THE IMPACT OF EXTERNAL DEBT ON ECONOMIC PERFORMANCE IN NIGERIA: AN ARDL APPROACH

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Citation: Ogonegbu, E. A., Kagwaini, D. M. (2025). The impact of external debt on economic performance in Nigeria: An ARDL approach. *International Academic Journal of Economics and Finance, 4*(4), 39-64.

ABSTRACT

This study examines the impact of external debt on Nigeria's economic growth between 2010 and 2022. Emphasis is given to rising debt levels from commercial sources (Eurobonds) and bilateral loans (China), which particularly impact economic performance and the country's long-term viability. Debt overhang theory was adopted, while an Auto-Regressive Distributed Lag (ARDL) model was employed utilizing quarterly time-series data. The research examines the relationship between external debt levels and GDP growth, with the exchange rate, inflation and Federal government capital expenditure as control variables. The findings highlighted that while external debt can occasionally stimulate economic growth by financing infrastructure and other developmental projects, the rising costs of debt servicing significantly strain fiscal resources, corroborate the debt overhang theory, and could potentially impede long-term economic growth by consuming a substantial portion of the national budget and limiting public investment. The study contributes to the existing literature by providing empirical evidence of the complex dynamics between external debt and economic growth in Nigeria, offering insights crucial for policymakers to formulate strategies that balance debt management with sustainable economic growth.

Keywords: Economic Growth, External Debt, Nigeria.

INTRODUCTION

Nigeria, one of the largest economies in Sub-Saharan Africa, faces a significant challenge in managing its debt, which significantly impacts its economic growth. Numerous reforms have been enacted to mitigate increasing concerns over the levels of external debt and the associated risks to Nigeria's economic stability (Romanus, 2014). According to (Osmond & Okechukwu, 2024), reforms aim to stabilize the macroeconomic environment, improve credit ratings, and enable sustainable growth. Further, they will help prevent financial crises, reduce vulnerability to oil price fluctuations by diversifying the economy, and stabilize inflation and exchange rates (Okegbemi, 2024). Despite those various reforms and debt management strategies, Nigeria's external debt levels have raised concerns about its sustainability and the potential risks to its economic stability (Ekeruche et al., 2023). During the period between 2010 and 2015, Nigeria experienced a significant increase in external borrowing, primarily driven by infrastructure projects and budget deficits (Akinola & Ohonba, 2024). The country took advantage of favourable lending conditions in global markets, particularly with multilateral institutions and through Eurobond issuances. From

2016 to 2019, Nigeria's external debt rose, reaching approximately $27 billion by the end of 2019 (National Bureau of Statistics, 2019). This increase was partly attributed to the government's efforts to fund large-scale infrastructure projects, stimulate economic growth, and offset revenue shortfalls due to fluctuating oil prices. While all this is ongoing, the COVID-19 pandemic had subsequent economic challenges set in 2020-2022, which prompted Nigeria to seek more external financing to manage the crisis (Erediauwa & Olawoye, 2024). By mid-2022, Nigeria's external debt had increased further; according to the 2022 Debt Sustainability Analysis (DSA) Report, the Total Public Debt-to-GDP ratio increased to 23.4 per cent as of September 30, 2022, with a Debt Service-to-Revenue ratio of 73.5 per cent, exceeding the threshold of 50 per cent. This highlights significant sustainability concerns due to low revenue performance (Debt Management Office, 2022)

Statement of the Problem

Nigeria's external debt has become alarmingly high, significantly affecting the nation's economic stability and growth. Okeke et al. (2023) noted that Nigeria's debt service to revenue ratio has risen to concerning levels. In 2021, Nigeria's debt service-to-revenue ratio surged to 86%, highlighting significant fiscal challenges. This alarming trend has persisted in recent years and has raised concerns among analysts, prompting questions about whether the country is broke or heading to insolvency (IMF, 2021, as cited in Okeke et al., 2023). According to (Ayoola and Segun-Olufemi, 2022), in 2005, international lenders cancelled about 60% of Nigeria's external debt, worth $18 billion, and officials celebrated this as a democratic success. However, less than 20 years later, the country has borrowed more money under different governments, and the current administration is asking for more debt relief due to the economic impact of COVID-19. The landscape of Nigerian debt has shifted in recent years, with a significant move toward commercial financing routes, including Eurobonds and bilateral loans, in which China is highly prominent. These sources, though vital for plugging fiscal gaps, carry a double-edged sword through their soaring interest rates with shorter windows for repayment, thus compounding the challenge of maintaining debt sustainability (Osmond et al., 2024). Okonkwo et al. (2024) noted that the increasing cost of debt servicing consumes a considerable portion of government revenues, leaving small portions for relevant sectors such as healthcare, education, and infrastructure. This situation limits public investment, hinders the government's ability to achieve development objectives, and deepens fiscal challenges. The increased debt burden raises severe concerns about the "crowding out" effect, where essential economic activities such as investment in infrastructure development, education, health care, education and housing are sidelined due to high debt servicing costs, leading to reduced public investment and lower productivity. This situation could hinder domestic capital formation and limit the availability of essential services, thus hampering economic growth and possibly worsening social inequalities (Ajayi & Edewusi, 2020). This research examines the impact of Nigeria's high external debt on its economic performance. The results are intended to assist policymakers in developing strategies that balance debt management with sustainable economic growth.

Objectives of the Study

This study aims to analyze the impact of external debt on Nigeria's economic growth and understand how different levels of external debt influence the country's economic performance.

Statement of Hypothesis

(H_0: External debt does not significantly impact Nigeria's economic growth.

Contribution to the Study

This study contributes to the existing literature by providing an updated and comprehensive analysis of the implications of external debt on economic growth in Nigeria, examining quarterly data from 2010 to 2022. The years 2010–2022 were chosen because they included important changes in Nigeria's borrowing, like the use of Eurobonds (2011), the oil price crash (2014) and COVID-19 (2020). This period also provided available and consistent data to study how external debt affected Nigeria's economy during these challenges.

LITERATURE REVIEW

Debt has played an important role in Nigeria's structural transformation and development by enabling the government to finance large-scale infrastructure projects, address fiscal deficits, and respond to economic crises.

While debt has been a double-edged sword for Nigeria in the quest for structural transformation and development, it has allowed the government to commit funds to massive infrastructure projects, bridge fiscal deficits, and meet current economic shocks. It is, however, on the other side becoming an anchor, according to Ekeruche et al. (2023), that is dragging the economy from reaching the heights of driving growth, meeting the challenges of crisis, and long-term development. This dynamic poses a paradox: the instrument meant to build and stabilize the economy now threatens to undercut its progress if not carefully managed.

Debt financing has supported critical infrastructure development, such as completing rail lines, highways, and energy projects, essential for economic diversification. For instance, China has provided loans to support key projects in Nigeria, including the Nigerian Railway Modernization Project (Idu-Kaduna section), Abuja Light Rail, the expansion of four major airport terminals (Abuja, Kano, Lagos, and Port Harcourt), the Lagos-Ibadan Railway, and the upgrade of the Abuja-Keffi-Makurdi Road. As the Debt Management Office (2023) stated, these loans have had a clear and visible impact. For example, the Idu-Kaduna Rail Line has become a popular means of transport between Abuja and Kaduna, and the new international airport in Abuja has improved Nigerians' air travel (Debt Management Office, 2023).

Additionally, during the COVID-19 pandemic, borrowed funds were instrumental in cushioning the economic impact. Emergency financial assistance from the International Monetary Fund (IMF) under its Rapid Financing Instrument (RFI) in 2021 provided Nigeria with $3.4 billion, helping to stabilize its economy and fund healthcare responses during the crisis (IMF, 2020).

However, by 2023, Nigeria's external debt soared to $42,495.16 million, marking a 550.46% increase since 2012 (Debt Management Office Nigeria, n.d.). While debt has facilitated

development, this growth has raised concerns about sustainability, given the rising debt service-to-revenue ratio. Factors such as global financial pressures, dependency on oil revenue, and external shocks, including the Russia-Ukraine conflict, have strained Nigeria's capacity to balance debt obligations with domestic investment priorities (Ekeruche et al., 2023).

Nigeria's borrowing has played a major role in supporting developmental projects, but the increasing debt levels emphasize the need for careful debt management to maintain sustainable economic growth.

External Debt

Public debt could either be internal (domestic) or external (foreign) (Okeke et al., 2023). Public debts consist of both short-term and long-term borrowings undertaken by governments to fund public expenses due to insufficient public revenues (Hilton, 2021). External debt refers to money Nigeria borrows from foreign creditors, including international organizations, governments, and private investors. As of December 31, 2022, Nigeria's total external debt stock was $41.69 billion (Debt Management Office, n.d.). External debt represents the total of disbursed and outstanding obligations that residents of a country owe to non-residents at any specific time. These obligations include the repayment of principal, either with or without interest, and the payment of interest, whether or not it includes the principal (World Bank, 1988). The table below shows the breakdown of Nigeria's External Debt as of December 31, 2022.

Table: Breakdown of Nigeria's External Debt as of December 31, 2022

Category	Amount ($'bn)	Details
Multilateral Loans	20.20	Includes loans from the World Bank, AFDB, Islamic Development Bank, e.t.c
Bilateral Loans	5.06	Includes $4.29 billion from China's Export-Import Bank for infrastructure projects.
Commercial Borrowing	15.62	Includes Eurobonds amounting to $15.62 billion.
Promissory Notes	0.55	Represents obligations settled through promissory notes.
Syndicated Loans	0.26	Includes syndicated loans from the Africa Finance Corporation.
	41.69	

External debt is vital for infrastructure projects, social programs, and economic stabilization initiatives. However, its composition reveals increasing reliance on commercial sources, which poses higher costs and risks for debt sustainability. Effective management and strategic use of these resources are crucial for long-term economic development.

Theoretical Framework

Debt Overhang Theory

Debt overhang occurs when an entity, such as a corporation, government, or household, accrues an overwhelming amount of debt, making it challenging or unfeasible to secure further loans to

finance new initiatives or growth (Asogwa et al., 2018). For countries, debt overhang arises when their total debt exceeds their future ability to pay it off.

According to Sundell & Lemdall, (2011), the theory of debt overhang was first prominently discussed by Stewart C. Myers in the context of corporate finance in his seminal 1977 paper titled "Determinants of Corporate Borrowing." Myers introduced the concept to explain how excessive debt could affect a company's investment decisions, specifically how it could deter new investment even if the projects were profitable. This framework has since been extended to analyze issues in sovereign debt and other areas.

The theory of debt overhang posits that high levels of external debt can deter economic growth by discouraging domestic and foreign investment. This is because future revenues are anticipated to repay existing debts rather than finance productive investments (Krugman, 1988). This theory is particularly relevant to the Nigerian context, where high debt levels could crowd out private investment.

Debt Servicing and Its Economic Implications

Debt servicing is a key part of understanding external debt, mainly because it can greatly impact economic growth. Muhammad and Abdullahi (2020) alluded that when debt repayments are too high, money is taken away from critical infrastructure, education, and healthcare, slowing economic progress. Akanbi et al. (2022) added that how borrowed funds are used makes a huge difference; smart investments in infrastructure and human development can reduce these adverse effects. The debt overhang theory provides a theoretical framework to understand these challenges. It posits that when a country's debt exceeds its repayment capacity, it creates an environment of uncertainty and pessimism among investors (Dawood et al., 2024). Anticipating that future revenues will primarily be used to repay existing debt rather than finance productive investments, domestic and foreign investors may withhold investment, thereby stifling economic growth (Krugman, 1988). Similarly, Gen et al. (2022) noted that the Debt Overhang Theory emphasizes how excessive debt discourages investment due to fears that future revenues will be diverted toward debt servicing, thereby hindering economic growth and corporate investment decisions. However, critics argue that the Debt Overhang Theory oversimplifies the complex relationship between debt and growth. For instance, Gómez-Puig et al. (2022) observed that countries with strong governance and institutional frameworks can sustain higher debt levels without significant damage to growth, while weaker systems remain highly vulnerable. Turan and Yanıkkaya (2021) also emphasized that weak governance exacerbates the adverse effects of external debt, underscoring institutional quality as a key moderator of debt's impact on growth.

Further complicating this dynamic, Musa et al. (2024) found that governance quality influences whether public debt promotes or hinders growth, depending on a country's economic performance. Meanwhile, Ibañez Martín et al. (2024) highlighted that moderate external debt can support growth, but excessive debt beyond critical levels becomes detrimental. This nuanced understanding suggests that while the Debt Overhang Theory rightly warns against excessive borrowing, it overlooks scenarios where debt, if carefully managed, can stimulate growth. For Nigeria, where

rising debt levels are raising concerns, the Debt Overhang Theory underscores the importance of prudent borrowing to avoid the pitfalls of excessive debt. It also highlights the need for improved governance and institutional quality to ensure that debt supports economic growth rather than hinders it.

Nigeria's External Debt and GDP: 2010–2022

Year	GDP (Current US$ Billion)	External Debt (US$ Billion)	Debt-to-GDP Ratio (%)
2010	367.0	4.6	1.25
2011	414.5	6.4	1.54
2012	464.0	6.5	1.40
2013	520.1	8.8	1.69
2014	574.1	9.7	1.69
2015	493.0	10.7	2.17
2016	404.6	11.4	2.82
2017	375.7	18.9	5.03
2018	421.7	25.3	6.00
2019	474.5	27.7	5.84
2020	432.2	33.3	7.71
2021	440.8	38.3	8.69
2022	477.4	41.7	8.74

Note: The GDP figures are in current US dollars, and the external debt figures represent the total external debt stock at year-end.

Data Sources:

- GDP data: (World Bank Data, n.d.).
- External debt data: (Debt Management Office, n.d.).

The table highlights Nigeria's GDP, external debt, and debt-to-GDP ratio from 2010 to 2022, showing a significant rise in external debt and its ratio to GDP. During the early period from 2010 to 2014, Nigeria maintained a relatively low external debt level, with a debt-to-GDP ratio below 2%, supported by strong economic growth due to favourable oil prices. However, a dramatic shift occurred in 2015; external debt surged from $10.7 billion to $41.7 billion in 2022, with the debt-to-GDP ratio climbing from 2.17% to 8.74%, reflecting the growing reliance on external financing. The period from 2016 to 2020 was particularly challenging, marked by an oil price crash and the COVID-19 pandemic cutting government revenues and forcing reliance on external borrowing. By 2021, the debt-to-GDP ratio reached a maximum of 8.69%. Despite some GDP recovery in 2021 and 2022, rising debt highlights the need for responsible debt management to avoid limiting resources for essential investments in infrastructure, healthcare, and education. The trends in this table demonstrate the relevance of the Debt Overhang Theory to Nigeria's economic challenges. It highlights how rising debt levels can stifle growth prospects if borrowed funds are not effectively allocated to productive sectors. Policymakers must focus on maintaining a sustainable debt profile and implementing reforms to improve revenue generation and public expenditure efficiency.
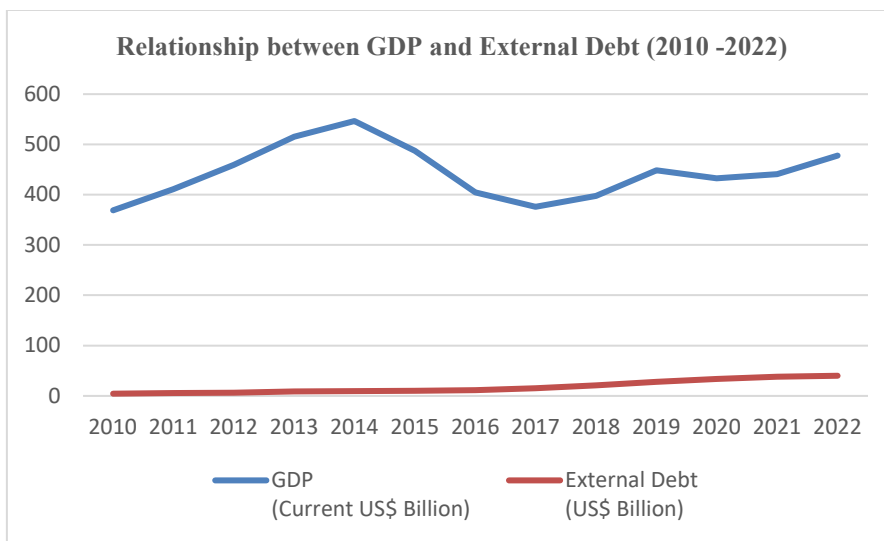
Relationship between GDP and External Debt (2010 -2022)

Figure Showing the Trends in Nigeria's GDP and External Debt (2010–2022)

Summary of the Graph: Relationship Between GDP and External Debt (2010–2022)

The graph illustrates the relationship between Nigeria's GDP and external debt from 2010 to 2022, highlighting significant trends and movements in these two key economic indicators. Nigeria's GDP grew from $367 billion in 2010 to $574 billion in 2014 but dropped sharply to $375 billion in 2017 during the oil price crash and recession. It started improving in 2018, reaching $477 billion by 2022. At the same time, external debt kept rising steadily, from $4.6 billion in 2010 to $41.7 billion in 2022, as the country borrowed more to cover budget shortfalls and support recovery efforts. Although the GDP has been recovering since 2017, the increasing debt raises concerns about its sustainability. High debt levels could limit Nigeria's ability to invest and grow in the long term, aligning with the Debt Overhang Theory, which warns that too much debt can slow down economic progress.

Empirical Review

The impact of external debt on Nigeria's economic growth has been a subject of extensive academic inquiry, reflecting on how an emerging economy manages its fiscal policy and economic growth. This review collates findings from recent scholarly research to define the complex relationship between external debt and economic growth in Nigeria. This review examines recent studies to explain how borrowing money outside the country affects Nigeria's economy and growth. The historical investigation into the impact of external debt begins with Muhammad and Abdullah (2020), who examined the Impact of External Debt Servicing on economic growth in Nigeria using the Autoregressive Distributed Lag (ARDL) model and data spanning from 1985 to 2018. Their findings revealed that external debt servicing negatively affects economic growth in the long run. This adverse effect was attributed to the depletion of government resources through debt repayment, which reduces funding available for essential services and development projects. Building on this perspective, Ajayi and Edewusi (2020) explored the heterogeneous effects of public debt on economic growth. Using advanced econometric techniques to analyze panel data

across 115 countries from 1995 to 2016, they discovered contrasting effects: domestic debt positively influences economic growth, while external debt negatively impacts it in both the short and long term. This nuanced finding highlights the importance of debt composition and management in determining its developmental impact. Similarly, Yusuf and Mohd (2021) further emphasized the need for strategic debt utilization, recommending that external debt should be directed toward growth-enhancing sectors. The country can improve its repayment capacity by channelling borrowed funds to productive investments, such as infrastructure and industrial development, while fostering steady economic growth.

Further insights were provided by Gómez-Puig et al., who studied the Heterogeneous Effects of Public Debt on Economic Growth. Employing the Grouped Fixed Effects (GFE) estimator and a multinomial logit model, the study examined how public debt affects economic growth differently across countries. Their findings highlighted that the impact of public debt on growth is moderated by factors such as institutional quality and the proportion of productive expenditure. For Nigeria, this suggests that enhancing governance and expenditure efficiency could amplify the positive effects of public debt. Most recently, Okeke et al. (2023) examined the Relationship Between External Debt and Economic Growth in Nigeria using the ARDL technique with annual data from 1981 to 2021. Their study revealed a positive and significant relationship between external debt and economic growth, highlighting the potential of external debt to catalyze growth when used judiciously for infrastructure and other productive investments. Experts agree that managing debt wisely and investing borrowed money in the right areas is crucial. Researchers like Yusuf and Mohd (2021) and Akanbi et al. (2022) point out that external debt should be used in sectors that boost sustainable growth. If Nigeria uses borrowed funds efficiently, it can cover repayment costs while building a stronger economy. This shows that debt can be a valuable tool for development, but only when it is carefully planned and used effectively.

Empirical Gap

This study addresses the empirical gap by resolving the mixed findings in the literature regarding the impact of external debt on Nigeria's economic growth. While some studies highlight the positive effects of external borrowing for financing development, others emphasize its negative implications due to debt servicing burdens. This research provides an updated analysis through 2022, incorporating exchange rates, inflation and federal government capital expenditure as a critical control variable to offer deeper insights into how external debt influences Nigeria's economic performance.

RESEARCH METHODOLOGY

Research Design

This study uses the Auto-Regressive Distributed Lag (ARDL) model to examine the relationship between external debt and economic growth in Nigeria. The analysis is based on quarterly time-series data spanning 2010 to 2022. External debt levels serve as the independent variable, the GDP growth rate as the dependent variable, and several control variables, including the exchange rate,

inflation, and federal government capital expenditure. This framework is designed to examine the impact of external debt, both direct and indirect, on Nigeria's economic performance.

Description of Variables in the Model

The study incorporates three variables to explore the relationship between external debt and economic growth in Nigeria:

Independent Variable

- **External Debt (EXTD)**: This variable quantifies the extent of Nigeria's reliance on foreign borrowing to finance its financial needs. It serves as a key determinant of the economic impact of external debt.

Dependent Variable

Economic Growth (GDP Growth Rate): This study uses the GDP growth rate as a tool for measuring economic growth as per previous studies by (Akanbi et al., 2022)

where:

$$GDP = C + I + G + (X - M)$$

- **C** = Consumption (household spending)
- **I** = Investment (business spending on capital)
- **G** = Government Spending (expenditure on public goods and services)
- **(X - M)** = Net Exports (exports minus imports)

GDP is a function of key components, including consumption (C), investment (I), government spending (G), and net exports (X - M). These components interact with the variables of this study, such as external debt, exchange rates, inflation, and government capital expenditure. For example, external debt can influence government spending if borrowed funds are directed toward infrastructure or development projects. In contrast, exchange rates influence net exports by changing the competitiveness of goods in global markets. Inflation impacts consumption and investment by reducing purchasing power, and government capital expenditure directly contributes to economic growth through long-term investments.

Control Variable:

a. **Exchange Rate (EXCH)**

The exchange rate represents the value of the Nigerian Naira relative to foreign currencies. It is a control variable to account for its impact on the relationship between external debt and economic growth. The exchange rate affects the cost of servicing external debt in local currency, influencing the country's balance of payments and debt sustainability (Oladipupo & Onotaniyohuwo, 2011).

b. **Inflation (INFLA)**

Inflation measures the rate at which the general price level for goods and services rises, eroding purchasing power. It is usually measured using the Consumer Price Index (CPI) or the Producer Price Index (PPI). This variable captures the broader economic environment that may impact on the debt-growth relationship (Mankiw, 2019).

c. **Federal Government Capital Expenditure. (FGCE)**

Federal government capital expenditure refers to the amount allocated and spent on long-term investments, developmental projects, and assets to promote economic growth and improve service delivery (Miar et al., 2024).

These variables will be used to construct the model to analyze how changes in external debt levels impact Nigeria's economic growth.

Model Specification

In this study, we employed the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration, as proposed by Pesaran & Shin (1999) and extended by Pesaran et al. (2001). This method is particularly suited for examining long-run relationships and short-run dynamics between variables, even when the variables have mixed integration orders (I(0) or I(1)).

The ARDL model for this study is specified as follows:

$GDP_t = \alpha + \sum_{i=1}^{p} \beta_i GDP_{t-i} + \sum_{j=1}^{q} \gamma_j DEBT_{t-j} + \sum_{k=1}^{r} \delta_k EXCH_{t-k} + \sum_{l=1}^{s} \phi_l INF_{t-l} + \sum_{m=1}^{t} \theta_m FGCE_{t-m} + \epsilon_t$

Where:

- GDP_t: Gross Domestic Product growth rate at time t (dependent variable).
- $DEBT_t$: External debt levels at time t.
- $EXCH_t$: Exchange rate at time t (control variable representing currency valuation impacts).
- INF_t: Inflation rate at time t (new control variable, reflecting economic uncertainty and price level changes).
- $FGCE$: Federal Government Capital Expenditure at time t (control variable representing public investment in capital projects).
- $\alpha, \beta_i, \gamma_j, \delta_k, \phi_l, \theta_m$\alpha, \beta_i, \gamma_j, \delta_k, \phi_l, \theta_m$\alpha, \beta_i, \gamma_j, \delta_k, \phi_l, \theta_m$: Parameters to be estimated.
- ϵ_t\epsilon_tϵ_t: Error term representing unobserved factors.
- p, q, r, s, t: Lag orders for the respective variables, determined using the Akaike Information Criterion (AIC) or Schwarz Bayesian Criterion (SBC).

1. GDP Growth Rate (GDP_t): This measure measures the dependent variable, representing the overall economic performance and growth rate.
2. External Debt (DEBT) is the key explanatory variable, capturing the impact of debt levels on GDP growth.
3. Exchange Rate ($EXCH_t$): Control variable to account for the influence of currency valuation on trade and investment.
4. Inflation (INF_t): Newly added control variable to capture the effect of price stability and economic uncertainty on growth.
5. Federal Government Capital Expenditure ($FGCE_t$) is the Control variable representing public investment in infrastructure and development projects, significantly influencing growth.

Methods of Data Collection

In this study, the data collection instrument was document analysis of secondary data sourced from credible institutions. These include reports and databases from the Debt Management Office of Nigeria, the Central Bank of Nigeria, and the World Bank. The data were extracted and organized using Microsoft Excel to ensure consistency and facilitate analysis. Quarterly time-series data from 2010 to 2022 were retrieved for external debt, GDP growth rate, exchange rates, inflation, and federal government capital expenditure.

Summary of Variables, Proxies, Data Sources

Variable	Type	Proxy/Measure	Source of Data	Short Name
External Debt	Independent	Total external debt in USD	Debt Management Office	EXTD
GDP Growth Rate	Dependent	Percentage change in GDP	World Bank Database	GDPG
Exchange Rate	Control	Naira/USD exchange rate	Central Bank of Nigeria	EXCH
Inflation	Control	Consumer Price Index (CPI)	Central Bank of Nigeria	INFLA
Federal Govt. Capital Expenditure	Control	Total capital expenditure (Naira)	Central Bank of Nigeria	FGCE

Estimation Technique

This research employs the Auto-Regressive Distributed Lag (ARDL) model to explore the dynamic relationship between external debt and economic growth in Nigeria, using the exchange rate as the control variable. The model employed in this research is a multiple regression model developed using time-series data collected specifically for this study. The Auto-Regressive Distributed Lag (ARDL) model has been widely used for many years to study how different economic factors relate to each other over time using a simple, single-equation approach \(Kripfganz & Appendix, 2016). The ARDL approach was chosen because it is flexible in handling variables regardless of their stationarity status, whether I(0) or I(1). This is particularly useful given the mixed integration order likely present in the fiscal and economic data used.

Empirical Procedure

The estimation process begins with model identification, where unit root tests are conducted to determine the order of integration for all variables. Although the ARDL framework accommodates variables integrated at levels I(0) and first differences I(1), this step ensures that none of the variables is integrated at the second order I(2), which could invalidate the bounds testing procedure (Pesaran & Shin, 1999). By confirming the integration orders, we maintain the validity of the ARDL method and its cointegration testing capabilities. Next, the appropriate lag length selection is performed for the variables using the Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC). Selecting the optimal lag length is crucial to balancing model complexity and explanatory power (Liew, 2004). Overfitting the model by including too many lags could lead to inefficiency and multicollinearity, while underfitting may omit relevant dynamics and produce

biased results. Lag length selection is a critical component in time series modelling (Asghar & Abid, 2007). The cointegration testing step involves applying the bounds-testing approach within the ARDL framework. This method tests for a long-run equilibrium relationship between GDP growth, external debt, and control variables such as exchange rate, inflation, and federal government capital expenditure. The F-statistic obtained from the bounds test is compared against critical value bounds provided by Pesaran, Shin, and Smith (2001) to determine the presence of cointegration. Once cointegration is established, long-run coefficients are estimated to determine the equilibrium relationships between GDP growth and its determinants. These coefficients provide insights into the sustained effects of external debt and control variables on economic growth, helping policymakers design long-term stability and fiscal sustainability strategies. The model incorporates an Error Correction Model (ECM) derived from the ARDL specification to understand short-term dynamics as demonstrated by (Matashu & Skhephe, 2022). The ECM includes a lagged error correction term representing the speed of adjustment toward equilibrium after a shock. This term's negative and statistically significant coefficient implies that the system is dynamically stable and tends to correct deviations from the long-run equilibrium. This step captures the short-run responses of GDP growth to changes in external debt and other macroeconomic variables, as demonstrated by (Akanbi et al., 2022), offering a dual perspective on growth dynamics. Lastly, to validate the robustness and reliability of the model, diagnostic tests such as serial correlation, heteroscedasticity, and stability assessments are performed, as exemplified by (Nisa, 2022). These steps enable the ARDL model to provide an all-encompassing framework for investigating the short-run and long-run relations between GDP growth and its determinants. The insights derived are theory-based and also robust empirically. This dual perspective is very important for policymakers who aim to address short-term economic challenges while providing sustainable long-term growth paths.

DATA ANALYSIS AND RESULT

4.1 Descriptive Analysis

Table 4.1

	GDP	EXT_DEBT	EXCH	INFLA	FGCE
Mean	450.3900	1.75E+10	258.0926	6.131178	1425.013
Median	440.8390	1.13E+10	255.8817	5.905194	1108.390
Maximum	574.1838	4.17E+10	450.1413	14.97653	3133.820
Minimum	366.9904	4.27E+09	150.4600	0.677361	653.6100
Std. Dev.	56.30351	1.21E+10	100.0387	3.971933	758.4299
Skewness	0.520353	0.646882	0.399337	0.428372	1.005823
Kurtosis	2.774571	1.971018	1.743431	2.371412	2.768278
Jarque-Bera	2.456758	5.920696	4.803167	2.446452	8.884234
Probability	0.292767	0.051801	0.090574	0.294279	0.011771
Sum	23420.28	9.09E+11	13420.81	318.8212	74100.68
Sum Sq. Dev.	161674.4	7.48E+21	510394.3	804.5889	29336008
Observations	52	52	52	52	52

Source: Eviews 10 output

NOTE:

- **GDP:** Gross Domestic Product growth rate, measured as the annual percentage change in real GDP.

- **EXT_DEBT:** External debt, representing the total amount of debt a country owes to foreign creditors, measured in naira (₦).
- **EXCH:** Exchange rate, defined as the annual average value of the naira relative to the US dollar.
- **INFLA:** Inflation rate, measured as the annual percentage change in the Consumer Price Index (CPI).
- **FGCE:** Federal Government Capital Expenditure, measured in billions of naira (₦).

The result in Table 4.1 above shows the distribution of the variables used. The minimum GDP within this period is 366.99, and the maximum is 574.18 million Dollars. All the data are normally distributed with the Jarque-Bera P-value greater than 0.05 at a 95% confidence interval for rejecting the null hypothesis of normality of data.

Table 4.2 Test for Stationarity (Unit Root Test)

Variable	Count	t-Statistic	Prob.*	Status
GDP	52	-3.084520	0.0352	I(1)
ED	52	-7.305045	0.0000	I(1)
EXCH	52	-6.500596	0.0000	I(1)
INFLA	52	-4.207513	0.0016	I(1)
FGCE	52	-7.198068	0.0000	I(1)

Source: Authors Computation

Hypothesis

H0: Variable has a unit root (Variable is non-stationary)

H1: Variable has no unit root (Variable is Stationary)

The result in Table 4.2 shows the stationarity level of the variables. GDP, ED, EXCH, INFLA and FGCE are stationary of order 1 (i.e. they attain stationarity at first difference) (I (1)) with P-values of 0.0352, 0.0000, 0.0000, 0.0016 and 0.0000 respectively, which are less than 0.05 at 95% confidence interval for accepting the null hypothesis of non-stationary (i.e. has unit root). Therefore, reject the null hypothesis, indicating the data set series is stationary (See Appendix)

Table 4.3: VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria

Endogenous variables: GDP

Exogenous variables: C EXT_DEBT
EXCH INFLA FGCE

Sample: 1 52

Included observations: 48

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-232.8592	NA	1180.487	9.910801	10.10572	9.984460

1	-216.1483	29.24419*	613.7666*	9.256177*	9.490077*	9.344569*
2	-216.1483	7.11e-06	640.3797	9.297844	9.570727	9.400967
3	-215.6734	0.791341	655.2317	9.319727	9.631594	9.437582
4	-214.3730	2.113237	647.9546	9.307208	9.658058	9.439795

Source: Eviews 10 output.

LR: sequential modified LR test statistics (each test at p-value 0.05 level)

FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The VAR Lag Order Selection result in Table 4.3 above selected Lag (1) as the optimum leg for estimating the long-run relationship with the Akaike information criterion (AIC) value of 9.256177. Therefore, the Autoregressive Distributed Lag will be computed based on the result.

Table 4.4: Bound Test (Test for Long or Short Run Relationship)

Model	F-Statistic	Signif.	I(0)	I(1)	Decision
ARDL (1, 0, 0)	3.741933	5%	2.86	4.01	Undefined, Estimate ARDL & ECM. Short & Long Run Model
Model	**t-Statistic**	**Signif.**	**I(0)**	**I(1)**	**Decision**
ARDL (1, 0, 0)	-3.417647	5%	-2.86	-3.99	Undefined, Estimate ARDL & ECM. Short & Long Run Model

Source: Authors' computation

Decision rule:

If the F or t-statistic value is less than the I(0) value, do not reject the null hypothesis of a no-level relationship; instead, estimate Auto Regressive Distributed Lag (ARDL). However, if the F or t-statistic value is greater than the I(0) value, reject the null hypothesis of a no-level relationship and conclude that there exists a long-run relationship; then, estimate the Error Correction Model (ECM).

From the result in Table 4.4, the F-statistics (3.741933) is neither less than I(0) nor greater than I(1). Therefore, we examined both short-run and long-run relationships. We then estimated Autoregressive Distributed Lag (ARDL) and Error Correction Model (ECM).

Table 4.5a: ARDL Short Run Result

Dependent Variable: GDP
Method: ARDL

Sample (adjusted): 2 52
Included observations: 51 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): EXT_DEBT EXCH INFLA FGCE
Fixed regressors: C
Number of models evaluated: 16
Selected Model: ARDL(1, 0, 0, 0, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP (-1)	0.663353	0.098502	6.734385	0.0000
EXT_DEBT	5.97E-10	1.49E-09	0.399582	0.6914
EXCH	-0.247255	0.139703	-1.769861	0.0835
INFLA	3.680159	1.580989	2.327758	0.0245
FGCE	0.033920	0.012710	2.668784	0.0105
C	135.6323	48.63785	2.788616	0.0077

R-squared	0.846606	Mean dependent var		452.0253
Adjusted R-squared	0.829563	S.D. dependent var		55.60261
S.E. of regression	22.95502	Akaike info criterion		9.215081
Sum squared resid	23711.98	Schwarz criterion		9.442355
Log-likelihood	-228.9846	Hannan-Quinn criteria.		9.301929
F-statistic	49.67255	Durbin-Watson stat		1.851038
Prob(F-statistic)	0.000000			

*Note: P-values and any subsequent tests do not account for the model
    selection.
Source: EViews 10 output.

Table 4.5b: Error Correction Model (Long Run Model)

Dependent Variable: D(GDP)
Method: Least Squares
Sample (adjusted): 3 52
Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.749830	4.008180	-0.187075	0.8525
D(GDP(-1))	0.644138	0.242645	2.654647	0.0111
D(EXT_DEBT)	-4.23E-10	2.91E-09	-0.145295	0.8852
D(EXCH)	-0.061845	0.207757	-0.297679	0.7674
D(INFLA)	4.509617	1.820755	2.476784	0.0173
D(FGCE)	0.049511	0.015078	3.283695	0.0020
ECM (-1)	-0.932777	0.293711	-3.175835	0.0028

R-squared	0.334882	Mean dependent var		2.112684
Adjusted R-squared	0.242075	S.D. dependent var		26.17303
S.E. of regression	22.78595	Akaike info criterion		9.219343
Sum squared resid	22325.58	Schwarz criterion		9.487026
Log-likelihood	-223.4836	Hannan-Quinn criteria.		9.321278
F-statistic	3.608362	Durbin-Watson stat		2.001142
Prob(F-statistic)	0.005501			

Source: EViews 10 output.

P-value at 0.05 significance level.

The short-run result in Table 4.5a shows that the previous value of GDP has a positive and significant effect on the current GDP. The result also shows that Inflation and Federal government Capital expenditure positively affect GDP. External Debt and Exchange rates, on the other hand, had a negative and non-significant effect on GDP. The overall model was also a good fit with **the F-statistics of 69.6726 and the P-value of the F-statistics of 0.0000,** which is statistically significant. The Durbin-Watson stat also indicated that there was little autocorrelation among the variables. The long-run result in Table 4.5b shows that the previous value of GDP has a positive and significant effect on the current GDP. The result also shows that Inflation and Federal government Capital Expenditure positively affect GDP. External Debt and Exchange rates, on the other hand, had a negative and non-significant effect on GDP. The overall model was also a good fit with **the F-statistic of 3.6084** and the **P-value of the F-statistic of 0.0055,** which is statistically significant. The Durbin-Watson stat also indicates that there is no autocorrelation among the variables. The R-squared result shows that 33.49% of the changes in GDP can be explained by all the independent variables combined.

Table 4.6: Serial Correlation LM Test Result

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.031580	Prob. F (2,41)	0.9689
Obs*R-squared	0.076907	Prob. Chi-Square (2)	0.9623

Hypothesis

H0: No Serial Correlation
H1: Presence of Serial Correlation
The result in Table 4.6 shows that the null hypothesis cannot be rejected with a P-value of 0.9689, which is a greater than 0.05 significance level at a 95% confidence interval for rejecting the null hypothesis. This implies that the ECM is a good fit.

Table 4.7: Test For Heteroskedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.403696	Prob. F (6,43)	0.2353
Obs*R-squared	8.189246	Prob. Chi-Square (6)	0.2246
Scaled explained SS	17.03391	Prob. Chi-Square (6)	0.0092

Hypothesis
H0: Homoskedasticity
H1: Heteroskedasticity
The result in Table 4.7, with the probability of its F-statistic (0.2353), shows that we cannot reject the null hypothesis of Homoskedasticity. Therefore, the model is free from Heteroskedasticity, and it is a good fit.
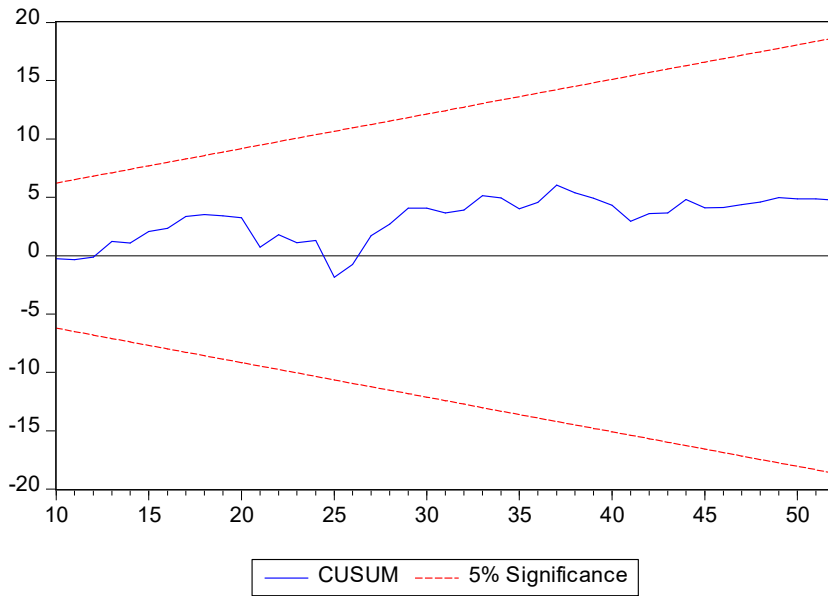
Figure 4.1 Stability result

SUMMARY, CONCLUSION & RECOMMENDATION

Summary of Findings

The study investigated the impact of external debt on Nigeria's economic growth using various econometric models and tools. Descriptive analysis showed that the data was normally distributed, and all variables achieved stationarity at the first difference (I(1)), as confirmed by the unit root test. The VAR lag order selection identified Lag 1 as the optimal Lag for estimation. Bound test results indicated an inconclusive relationship, prompting further analysis using the Autoregressive Distributed Lag (ARDL) and Error Correction Model (ECM).

The ARDL estimation in the short run showed that inflation and federal government capital expenditure positively and significantly influenced GDP growth. At the same time, external debt and exchange rates had negative but insignificant influences. The previous year's GDP exhibited a strong positive impact on current GDP. The model fit was confirmed with a statistically significant F-statistic ($p < 0.01$) and no significant autocorrelation, as indicated by the Durbin-Watson statistic. The ECM (long-run model) corroborated these findings, revealing a similar positive impact of inflation and capital expenditure on GDP growth. At the same time, external debt and exchange rate remained negative and non-significant. The error correction term (ECM(-1)) was statistically significant, indicating the model's ability to correct deviations from long-run equilibrium. Diagnostic tests confirmed the absence of serial correlation and heteroskedasticity, attesting to the model's reliability.

Conclusion

The study shows that external debt does not significantly impact Nigeria's economic growth in the short or long term. While external debt is often used to fund development, its negative but non-significant effect suggests that it is not being used effectively to drive growth. Conversely, inflation and federal government capital spending positively impact economic growth. This highlights the importance of sound fiscal policies and focused government investments in boosting the economy. The hypothesis test supports these findings. The null hypothesis, which states that external debt does not significantly affect Nigeria's economic growth, cannot be rejected. This means the data does not support the alternative hypothesis, which suggests that external debt does have a significant impact.

In conclusion, although external debt has not contributed to Nigeria's growth as anticipated, effective government spending and careful inflation management are crucial in strengthening the economy.

Recommendations

Based on the findings of this study, the following recommendations are proposed to enhance Nigeria's economic stability and growth while managing external debt:

1. Improve Debt Utilization Efficiency

   Policymakers should ensure external debt is deployed to productive sectors that generate economic returns, such as infrastructure, education, and healthcare. This can enhance its contribution to economic growth.

2. Strengthen Debt Management Practices

   Establishing robust debt management frameworks and ensuring transparency in borrowing decisions are essential to avoid unsustainable debt accumulation and ensure accountability in its utilization.

3. Enhance Fiscal Discipline and Expenditure Efficiency

   Inflation and government capital expenditure significantly influence GDP. Efforts should be made to control inflation through sound monetary policies while ensuring that government spending is directed towards high-impact projects.

4. Monitor Exchange Rate Volatility

   Although the exchange rate's impact was negative and non-significant, its influence on other economic variables necessitates policies aimed at stabilizing the naira to enhance investor confidence and economic stability.

5. Encourage Long-Term Economic Planning

   The significant role of past GDP in influencing current GDP underscores the need for long-term economic policies that build on sustainable growth trajectories.

   By adopting these measures, Nigeria can mitigate the adverse effects of external debt and harness its potential as a tool for economic growth**.**

Appendix

F-Bounds Test			Null Hypothesis: No levels of relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	2.761545	10%	3.17	4.14
k	2	5%	3.79	4.85
		2.5%	4.41	5.52
		1%	5.15	6.36
Actual Sample Size	51	Finite Sample: n=55		
		10%	3.28	4.273
		5%	3.987	5.09
		1%	5.707	6.977
		Finite Sample: n=50		
		10%	3.333	4.313
		5%	4.07	5.19
		1%	5.817	7.303

t-Bounds Test			Null Hypothesis: No levels of relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-2.814757	10%	-2.57	-3.21
		5%	-2.86	-3.53
		2.5%	-3.13	-3.8
		1%	-3.43	-4.1

Null Hypothesis: EXCH has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.421372	0.9820
Test critical values:	1% level	-3.565430	
	5% level	-2.919952	
	10% level	-2.597905	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(EXCH) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.500596	0.0000
Test critical values:	1% level	-3.568308	
	5% level	-2.921175	
	10% level	-2.598551	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: ED has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.823980	0.9997
Test critical values:	1% level	-3.565430	
	5% level	-2.919952	
	10% level	-2.597905	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(ED) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.305045	0.0000

Test critical values:	1% level	-3.568308
	5% level	-2.921175
	10% level	-2.598551

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: GDP has a unit root

Exogenous: Constant

Lag Length: 8 (Automatic - based on AIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.030912	0.2730

Test critical values:	1% level	-3.592462
	5% level	-2.931404
	10% level	-2.603944

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(GDP) has a unit root

Exogenous: Constant

Lag Length: 7 (Automatic - based on AIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.084520	0.0352

Test critical values:	1% level	-3.592462
	5% level	-2.931404
	10% level	-2.603944

*MacKinnon (1996) one-sided p-values.

Dependent Variable: GDP

Method: ARDL

Date: 04/30/24   Time: 11:36

Sample (adjusted): 2010Q2 2022Q4

Included observations: 51 after adjustments

Maximum dependent lags: 1 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (1 lag, automatic): ED

Fixed regressors: C

Number of models evaluated: 2

Selected Model: ARDL (1, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP (-1)	0.875310	0.063425	13.80072	0.0000
ED	-1.22E-11	2.98E-10	-0.040884	0.9676
C	58.39239	29.45256	1.982591	0.0532

R-squared	0.799019	Mean dependent var	452.0253
Adjusted R-squared	0.790645	S.D. dependent var	55.60261
S.E. of regression	25.44114	Akaike info criterion	9.367635
Sum squared resid	31068.08	Schwarz criterion	9.481272
Log-likelihood	-235.8747	Hannan-Quinn criteria.	9.411059
F-statistic	95.41451	Durbin-Watson stat	1.921025
Prob(F-statistic)	0.000000		

*Note: P-values and any subsequent tests do not account for the model

   selection.

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