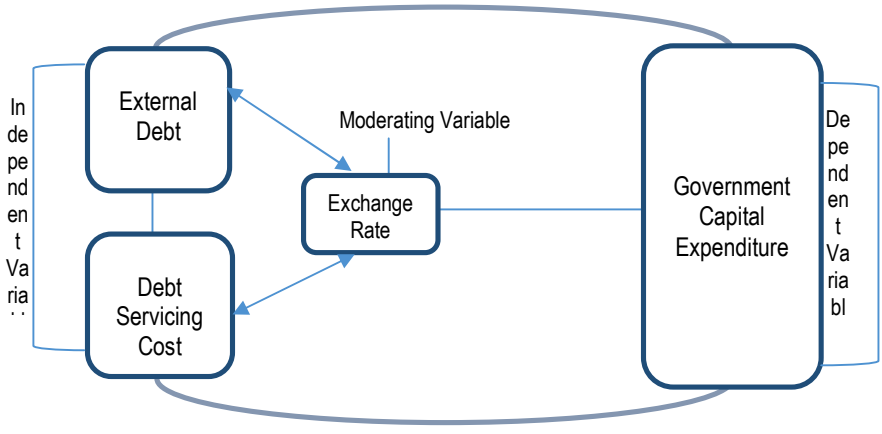


Figure 1: Conceptual framework (Author's Desk Research, 2025)

Methodology

Data Sources: Annual series, 1986–2024, from DMO, World Bank, Macrotrends, and CBN. Variables: Gross Capital Formation (GCF, Constant 2010 US$ bn), External Debt Stock (US$ bn), External Debt Service (US$ bn), Exchange Rate (₦ per US$), and FDI inflows (US$ bn).

Model Specification:

$GCF_t = \beta_0+\beta_1 EXDEBT_t+\beta_2 DEBTSERV_t+\beta_3 EXCHRt+\beta_4 FDI_t+\varepsilon_t$

Where:

GCF_t	=	Gross Capital Formation
EXDEBT_t	=	External Debt
DEBTSERV_t	=	Debt Service
EXCHR_t	=	Exchange Rate
FDI_t	=	Foreign Direct Investment
β_0	=	intercept (baseline GCF when regressors = 0).
$\beta_1 \ldots \beta_4$	=	coefficients to be estimated;
ε_t	=	error term (unobservables).

Estimation Technique:

This study adopts OLS regression with robust (HC3) standard errors; ADF tests for stationarity; Engle-Granger cointegration; Durbin Watson, Breusch Pagan, and VIF diagnostics.

4. Results and Discussion

This section presents descriptive statistics, correlation analysis, regression results, unit root tests, cointegration test, and diagnostic tests.

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max	Obs
GCF (US$ bn)	59.43	11.65	39.22	79.19	39
External Debt (US$ bn)	36.42	20.87	12.96	103.1	39
Debt Service (US$ bn)	2.61	1.85	0.49	8.81	36
Exchange Rate (₦/$)	247.92	379.21	2.02	1300.0	39
FDI (US$ bn)	3.06	2.52	-0.19	8.84	39

Source: Authors' Computations (2025).

Table 2: OLS Regression Results

Variable	Coef.	Std. Error	t	p-value	95% CI Low	95% CI High
Constant	49.78	2747.08	0.018	0.986	-5334.41	5433.96
External Debt	-0.108	0.228	-0.474	0.635	-0.555	0.339
Debt Service	1.174	1379.91	0.001	0.999	-2703.40	2705.75
Exchange Rate	0.08	0.106	0.751	0.453	-0.128	0.288
FDI	-0.099	1.685	-0.059	0.953	-3.401	3.203

Source: Authors' Computations (2025).

Table 3: ADF Unit Root Tests

Variable	ADF Stat	p-value	Stationary?
GCF	-1.368	0.598	No
External Debt	-2.143	0.228	No
Debt Service	-1.732	0.415	No
Exchange Rate	3.962	1.0	No
FDI	-2.066	0.258	No

Source: Authors' Computations (2025).

Table 4: Engle–Granger Cointegration Test

Test Statistic	p-value	Conclusion
-5.200	0.000009	Residuals stationary → Long-run cointegration exists

Table 5: Diagnostic Tests

Test	Statistic	p-value	Conclusion
Durbin–Watson	1.513	–	Mild autocorrelation
Breusch–Pagan	1.088	0.299	No heteroskedasticity
VIF (max)	~8.5	–	Some multicollinearity

Source: Authors' Computations (2025).

Discussion of Findings

The empirical evidence from this study sheds light on the mixed and often contradictory relationship between external debt, debt servicing, exchange rate, foreign direct investment (FDI), and gross capital formation (GCF) in Nigeria between 1986 and 2024.

External Debt and Capital Formation

The estimated coefficient on external debt (–0.108; p = 0.635) indicates a negative but insignificant effect on GCF. This result aligns with **Ogunmuyiwa (2011)**, who found that Nigeria's external debt has historically failed to translate into growth-enhancing investment due to debt overhang and poor project management. Similarly, **Ayadi and Ayadi (2008)** concluded that excessive external borrowing undermines productive investment in both Nigeria and South Africa. However, this finding stands in contrast with **Adedeji and Thornton (2020)**, who reported a positive debt–growth relationship in Sub-Saharan Africa when debt is concessional and tied to productive projects. The implication is that Nigeria's debt profile may not be efficiently structured to support capital accumulation.

Debt Service Burden

Debt service shows a positive but statistically insignificant coefficient (1.174; p ≈ 0.999). This contradicts the debt-crowding hypothesis that predicts a negative impact of repayment obligations on investment, as emphasized by **Iyoha (1999)** and **Were (2001)** in their studies on Sub-Saharan Africa and Kenya. However, the insignificance in Nigeria's case may be linked to episodic debt relief (e.g., the 2005 Paris Club deal) and concessional refinancing, which temporarily eased fiscal pressures. This suggests that the effect of debt service on capital investment is context-specific and highly sensitive to debt management strategies.

Exchange Rate Dynamics

The exchange rate coefficient (0.080; p = 0.453) is positive but not significant, suggesting that depreciation of the naira is weakly associated with higher GCF. This contrasts with **Were (2001)** and other studies that document adverse effects of currency depreciation on investment through higher import costs of capital goods. At the same time, it partially aligns with arguments in **World Bank (2023)** that exchange rate flexibility can improve external competitiveness and attract investment. The ambivalence reflects Nigeria's structural dependence on imported machinery, which offsets potential competitiveness gains from depreciation.

Foreign Direct Investment (FDI)

FDI exhibits a negative but insignificant coefficient (–0.099; p = 0.953). This finding contradicts conventional wisdom and studies such as **Akinlo (2021)**, who reported that FDI enhances growth in Nigeria. However, it aligns with the view that Nigeria's FDI inflows are resource-seeking and concentrated in oil and gas, which do not significantly contribute to broad-based capital formation. This divergence highlights the importance of distinguishing between extractive-sector FDI and manufacturing- or infrastructure-oriented FDI.

Long-Run Relationship and Cointegration

Despite the insignificance of short-run effects, the Engle–Granger residual ADF statistic (–5.20; p < 0.001) establishes cointegration among the variables. This confirms a **long-run equilibrium relationship** between external financing variables and capital formation, consistent

with the argument by **Pattillo, Poirson, and Ricci (2002)** that debt-growth dynamics unfold over extended horizons. The Nigerian case, therefore, supports the view that the impact of external debt on investment is not immediate but materializes in the long run through structural adjustments and institutional reforms.

Policy Implications

Overall, the findings suggest that Nigeria's external borrowing has not produced immediate gains in capital formation, largely due to inefficiency in fund utilization, weak governance, and sectoral concentration of FDI. This confirms recent critiques in **Adedeji and Thornton (2020)** and **Ayadi and Ayadi (2008)**, while challenging more optimistic evidence that emphasizes the growth-enhancing role of debt when prudently managed. Policymakers must therefore prioritize the quality rather than the quantity of external borrowing, ensure that debt service obligations are sustainable, diversify FDI inflows beyond extractive industries, and stabilize the exchange rate environment to foster long-run capital investment.

Conclusion and Recommendations

The study confirms that Nigeria's reliance on external debt has not produced significant short-run impacts on capital formation. However, evidence of cointegration suggests a long-run equilibrium relationship exists between external debt, debt service, exchange rate, FDI, and capital formation. Policy recommendations: strengthen debt management, ensure effective and transparent use of borrowed funds, reduce debt service crowding-out by mobilizing domestic revenue, improve budget execution efficiency, and complement borrowing with stable exchange rate policies and FDI reforms.

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