THE EFFECT OF DEBT BURDEN ON INVESTMENT IN NIGERIA

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ABSTRACT
This study investigates the effects of Nigeria's debt burden on investment from 1981 to 2022, utilizing an autoregressive distributed lag (ARDL) approach to analyze the short- and long-run relationships between external debt, domestic debt, debt servicing, and investment. The findings reveal that domestic debt significantly boosts private investment and foreign direct investment (FDI), suggesting that domestic borrowing serves as a viable financing mechanism for investment expansion. Conversely, external debt negatively affects private investment, corroborating the crowding-out hypothesis (Majumder, 2007), while debt service does not exhibit a statistically significant impact on investment decisions. Public investment inefficiencies further underscore the need for sound fiscal management. These results emphasize the importance of optimizing domestic debt to support private-sector growth and attract FDI while ensuring external borrowing is effectively allocated to high-return projects. Policy recommendations include enhancing debt transparency, prioritizing concessional external loans, and strengthening institutional frameworks for debt management. Additionally, fostering macroeconomic stability, improving governance, and aligning public investment with private sector needs will be critical to mitigating the adverse effects of external debt. This study contributes to the literature by providing empirical evidence on Nigeria's debt-investment nexus and offering policy insights to balance debt accumulation with sustainable economic growth. Future research should explore sector-specific debt effects, governance influences, and cross-country comparisons within Sub-Saharan Africa to deepen understanding of debt dynamics and investment behavior.
Keywords: ARDL, External debt, Domestic debt, Debt servicing, Investment
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1. INTRODUCTION
Achieving the macroeconomic objectives of price stability, full employment, a favourable balance of payments, and high and sustainable economic development are the ultimate goals of every economy (Apere, 2014). Among these goals, high economic growth remains the most discussed and critical (United Nations, 2018). In today's rapidly evolving economic landscape, marked by the advent of the fourth industrial revolution, attaining high economic growth is contingent on investments in pivotal sectors such as artificial intelligence, machine learning, technological development, and human capital. Without such strategic investments, economic growth stagnates, and countries risk becoming less competitive, as investments are funneled into traditional production methods (World Economic Forum, 2017).
Investment in these crucial areas necessitates substantial financial resources. Countries with limited domestic or international trade investment flows might resort to public borrowing to fuel their economic development. Debt financing is vital for development, but it must be transparent, well-managed, and implemented within a credible growth strategy. Unfortunately,

this is often not the case. Unsustainable public debt levels impede growth, disproportionately affecting the most vulnerable citizens. It can stifle private investment, escalate pressures on social and infrastructure spending, and constrain governments' reform capabilities. Over the past decade, external debt in low-income countries has surged, outpacing economic growth. The multiple shocks since 2020 have exacerbated these vulnerabilities, with approximately 60 percent of low-income countries now facing high debt distress risk or already in distress (World Economic Forum, 2017).

As a developing country, Nigeria faces numerous economic challenges, including significant public debt accumulation due to economic downturns, infrastructure investments, and fiscal mismanagement. This debt burden is a significant concern, with potential adverse effects on various economic facets, particularly investment. Investment, a critical driver of economic growth and development, is widely acknowledged to be negatively impacted by a high debt burden (Checherita-Westphal & Rother, 2012). The neoclassical theory, which posits that investment decisions are influenced by the cost of capital, expected return on investment, and the level of uncertainty (Jorgenson, 1963), is relevant to the debt-investment relationship. In Nigeria, a high debt burden can lead to higher interest rates, uncertainty about the government's debt servicing ability, and diversion of resources from productive investments, given that a significant portion of the budget is needed for debt servicing.

According to the World Bank (2021), Nigeria's public debt-to-GDP ratio was 35.3% in 2020, indicating a substantial debt burden with potential implications for economic growth and development. Nigeria's total public debt stock has increased consistently from N3.37 trillion in 1999 to N46.25 trillion in 2022, and sharply to N97.34 trillion in 2023, reaching N121.67 trillion in 2024'Q1 (Analysts' Data Services and Resources (ADSR), 2024). The external component of Nigeria’s debt has gained prominence, rising from 10% in 2010 to 46% in 2024'Q1, while the Debt-GDP ratio declined from 61.51% in 1999 to 7.26% in 2006 due to debt relief secured with the Paris Club in 2005. However, the country's debt situation now resembles the pre-debt relief years, with a Debt-GDP ratio of 48.68% in 2024'Q1. This situation underscores the urgency of addressing Nigeria's debt challenges to foster investment and economic growth.

Numerous studies have examined the debt burden's impact on investment in Nigeria. A prevalent argument in the literature is that public debt crowds out private investment, deeming it undesirable for the economy. Mona (2013) argued that factors such as interest rates, economic growth, and public capital expenditure influence investment. Some scholars suggest the negative effect of public debt on investment occurs when investors fear that returns from their investment will be taxed away for debt servicing (Deshpande, 1997). Conversely, another literature strand supports the Keynesian view, suggesting that public debt can positively impact private investment (Abubakar & Mamman, 2020). Additionally, some studies indicate that public debt can simultaneously stimulate and negatively impact investment in the long run (Calvo, 1998). These conflicting perspectives highlight a lack of consensus on public debt's effect on investment. Thus, this study seeks to provide policymakers with a nuanced understanding of the debt burden's effect on investment in Nigeria, informing policy and strategy design to address debt challenges and promote investment-led growth.

The existing literature on the relationship between public debt and investment in Nigeria reveals notable gaps. Firstly, there is a scarcity of empirical studies examining the effect of debt service on investment in Nigeria. Secondly, comprehensive analyses that simultaneously investigate the impacts of all components of public debt (domestic and external debt) along with debt service on various forms of investment are uncommon. This study aims to fill these

gaps by providing a more holistic analysis of public debt and its effects on investment in Nigeria. By considering the influence of domestic debt, external debt, and debt service on different forms of investment, this research contributes to a deeper understanding of how public debt impacts the Nigerian investment landscape. This comprehensive approach not only addresses the gaps in the literature but also provides valuable insights for policymakers and stakeholders in formulating more effective debt management and investment strategies.

This study aims to investigate the short and long run effects of domestic debt on investment (private, public and FDI) in Nigeria, determine empirically the short and long run effect of external debt on investment (private, public and FDI) in Nigeria, and ascertain the short and long run effect of debt service on investment (private, public and FDI) in Nigeria. The rest of the study is structured as follows: Section 2 reviews the literature, Section 3 demonstrate the methodology, Section 4 presents and discusses the empirical findings, and Section 5 concludes the study.

2. **LITERATURE REVIEW**

2.1 THEORETICAL REVIEW

The relationship between public debt and investment has been extensively explored in economic theory, with three primary perspectives—the Crowding-Out Hypothesis, the Keynesian View, and the Debt Overhang Theory—offering distinct explanations for the influence of debt on investment. These theoretical foundations provide the basis for the hypotheses tested in this study.

Domestic Debt and Investment (H_{01}: Domestic debt has no influence on investment in Nigeria)

The Keynesian View suggests that domestic debt, when efficiently utilized, can crowd in investment by financing public infrastructure and stimulating economic growth (Musgrave, 1997; Christ & Green, 2004). Investments in infrastructure can enhance productivity, lower transaction costs, and create a favorable business environment, thereby encouraging private sector participation (Baddeley, 2003). However, the Crowding-Out Hypothesis argues that domestic debt may restrict private investment by competing for limited loanable funds, driving up interest rates, and reducing credit availability for private firms (Majumder, 2007). This theoretical contrast underscores the necessity of empirical analysis to determine whether domestic debt in Nigeria fosters investment (as suggested by Keynesian theory) or constrains it through increased borrowing costs (as postulated by neoclassical theory).

External Debt and Investment (H_{02}: External debt has no influence on investment in Nigeria)

The impact of external debt on investment is similarly contested. The Debt Overhang Theory (Krugman, 1988; Sachs, 1989) posits that while external borrowing can initially support investment by providing additional capital, excessive debt accumulation raises concerns about future tax burdens, discouraging private sector participation (Deshpande, 1997). Countries with high external debt levels may face credit rating downgrades, resulting in reduced investor confidence and capital flight (Paudyn, 2013). Furthermore, the crowding-out argument applies here as well—excessive external borrowing may divert resources toward debt servicing rather than productive investment, further inhibiting private sector growth. In contrast, the Keynesian View argues that external debt, if well-managed, can finance public investment in

infrastructure, attracting foreign direct investment (FDI) and stimulating domestic private investment (Makin, 2015).

Debt Service and Investment (H_{03}: Debt service has no significant influence on investment in Nigeria)

Debt service obligations represent a significant constraint on investment, as they divert government revenue away from development expenditures toward debt repayment. The Debt Overhang Theory suggests that high debt servicing burdens reduce available resources for productive investment, leading to stagnation in economic growth (Krugman, 1988; Sachs, 1989). If a substantial portion of fiscal revenues is allocated to debt repayment, fewer funds remain for infrastructure development, education, and health—sectors critical for stimulating investment (Deshpande, 1997). On the other hand, efficient debt servicing strategies and prudent fiscal management may mitigate these adverse effects, ensuring that borrowing contributes to long-term economic expansion rather than constraining investment.

The competing theoretical perspectives provide a compelling rationale for empirically testing the relationship between debt variables and investment in Nigeria. The Crowding-Out Hypothesis suggests that public debt could impede investment by raising borrowing costs, while the Keynesian View argues that debt-financed public investment can enhance economic growth and attract private sector participation. Meanwhile, the Debt Overhang Theory highlights the risk of excessive borrowing, which could deter investment due to concerns about future tax burdens and credit risks. By testing the formulated hypotheses, this study aims to provide empirical clarity on these theoretical debates and inform Nigeria's debt management policies.

2.2 EMPIRICAL LITERATURE

Empirical studies on the effect of public debt on investment and economic growth yield mixed results, with findings oscillating between debt overhang effects, crowding-out phenomena, and, in some cases, positive impacts on private investment. The literature can be categorized into three thematic areas: debt overhang and public investment, debt and private investment, and asymmetric effects of debt.

Debt Overhang and Public Investment

Several studies provide evidence supporting the debt overhang hypothesis, where high levels of public debt impede public investment. Picarelli, Vanlaer, and Marneffe (2019) utilized a panel dataset for 26 EU countries (1995–2015) with a GMM estimation approach, confirming that increased public debt led to reduced public investment. Similarly, Origin, Nneka, and Ubah (2021), using an ARDL framework for Nigeria (1985–2018), found a long-run negative relationship between public debt and public investment, advocating fiscal prudence in debt management.

Debt and Private Investment: Crowding-Out vs. Crowding-In

Most studies confirm that public debt crowds out private investment, primarily through increased borrowing costs and resource constraints. Mabula and Mutasa (2019), employing an ARDL model for Tanzania (1970–2016), found that external debt negatively affected private investment, with greater responsiveness to external than domestic debt. Kamundia et al. (2015) similarly reported a negative effect of debt on private investment in Kenya (1980–2013), advocating reduced public borrowing. In Nigeria, multiple studies reinforce the crowding-out effect. Asogwa and Okeke (2013) used a VEC model and Granger causality test to confirm bidirectional causality between public debt and investment, while Vincent and Clem (2013) found a depressive effect of debt on investment using cointegration and structural analysis. Philip et al. (2017), through a structural VAR model (1970–2015), revealed a prolonged negative effect of public debt on domestic credit, further constraining private sector investment.

However, some studies find crowding-in effects under specific conditions. Thilanka and Ranjith (2018) examined Sri Lanka (1978–2015) using a VECM model and found public debt spurring private investment in the long run, provided government borrowing was well-managed. Ogunjimi (2016), using an ARDL framework for Nigeria (1981–2016), found that while external debt crowded out public investment, it crowded in private investment in both short- and long-run.

Asymmetric Effects of Public Debt

Recent studies highlight the asymmetric nature of debt effects on investment. Lau, Tan, and Liew (2019) applied a non-linear ARDL approach to Malaysia (1980–2016), revealing that public debt had an asymmetric effect on private investment, with higher debt levels crowding out investment more significantly than lower debt levels facilitated it. These findings align with the broader consensus advocating for cautious debt accumulation to avoid detrimental investment distortions.

3. **METHODOLOGY**

This study empirically examines the impact of public debt—both domestic and external—and debt service on different forms of investment (private, public, and foreign direct investment) in Nigeria from 1981 to 2022. The analysis employs an Autoregressive Distributed Lag (ARDL) model, which is particularly suitable given its flexibility in handling regressors that are stationary at different levels (i.e., I(0) and I(1)) and its robustness in small sample sizes. The ARDL framework allows for the estimation of both short-run and long-run relationships, making it ideal for capturing the dynamic effects of debt burden on investment.

3.1 THEORETICAL FRAMEWORK

The theoretical foundation of this study is rooted in the Debt Overhang Hypothesis (Krugman, 1988; Sachs, 1989) and the Crowding-Out/Crowding-In Hypothesis (Blanchard, 1985). The debt overhang theory suggests that excessive public debt discourages private investment due to expected future tax burdens, while the crowding-out effect posits that high government borrowing raises interest rates, reducing private sector credit availability. However, the crowding-in effect suggests that government borrowing, if used for productive investment, can stimulate private investment by improving infrastructure and economic conditions (Greiner, 2012).

3.2 MODEL SPECIFICATION

Following Ogunjimi (2016), the study estimates three investment models:

Functional Form:

lPR_INV = f(lEXDT, lDDT, lDTS, LDR, INF) -- -- -- -- (1)

lPU_INV = f(lEXDT, lDDT, lDTS, LDR, INF) -- -- -- -- (2)

lFDI = f(lEXDT, lDDT, lDTS, LDR, INF) -- -- -- -- (3)

Where:

- **PR_INV** = Private Investment (proxied by domestic credit to the private sector)
- **PU_INV** = Public Investment (proxied by imports of goods and services)
- **FDI** = Foreign Direct Investment (net inflows)
- **EXDT** = External Debt (public external debt outstanding)
- **DDT** = Domestic Debt (federal government domestic debt outstanding)
- **DTS** = Debt Service (total external debt service)
- **LDR** = Lending Rate (prime interest rate)
- **INF** = Inflation Rate (consumer price index, 2010=100)
- **εt** = Stochastic Error Term

The econometric models are:

lPR_INVt = α0 + α1lEXDTt + α2lDDTt + α3lDTSt + α4LDRt +α5INFt + ε1t ---- (4)

lPU_INVt = β0 + β1lEXDT + β2lDDTt + β3lDTSt + β4LDRt +β5INFt + ε2t ----- (5)

lFDIt = Ω0 + Ω1lEXDT + Ω2lDDTt + Ω3lDTSt + Ω4LDRt + β5INFt + ε3t -- (6)

The ARDL representations of equation (4), (5) and (6) are specified below:

$$\Delta lPR-INV=\alpha_0+\sum_{i=0}^{n}\alpha_{1i}\Delta lPR-INV_{t-1}+\sum_{i=0}^{n}\alpha_{2i}\Delta lEXDT_{t-1}+\sum_{i=0}^{n}\alpha_{3i}lDDT_{t-1}+i=\sum_{i=0}^{n}\alpha_{4i}lDTS_{t-1}+\sum_{i=0}^{n}\alpha_{5i}LDR_{t-1}+\sum_{i=0}^{n}\alpha_{6i}INF_{t-1}+$$
$$\beta_2 lPR-INV_t+\beta_3 lEXDT_t+\beta_4 lDDT_t+\beta_5 lDTS_t+\beta_6 LDR_t+\beta_7 INF_t+\varphi ECT_{t-1}+\varepsilon_t$$

$$\Delta lPU-INV=\alpha_0+\sum_{i=0}^{n}\alpha_{1i}lPU-INV_{t-1}+\sum_{i=0}^{n}\alpha_{2i}lEXDT_{t-1}+\sum_{i=0}^{n}\alpha_{3i}lDDT_{t-1}+\sum_{i=0}^{n}\alpha_{4i}lDTS_{t-1}+\sum_{i=0}^{n}\alpha_{5i}LDR_{t-1}+\sum_{i=0}^{n}\alpha_{6i}INF_{t-1}+$$
$$\beta_2 lPU-INV_t+\beta_3 lEXDT_t+\beta_4 lDDT_t+\beta_5 lDTS_t+\beta_6 LDR_t+\beta_7 INF_t+\varphi ECT_{t-1}+\varepsilon_t$$

$$\Delta lFDI=\alpha_0+\sum_{i=0}^{n}\alpha_{1i}\Delta lFDI_{t-1}+\sum_{i=0}^{n}\alpha_{2i}\Delta lEXDT_{t-1}+\sum_{i=0}^{n}\alpha_{3i}\Delta lDDT_{t-1}+\sum_{i=0}^{n}\alpha_{4i}\Delta lDTS_{t-1}+\sum_{i=0}^{n}\alpha_{5i}\Delta LDR_{t-1}+\sum_{i=0}^{n}\alpha_{6i}\Delta INF_t+$$
$$\beta_2 lFDI_t+\beta_3 lEXDT_t+\beta_4 lDDT_t+\beta_5 lDTS_t+\beta_6 LDR_t+\beta_7 INF_t+\varphi ECT_{t-1}+\varepsilon_t$$

Expected Signs:

- **Domestic debt (DDT)**: Expected to have a positive effect on investment (crowding-in) if used productively, but potentially negative for private investment if it leads to credit market distortions.
- **External debt (EXDT)**: May have a positive effect if it finances growth-enhancing projects but can be negative if it leads to debt overhang concerns.
- **Debt service (DTS)**: Expected to have a negative effect on investment by diverting resources away from productive activities.
- **Lending rate (LDR)**: Likely to negatively impact private and FDI investment due to higher borrowing costs.
- **Inflation (INF)**: Expected to deter investment by increasing economic uncertainty.

3.3 Justification for Control Variables

The **lending rate (LDR) and inflation rate (INF)** are included as control variables due to their significant influence on investment decisions. High lending rates increase borrowing costs, potentially discouraging private sector investment (Fry, 1997). Similarly, inflation increases uncertainty, reducing both domestic and foreign investment inflows (Fischer, 1993). Including these variables ensures a more comprehensive analysis of debt dynamics on investment behavior.

3.4 ESTIMATION PROCEDURE

I. To ensure robustness, the study follows a structured econometric approach:
II. **Descriptive Statistics**: Summarizes data characteristics.
III. **Unit Root Tests (Augmented Dickey-Fuller - ADF)**: Determines stationarity levels to confirm ARDL suitability.
IV. **Bounds Testing (ARDL Cointegration Test)**: Identifies long-run relationships among variables.
V. **Error Correction Model (`ECM)**: Estimates short-run dynamics and speed of adjustment to equilibrium.
VI. **Diagnostic Tests**: Ensures the model does not violate classical regression assumptions (serial correlation, heteroscedasticity, normality, and stability).

4. **RESULTS AND DISCUSSION OF FINDINGS**

4.1 TEST FOR STATIONARITY

The stationarity test precedes any form of time series estimation. As the first step in time series analysis, the Augmented Dickey-Fuller (ADF) test for unit root is employed by the study. The test results is presented in Table 4.1 below.

Table 4.1: UNIT ROOT TEST RESULTS

	Augmented Dickey Fuller (Constant)		
Variables	Level	First Differene	Order of Integration
lPR-INV	-1.653094	-5.946128*	1(1)
lPU-INV	-0.615846	-5.981824*	1(1)
lFDI	-1.952217	-10.13397*	1(1)
lEXDT	-1.471478	-4.928631*	1(1)
lDDT	-1.552734	-4.757102*	1(1)
lDTS	-2.614095***	-6.694986*	1(0)
LDR	-2.188685	-6.058972*	1(1)
INF	3.552026**	5.028757*	1(0)

Source: Author's computation using Eviews9

Note: * ; ** and *** represent 1% ; 5% and 10% levels of significance respectively

The unit root test in the table above using augmented Dickey Fuller shows that the variables (PR_inv, lPU-INV, lFDI, lEXDT, lDDT, and LDR) were found to be stationary at first difference which implies they are I(1) variables, while the variables lDTS and INF were found to be stationary at levels form indicative of I(0) variables. A linear combination of these variables may produce a spurious result if the variables are not cointegrated. This informs the use of the Autoregressive and Distributed Lag (ARDL) model for analysis due to the mixed order of the variables. The ARDL model via the bound test allows us to determine if the variables have a long-run association (cointegrated). Where the variables are cointegrated, the relationship between them is no longer spurious.

4.2 ARDL BOUNDS TEST/ COINTEGRATION RESULTS

Here, a null hypothesis of no long run relationship is tested against the alternative of a long run relationship exists. The rule for accepting the null hypothesis is that the value of the computed F-statistic must be less than the critical lower bound; greater than the upper bound for the null hypothesis to be rejected, but fall between the upper and lower bound for the test to be considered inconclusive. See results below.

Table 4.2: RESULT OF ARDL BOUNDS TEST FOR COINTEGRATION

Sig.Level	F(lPR_INV/ lEXDT, lDDT, lDTS, LDR,INF)			F(lPU_INV/ lEXDT, lDDT, lDTS, LDR, INF)			F(lFDI / lEXDT, lDDT, lDTS, LDR, INF)		
	Critical Value		F-Stat.	Critical Value		F-Stat.	Critical Value		F-Stat.
	Lower Bound	Upper Bound		Lower Bound	Upper Bound		Lower Bound	Upper Bound	
10% 5% 1%	2.26 2.62 3.41	3.35 3.79 4.68	6.29	2.26 2.62 3.41	3.35 3.79 4.68	1.72	2.26 2.62 3.41	3.35 3.79 4.68	2.84

Source: Author's Computation using Eviews9

Note: The Akaike Info Criterion (AIC) selected the optimal lag length (k=5).

Table 4.2 shows that the computed F-statistic (6.29) of the private investment model is greater than the upper bound at all level of significance, thus, there is a long run relationship among the variables in this model. Similarly, the Fstat value of 2.84 of the FDI model, which falls between the traditional bound critical value at 5 percent (significance level), is considered inconclusive. However, the ARDL short run (static) analysis is sufficient for the public investment model as its computed F-statistic (1.72) falls below the lower bound at 5 percent and 10 percent level of significance.

4.3 INVESTMENT MODEL RESULTS

4.3.1 ARDL Long-Run Results

Table 4.3 presents the long-run estimates of the investment models, examining the effects of external debt, domestic debt, and debt service on private investment, public investment, and foreign direct investment (FDI) in Nigeria.

Interpretation of Statistical Outputs: External debt exerts a statistically significant negative impact on private investment at a 10% significance level, while its effects on public investment and FDI are statistically insignificant. This suggests that external borrowing does not translate into productive investment in Nigeria, aligning with the crowding-out hypothesis. A 1% increase in external debt leads to a 0.09% decline in private investment, indicating that external funds may have been misallocated, poorly managed, or diverted from investment-driven projects over the period under investigation in Nigeria.

Conversely, domestic debt emerges as a crucial driver of investment, exhibiting a statistically significant positive effect on both private investment and FDI. A 1% increase in domestic debt raises private investment by approximately 0.28% and FDI by 0.61%. This suggests that domestic borrowing provides a viable financing alternative for private sector expansion and foreign investment attraction. Notably, the responsiveness of FDI to domestic debt is greater than that of private investment, which may be linked to the loanable funds theory, whereby increased government borrowing raises interest rates, potentially deterring private investment while attracting foreign capital inflows seeking higher returns (Majumder, 2007).

These findings are consistent with Thilanka and Ranjith (2018) in Sri Lanka, who observed similar positive effects of public debt on investment. However, they contrast with studies in Nigeria such as Vincent and Clem (2013), Asogwa and Okeke (2013), and Picarelli et al. (2019) in 26 EU countries, which reported a negative impact of public debt on private investment, largely due to debt overhang effects and fiscal mismanagement.

Debt servicing, along with other control variables, does not exhibit a statistically significant long-run effect on investment, implying that while debt accumulation may influence investment, the repayment burden does not directly impact investment decisions in Nideria under the period of investigation.

4.3.2 ARDL Short-Run Results

Interpretation of Statistical Outputs: Short-run estimates reinforce the significance of domestic debt as a financing instrument for investment. A 1% increase in domestic debt raises private investment by 0.16% and public investment by 0.99%, though the effect on private investment is relatively modest. This finding diverges from Lau et al. (2019), who observed a

crowding-out effect of public debt on private investment. The observed weak effect may be explained by public debt-financed infrastructure investments complementing private sector activities, as suggested by the public capital hypothesis (Conrad & Seitz, 1994).

The error correction term (ECT) is negative and statistically significant for private and FDI investment models, confirming the presence of long-run equilibrium relationships. The ECT coefficients of -0.560173 and -0.529789 for private investment and FDI, respectively, indicate that about 53% and 56% of deviations from long-run equilibrium are corrected in the subsequent period. However, for public investment, the ECT (-0.186716) is statistically insignificant, reaffirming the bounds test result, which suggests no long-run relationship in the model.

Table 4.3: ARDL Long Run and Short Run Estimation/ Post-Estimation Diagnostic Tests

Variables	**Private Investment Model**	**Public Investment Model**	**Foreign Direct Investment Model**
Long Run Estimates			
LEXDT	-0.087471 (0.0926)	0.353532 (0.5995)	-0.24428 (0.3699)
LDDT	0.279711 (0.0001)	0.339583 (0.4284)	0.609511 (0.0368)
LDTS	0.184398 (0.2023)	0.042525 (0.9374)	-0.213597 (0.5946)
LDR	-0.016657 (0.2563	-0.050807 (0.6253)	0.056002 (0.3677)
INF	-0.000318 (0.8907	0.012409 (0.4539)	-0.001174 (0.8277)
C	-2.618909 (0.4127)	18.135788 (0.1424)	22.404009 (0.017)
Short Run Estimates			
D(LEXDT)	-0.048999 (0.1203)	0.06601 (0.476)	-0.129417 (0.4397)
D(LDDT)	0.156686 (0.0003)	0.985432 (0.0223)	0.322912 (0.4397)
D(LDTS)	-0.037478 (0.4201)	0.00794 (0.9379)	-0.113162 (0.5866)
D(LDTS(-1))	-0.141856 (0.0048)	—	—
D(LDR)	0.004754 (0.4607)	-0.009486 (0.5864)	0.029669 (0.3892)
D(INF)	0.009518 (0.1806)	-0.041066 (0.0211)	-0.000622 (0.83)
D(INF(-1))	-0.021122 (0.0312)	0.031202 (0.2106)	—
CointEq(-1)	-0.560173 (0.0002)	-0.186716 (0.1429)	-0.529789 (0.0076)
Adjusted R2	0.916397	0.942736	0.730891
F-Stat.	27.9016 (0.000)	54.87623 (0.000)	14.93784 (0.000)
Durbin Watson	2.222241	2.17907	2.179135
POST-ESTIMATION DIAGNOSTIC TESTS			
Normality Test	0.670865 (0.715029)	0.689828 (0.708281)	3.058252 (0.216725)
Serial Correlation LM Test	0.3724 (0.2315)	0.2866 (0.1813)	0.1878 (0.1293)
Heteroscedasticity Test (ARCH)	0.2046 (0.8415)	0.6213 (0.7698)	0.7253 (0.6883)
Ramsey RESET Test	0.3809 (0.3809)	0.1039 (0.1039)	0.0601 (0.0601)

Source: Author's computation using Eviews9

Selected Model: ARDL (1,0,0,2,1,2), (1, 0, 1, 0,0, 2) and (1, 0, 0, 0, 0, 0) respectively.

Model selection method: Akaike Info Criterion (AIC)

Number of selected lags: 2 period lags

Probability values are in parenthesis

4.3.3 MODEL FIT AND POST-ESTIMATION DIAGNOSTICS

The Adjusted R-squared values of 92%, 94%, and 73% for private investment, public investment, and FDI models, respectively, indicate a strong explanatory power of the independent variables. The F-statistics confirm the overall significance of each model at the 5% level. The Durbin-Watson statistics reveal no evidence of autocorrelation, reinforcing the robustness of the results.

Post-estimation diagnostic tests indicate that all models satisfy the Classical Linear Regression Model (CLRM) assumptions, including no serial correlation, normality, homoscedasticity, and correct model specification. Stability tests using the CUSUM and CUSUMSQ plots confirm the stability of all three models within the 5% critical bounds, supporting the reliability of the estimated results for policy formulation.

4.3.4 COMPARISON WITH EXISTING LITERATURE

These findings contribute to the ongoing debate on public debt and investment. While the negative impact of external debt on private investment aligns with the crowding-out hypothesis (Picarelli et al., 2019), the positive role of domestic debt contradicts studies such as Vincent and Clem (2013) and Asogwa and Okeke (2013). The study's results align more closely with Thilanka and Ranjith (2018), who found that well-managed public borrowing could enhance investment. Additionally, the relatively stronger response of FDI to domestic debt highlights a novel insight, suggesting that Nigeria's domestic borrowing may be more attractive to foreign investors than previously thought.

4.3.5 LIMITATIONS AND ASSUMPTIONS

Despite the robustness of the findings, some limitations exist. First, the study assumes that all debt-financed expenditures are correctly classified as either productive or unproductive, whereas misallocation or leakages may distort actual effects. Second, the model does not account for potential structural breaks due to economic crises, policy shifts, or external shocks, which could influence debt-investment dynamics. Third, endogeneity concerns, while mitigated through the ARDL approach, remain a potential limitation, as causality between debt and investment may be bidirectional. Finally, external factors such as global interest rate fluctuations and investor sentiment are not explicitly incorporated but could influence investment responses to debt accumulation.

4.3.6 POLICY IMPLICATIONS

The findings provide crucial insights for Nigeria's debt management strategy and its impact on investment.

Optimize Domestic Borrowing for Investment Growth – The positive effect of domestic debt on private investment and FDI underscores its potential as a financing tool. Policymakers should ensure that domestic borrowing supports productive sectors while maintaining fiscal discipline to prevent excessive debt accumulation (Thilanka & Ranjith, 2018).

Mitigate the Negative Effects of External Debt – The adverse impact of external debt on private investment (Majumder, 2007) suggests inefficiencies in debt utilization. To counter this, policymakers should enhance transparency in debt allocation, prioritize concessional loans, and channel external funds into high-yield investment projects (Vincent & Clem, 2013; Asogwa & Okeke, 2013).

Enhance Debt Management and Sustainability – Since debt service does not significantly influence investment in the long run, attention should be placed on efficient debt structuring, improved revenue mobilization, and institutional reforms to mitigate excessive borrowing risks.

Improve Public Investment Efficiency – The lack of a long-run relationship between public investment and debt highlights inefficiencies in government spending. Directing public borrowing toward infrastructure and complementary private-sector projects can enhance investment effectiveness (Conrad & Seitz, 1994).

Strengthen Macroeconomic Stability to Attract FDI – The strong responsiveness of FDI to domestic debt suggests the need for investor-friendly policies, regulatory reforms, and macroeconomic stability to sustain capital inflows and foster investment-led growth.

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study contributes to the existing literature by providing empirical evidence on the differential effects of external and domestic debt on investment in Nigeria, using an autoregressive distributed lag (ARDL) framework. The findings reaffirm the crowding-out hypothesis (Majumder, 2007), demonstrating that external debt negatively affects private investment, while domestic debt serves as a critical driver of both private investment and FDI. The study also highlights the inefficiencies in public investment and the limited impact of debt servicing on investment decisions. These insights enhance understanding of the debt-investment nexus in Nigeria, offering a nuanced perspective on optimal debt management strategies.

5.2 Research Contributions

This research advances the literature by:

- Extending the empirical analysis of debt and investment in Nigeria with a robust ARDL model, covering an extended dataset from 1981–2022.
- Providing comparative insights by aligning with and diverging from prior studies (e.g., Thilanka & Ranjith, 2018; Vincent & Clem, 2013), particularly in explaining the contrasting roles of external and domestic debt.
- Offering policy-driven implications that bridge theoretical frameworks, such as the loanable funds theory and the public capital hypothesis (Conrad & Seitz, 1994), with real-world debt dynamics in Nigeria.

5.3 FUTURE RESEARCH DIRECTIONS

To build on these findings, future research could:

- Explore sector-specific effects of debt to assess whether certain industries benefit more from domestic or external borrowing.
- Investigate the role of institutional quality and governance in mediating the relationship between debt accumulation and investment.
- Extend the analysis to a panel study of Sub-Saharan African economies to determine the broader applicability of these findings across diverse economic structures.

- Incorporate non-linear modeling techniques to capture potential threshold effects in the debt-investment relationship.

5.4 **RECOMMENDATIONS**

- **Optimize Domestic Borrowing** – Given its positive impact on investment, domestic debt should be strategically leveraged to support private sector expansion and attract FDI while maintaining fiscal discipline to avoid excessive accumulation.
- **Improve External Debt Utilization** – To mitigate the negative effects of external debt on private investment, policymakers should prioritize concessional loans, enhance debt transparency, and ensure borrowed funds are allocated to productive sectors.
- **Enhance Debt Management Frameworks** – Strengthening institutional oversight, improving debt monitoring mechanisms, and adopting sustainable fiscal policies will help minimize the risks associated with excessive borrowing.
- **Boost Public Investment Efficiency** – Public borrowing should be directed toward infrastructure and sectors that complement private investment, aligning with the public capital hypothesis (Conrad & Seitz, 1994).
- **Strengthen Macroeconomic Policies to Attract FDI** – Given the strong responsiveness of FDI to domestic debt, regulatory reforms, investor-friendly policies, and enhanced macroeconomic stability are crucial for sustaining investment growth.

By implementing these recommendations, Nigeria can maximize the benefits of debt financing while ensuring sustainable investment-driven economic growth.

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