

Public Debt and Private Investment in Nigeria: Evidence from Time-Series Analysis

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Abstract

This study examines the relationship between public debt and private investment in Nigeria using annual time-series data from 1986 to 2025. Private investment (proxied by private gross fixed capital formation as a percentage of GDP) is the dependent variable. Domestic debt, external debt and debt servicing are the main explanatory variables, while interest rate, inflation and real GDP growth serve as controls. After confirming a mix of $I(0)$ and $I(1)$ series, the study applies the ARDL bounds-testing approach. The bounds F-statistic (3.1809) indicates a possible long-run relationship at the 10% significance level. Domestic debt exerts a statistically significant negative long-run effect on private investment, consistent with the crowding-out hypothesis. External debt shows a positive but statistically weak coefficient, while debt servicing remains inconclusive. Approximately 42% of short-run disequilibrium is corrected each year. The study concludes that excessive domestic borrowing constrains private investment and recommends reduced reliance on domestic debt, improved debt sustainability and the productive use of borrowed funds.

Keywords: Public Debt, Private Investment, Domestic Debt, External Debt, Crowding-Out, Ardl, Nigeria

Introduction

Private Investment is a central driver of productive capacity, employment and long-term growth in developing economies. In Nigeria it is particularly important because public resources alone cannot close infrastructure gaps or reduce dependence on oil. Investment decisions respond to inflation, interest rates, exchange-rate stability, credit availability, infrastructure quality and the scale and management of public debt.

Public debt can crowd in private investment when used for productive infrastructure (Aschauer, 1989) or crowd it out when excessive domestic borrowing raises the cost of capital and reduces credit available to the private sector (Elmendorf & Mankiw, 1999; Krugman, 1988). Nigeria's total public debt reached ₦159.28 trillion at the end of 2025, of which domestic debt accounted for 53.27% and external debt 46.73% (Debt Management Office [DMO], 2026). Rising debt-service obligations further constrain fiscal space.

Empirical evidence for Nigeria remains mixed (Abubakar & Mamman, 2021; Akpan et al., 2023). This study therefore investigates the short- and long-run effects of domestic debt, external debt and debt servicing on private investment over the period 1986–2025 using the ARDL approach.

Literature review

Conceptual Framework

Public debt comprises domestic and external obligations incurred to finance deficits or development projects. Domestic debt (treasury bills and bonds) competes directly with private borrowers in the local credit market. External debt supplies foreign-currency resources but exposes the economy to exchange-rate risk. Debt servicing measures the actual repayment burden and reduces resources available for infrastructure that supports private investment. In this study private investment is measured as private gross fixed capital formation, expressed as a percentage of GDP.

Theoretical Framework

Debt-overhang theory (Krugman, 1988) posits that high debt discourages investment because future returns are expected to be used for debt service. Crowding-out theory argues that government borrowing raises interest rates and reduces private-sector credit (Modigliani, 1961; Diamond, 1965). Keynesian theory suggests that productive public borrowing can crowd in private investment by improving infrastructure (Aschauer, 1989). Ricardian equivalence implies that agents anticipate future taxes, which may dampen investment (Barro, 1974). This study draws primarily on debt-overhang and crowding-out arguments.

Empirical Review

Abubakar and Mamman (2021) found that total debt, external debt and debt-service payments adversely affected Nigerian private investment between 1981 and 2018, while domestic debt displayed an asymmetric effect. Akpan et al. (2023) reported negative long-run effects of both domestic and external debt on private domestic investment (1981–2021). Similar crowding-out results appear in Chinanuife et al. (2018), Anoke et al. (2021) and Akomolafe et al. (2015).

Firm-level evidence from developing economies shows that higher public debt is associated with lower investment, especially among small and medium-sized enterprises (Islam, 2024). Complementary public investment can support private capital formation when it improves productive capacity (Francois, 2026). Overall, the literature indicates that debt composition, borrowing cost, debt-service burden and the productivity of debt-financed expenditure determine whether public debt crowds out or crowds in private investment.

Methodology

The study adopts an ex-post facto design using annual secondary data for 1986–2025. Data for 2024 and 2025 are the most recent official figures available; some observations may still be subject to revision. Sources include the Central Bank of Nigeria Statistical Bulletin, Debt Management Office publications, World Bank World Development Indicators and International Monetary Fund databases.

Variable definitions

- i. PRI = private gross fixed capital formation as a percentage (% of GDP).
- ii. lnDDBT = natural logarithm of domestic debt (₦ billion)
- iii. lnEDBT = natural logarithm of external debt (₦ billion)
- iv. lnDSERV = natural logarithm of debt-service payments (₦ billion)
- v. INT = lending interest rate (%)
- vi. INF = annual consumer-price inflation (%)
- vii. GDPG = real GDP growth rate (%)

Debt variables are logged to reduce scale differences and permit approximate elasticity interpretation. Total public debt is excluded from the regression to avoid perfect multicollinearity with its components.

The model is specified as:

$$PRI_t = \beta_0 + \beta_1 \ln DDBT_t + \beta_2 \ln EDBT_t + \beta_3 \ln DSERV_t + \beta_4 INT_t + \beta_5 INF_t + \beta_6 GDPG_t + \mu_t$$

Stationarity is examined with the Augmented Dickey-Fuller test. The series are a mixture of $I(0)$ and $I(1)$, and none is $I(2)$. The ARDL bounds-testing approach of Pesaran, Shin and Smith (2001) is therefore employed. Optimal lag length is selected by the Akaike information criterion. Long-run coefficients and the short-run error-correction model are estimated when cointegration is indicated.

Diagnostic tests for serial correlation, heteroscedasticity, normality, functional form and parameter stability are conducted. Estimation was performed using standard econometric software. The dataset is available from the author upon reasonable request.

Results and Discussion

Table 1. Descriptive Statistics (1986–2025)

Variable	Mean	Std. Dev.	Minimum	Maximum
PRI	29.79	12.46	14.17	54.95
PDBT	16,958.88	35,453.06	69.89	159,276.07
DDBT	9,549.54	18,952.81	28.44	84,849.33
EDBT	7,409.35	16,643.15	41.45	74,426.74
DSERV	1,645.23	3,445.88	1.63	16,260.00
INT	18.25	4.03	9.96	31.65
INF	20.00	16.82	5.39	72.84
GDPG	4.09	3.71	−2.04	15.33

Note: PRI is expressed as % of GDP; debt variables are in ₦ billion (levels). Logged versions are used in the regression analysis.

Source: Author's computation from CBN, DMO and World Bank data.

Private investment averaged 29.8% of GDP. Debt stocks and servicing rose sharply over the sample period.

Table 2. Correlation with Private Investment

Variable	Correlation	Interpretation
lnDDBT	−0.839	Strong negative
lnEDBT	−0.542	Moderate negative
lnDSERV	−0.797	Strong negative
INT	0.331	Weak positive
INF	0.379	Weak positive
GDPG	−0.186	Weak negative

Source: Author's computation

Table 3: ADF Unit-Root Results

Variable	Level p-value	First-difference p-value	Order
PRI	0.2506	0.0000	I (1)
lnDDBT	0.8378	0.0000	I (1)
lnEDBT	0.8702	0.0002	I (1)
lnDSERV	0.9455	0.0457	I (1)
INT	0.0236	—	I(0)
INF	0.0048	—	I(0)
GDPG	0.0007	—	I(0)

Source: Author's computation

Table 4: Bounds Test and Error-Correction Term

Statistic	Value	Decision
Bounds F-statistic	3.1809	Possible cointegration at the 10% level
ECM(−1)	−0.4224	Significant ($p = 0.0013$); $\approx 42\%$ annual adjustment

Source: Author's computation.

The bounds test provides only marginal evidence of cointegration (significant at 10% but not at 5%). Results are therefore interpreted with appropriate caution.

Table 5: Normalised Long-Run Coefficients

Variable	Coefficient	Interpretation
lnDDBT	−11.570	Significant negative (crowding-out)
lnEDBT	4.429	Positive but statistically weak
lnDSERV	4.135	Positive but statistically weak
INT	−0.589	Negative
INF	0.110	Weak positive
GDPG	−0.746	Unexpected negative: interpret cautiously

Source: Author's computation

The long-run coefficient on domestic debt is large in magnitude. While the negative sign is consistent with crowding-out, the size of the estimate may reflect multicollinearity among the debt variables, the relatively short sample, or measurement characteristics of the investment-share proxy. The result should therefore be treated as indicative rather than precise.

Table 6: Selected Short-Run Coefficients

Variable	Coefficient	p-value	Decision
D(lnDDBT)	2.472	0.4666	Insignificant
D(lnEDBT)	1.531	0.2211	Insignificant
D(lnDSERV)	0.642	0.6627	Insignificant
D(INF)	−0.092	0.0249	Significant negative
D(GDPG)	−0.520	0.0021	Significant negative

Source: Author's computation.

Table 7: Diagnostic Tests

Test	Result	Interpretation
Adjusted R^2	0.9477	High explanatory power
Durbin-Watson	1.79	No severe autocorrelation
Jarque-Bera	$p = 0.72$	Residuals arenormal.
Breusch-Pagan	$p = 0.30$	Homoscedasticity

Ramsey RESET	$p = 0.91$	Correct specification
Breusch-Godfrey (lag 2)	$p \approx 0.05$	Borderline; interpret with caution.

Source: Author's computation.

Discussion

Domestic debt exerts a statistically significant negative long-run effect on private investment, supporting the crowding-out hypothesis. Banks and institutional investors in Nigeria frequently prefer government securities, thereby reducing credit available to private firms. The large coefficient magnitude warrants caution, yet the direction of the effect is robust across the descriptive, correlation and regression evidence.

External debt and debt servicing display positive but statistically weak coefficients. Any crowding-in effect appears conditional on the productive use of borrowed funds and is not strongly supported by the data. Short-run changes in the debt variables are insignificant, while inflation and GDP growth exert significant negative short-run effects. The unexpected GDP-growth sign may reflect the use of an investment-share measure, structural breaks or endogeneity; further robustness checks are desirable.

The error-correction term indicates that approximately 42% of any deviation from long-run equilibrium is corrected each year. Overall, the results suggest that Nigeria's heavy reliance on domestic borrowing has constrained rather than stimulated private investment.

Conclusion and Recommendations

The study finds marginal evidence of a long-run relationship between public debt indicators and private investment in Nigeria over 1986–2025. Domestic debt significantly crowds out private investment, while external debt and debt servicing yield inconclusive results. Public debt is not inherently harmful; its effect depends on source, cost and utilisation.

Recommendations

1. Reduce dependence on domestic borrowing and diversify financing sources.
2. Channel borrowed funds primarily into productive infrastructure that lowers private-sector costs.
3. Strengthen revenue mobilisation and debt-sustainability frameworks.
4. Maintain macroeconomic stability (interest rates, inflation and exchange rates) to support private capital formation.

Future research should incorporate structural-break tests, alternative investment proxies and non-linear (NARDL) specifications.

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