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The Impact of Public Debt on Fiscal Sustainability in Nigeria

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ABSTRACT

This paper systematically investigates the disaggregated effects of public debt on fiscal stability in Nigeria from 1980 to 2022, a period marked by structural adjustments, fiscal crises, oil price volatility, and changing debt management practices. After obtaining stationarity, data was analysed using the Autoregressive Distributed Lag (ARDL) approach. The results indicate that domestic debt, debt service payments, foreign reserves, currency rates, and private investment all contribute to macroeconomic instability. Foreign direct investment inflows improved fiscal stability in the long and short term. External debt, interest rates, and trade openness all have different immediate and long-term repercussions. Despite the fact that public borrowing is a crucial tool for promoting development, the results show that Nigeria's debt profile has been undermined by poor revenue capacity, ongoing fiscal deficits, governance issues, and inefficient use of borrowed funds. To reduce vulnerability to external shocks, the study suggests strengthening domestic revenue mobilization, prioritizing concessional borrowing, improving debt management transparency, increasing public investment efficiency, and diversifying the economy. These steps are critical for achieving sustainable debt management and ensuring that public borrowing contributes meaningfully to long-term economic growth.

Keywords: ARDL Co-Integration; Debt Overhang; Debt Servicing; Fiscal Sustainability; Public Debt; Nigeria

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1. Introduction

Fiscal policy pertains to the government's measures to steer the economy by regulating borrowing, spending, and taxation in order to attain particular macroeconomic objectives. The Washington Consensus outlined three key goals for fiscal policy, among other things: maintain fiscal restraint to prevent the instability of the economy brought on by profligate debt issuance or money creation; direct public spending towards essential services like infrastructure, welfare, education, and healthcare rather than sectoral subsidies with questionable social and economic benefits; and increase tax revenues from a wide tax base while upholding modest marginal tax rates^[1]. Fiscal policy aims to improve both economic and social progress by implementing sustainable macroeconomic initiatives that balance government expenditure, borrowing, and revenue in order to foster long-term, sustainable growth. Fiscal policy has a crucial role in fostering stable and balanced economic growth in advanced as well as developing nations^[2].

The need for faster economic growth and development in emerging countries has driven governments to run continual budget deficits, which are funded by both foreign and domestic borrowing. Public debt has become one of the most serious macroeconomic concerns confronting developing nations, notably in Sub-Saharan Africa. Nigeria's public debt stock has increased significantly since the debt relief gains under the Highly Indebted Poor Countries (HIPC) program, as the government borrows to address recurring fiscal deficits, declining oil revenue, increasing public spending, and structural economic challenges^[3]. Nigeria has relied significantly on both foreign and internal borrowing to finance infrastructure, stabilize the economy, and support public investment during periods of income shortfalls. However, since the mid-2010s, worries have grown regarding the sustainability of the country's debt trajectory, especially as debt servicing costs now form one of the major components of yearly public expenditure. Concerns regarding potential macroeconomic instability, the Sustainable Development Goals (SDGs), and other regional development goals have been raised by these trends^[4].

The Nigerian economy is confronting a severe issue as public debt burdens hit new highs, which have ramifications for economic growth, macroeconomic stability, and social

development. According to the country's Debt Management Office, Nigeria's total public debt climbed from 39.56 trillion Naira (95.78 billion dollars) in 2021 to 97,340,708.25 trillion Naira (108,229.34 billion dollars) in 2023. Similarly, Nigeria's debt-to-GDP ratio increased from 22.47% in 2021 to 42.34% in 2023, exceeding the 40% guideline by 2.34%. This suggests that the debt-to-GDP ratio is rising faster than planned due to increased borrowing and the economy's lacklustre growth. Deficit financing also grows by about 370%, from 2.41 trillion Naira in 2016 to 11.34 trillion Naira in 2023^[5]. On the other hand, the government's total revenue in 2021 was 5.51 trillion Naira, but it climbed to 11.88 trillion Naira in 2023, with 7.66 trillion Naira spent on debt servicing that year. Though there was a 4.22 trillion Naira surplus after debt servicing that year, the rate of increase in debt stock underscores the critical need for policy adjustments to mitigate Nigeria's debt burden.

Nigeria's debt service-to-revenue ratio has escalated significantly, increasing from 81.1% in 2020 to 99.9% in 2021, 118.9% in 2022, and 149% in 2023, hence raising concerns about financial stability, long-term growth, and fiscal sustainability^[6]. In 2022, interest payments as a proportion of total government revenue surpassed 90%. Higher debt risks and borrowing costs have been caused by currency devaluation, rising interest rates, and increasingly difficult global economic conditions. While Nigeria's total public debt-to-GDP ratios remained within some international thresholds, debt service relative to government revenue has reached levels that threaten fiscal space and public investment, with the Debt Management Office (2022)^[7] identifying debt-service-to-revenue ratios as a primary vulnerability for Nigeria's debt profile. This development has prompted issues about whether the country's expanding debt portfolio supports or hinders economic growth.

The International Monetary Fund^[8] has also warned that rising interest rates and adverse external factors, such as tighter global financing conditions or exchange-rate pressures, could significantly increase Nigeria's debt-service burden and hinder growth-oriented investment. Nigeria's interest-to-revenue and debt-service indices were exceptionally significant in recent years, limiting the government's ability to finance public investment without incurring more fiscal stress. Excessive accumulation of debt in emerging nations can lead to debt overhang, inhibit private invest-

ment, and diminish fiscal capacity. In Nigeria, the situation is exacerbated by poor revenue mobilization, a reliance on fluctuating oil revenue, and recurring budget deficits^[9].

Nigeria's expanding public debt burden, combined with limited budgetary flexibility and recurrent shocks, remains a significant development problem. Since the 1980s, when oil prices fell sharply, the budget has been funded by increased borrowing. In contrast to the 1980s debt crisis, which was primarily influenced by obligations to multilateral institutions, the present debt burden predominantly stems from commercial and bilateral borrowing, facilitated by enhanced access to international financial markets and China's emergence as a major creditor^[3]. Furthermore, Nigeria's fiscal vulnerabilities have grown unsustainably, with government expenditure outpacing domestic revenue growth. Elevated debt levels diminish a nation's capacity to address economic shocks. Similarly, Nigeria's overall deficit level is difficult to manage given its low foreign reserves. Rising budget pressures and economic concerns may lead to increased policy volatility^[10].

While public borrowing is designed to finance development initiatives, its effectiveness is primarily determined by how well it is handled and whether it results in productive investment. However, rapid debt accumulation puts the country at risk of being unable to service debts and interest, weakening national economic stability, creating deeper financial vulnerabilities, and causing catastrophic economic distortions such as financial instability, reduced fiscal space, decreased investment, and slower growth. The Nigerian government has borrowed heavily in recent decades to cover the country's mounting budget deficits and infrastructure gaps, which are fuelled by a weak tax base, raising concerns about fiscal policy's sustainability and the extent to which borrowing has translated into productive investments that boost long-term growth. However, meeting the current generation's development demands must not jeopardize future generations' ability to meet their own requirements in the same economy. Since effective debt management techniques are critical for sustainable growth in developing economies, understanding whether rising debt levels promote or impede economic growth in Nigeria becomes topical for evidence-based policymaking, determining the viability of the current debt management strategy, and directing fiscal and monetary policy improvements. The study therefore addresses the key

question of how public debt influences fiscal sustainability in Nigeria and provides insights into policy measures to enhance fiscal stability and drive economic growth.

Consequently, this study extensively analysed the disaggregated impact of public debt on fiscal sustainability in Nigeria and provided insights into increasing fiscal stability, eliminating poverty, and fostering inclusive growth. Utilizing 43 years of annualized data from 1980 to 2022 and a more reliable Autoregressive Distributed Lag (ARDL) bounds testing technique, this study goes beyond earlier research that has historically concentrated solely on the debt-GDP growth relationship to establish a nexus between the sustainability of government fiscal policies and macroeconomic performance. The results of the study can be used by policymakers to enhance domestic resource mobilization, boost government spending efficiency, encourage fiscal sustainability evaluation, implement a prudent debt management plan, and promote inclusive economic growth. The paper is organized into five sections. Following the introduction, part two provides an exposition of the theoretical framework, and section three addresses methodological issues and study tools. Section four presents and examines the empirical findings, while section five summarizes the study's results and makes policy suggestions based on them.

2. Literature Review

2.1. Theoretical Underpinnings

A key component of macroeconomic stability, especially for developing nations like Nigeria, is debt dynamics and fiscal sustainability. Comprehending the way these two elements interact is crucial for policymakers to create plans that guarantee sustained economic growth. Public debt sustainability is widely defined as ensuring that accumulated debt can be serviced on a continuing basis without causing significant strain on public resources. Fiscal sustainability typically refers to the government's ability to service its debt over time without requiring implausible adjustments to revenues or expenditures. Economic growth, particularly in developing nations, depends on debt funding. Strategic debt financing can stimulate long-term development when used to fund growth-promoting projects and efficiency-enhancing reforms. However, excessive debt may be a major issue for developing nations, possibly impeding their advancement

toward sustainability^[10].

The rationale for deficit financing and its impact on the macroeconomy is viewed differently by economists from various schools of thought. Three schools of thought exist in the theoretical literature regarding the necessity of budget deficits and their effects on the economy: Keynesian, Ricardian, and Neoclassical. Admittedly, none of these theories is ideal or closer to reality, but their application is determined by the paradigm to which one subscribes.

Classical economics offered an uncommon viewpoint on public debt and its consequences on the economy. They felt that transferring money to the government for borrowing reduces savings, private investment, and employment because the money supply remains constant. They noticed that substantial government borrowing to sustain spending would raise interest rates and diminish private investment in the credit market, leading to the crowding out of private sector investment. They claim that government borrowing is always inefficient, detrimental to financial stability, and ethically wrong. Smith and other classical economists opposed the government's budget deficit, arguing that relying primarily on domestic debt hurts the economy. This is because debt repayment generates a rise in tax, resulting in capital flight and currency devaluation, which has a detrimental impact on manufacturers^[11].

According to classical economists, public borrowing should be used to finance war or growth efforts because the government is fundamentally inefficient. It should also be paid back as soon as possible to prevent penalties and interest from accruing. If not, governmental borrowing will weaken private sector credit availability and budgetary management, burden future generations and prevent long-term investment. Particularly when borrowed funds are utilized to pay for recurrent government expenses, which raise aggregate demand, the state's inefficiency reduces capital formation, which stifles economic progress and causes inflation^[12].

The Keynesian assumption contradicted the customary approach of regulating debt finance. It also questioned mainstream economists' belief that the government should always maintain a balanced budget. According to Keynesian theory, high amounts of government debt are advantageous rather than harmful. According to Gilbert and Raymond^[11], governments must engage in ongoing deficit spending to attain full employment and promote economic growth. The

Keynesians therefore support expansionary fiscal policies, highlighting the significance of government expenditure in boosting economic activity, particularly in recessions when labour market rigidities hinder the restoration of market processes to equilibrium. They contend that in order to increase aggregate demand and maintain the economy's trajectory toward full employment, public debt is necessary. However, excessive borrowing may lead to future tax increases, lowering consumption, curtailing investment and employment prospects^[13].

Some classical and neoclassical economists have critiqued Keynes' advocacy for fiscal incentives, contending that the crowding-out effect—whereby augmented public expenditure diminishes private goods and elevates interest rates, consequently constraining private investment and economic expansion—renders fiscal policies ineffectual. Other potential difficulties with fiscal stimulus include the time lag between policy implementation and observable economic effects, as well as inflationary consequences from increased demand. The Ricardian Equivalence theory asserts that the government's borrowing has no influence on national savings or consumption patterns. This assumes that reasonable economic actors adjust their savings based on their anticipation that future tax increases will pay off the government's debt^[14]. Government expenditure on infrastructure, health-care, education, and other critical areas is thought to have a positive economic impact since it increases aggregate demand and economic activity. This is referred to as the fiscal multiplier effect. Empirical studies indicate that the fiscal multiplier is more effective in low-debt countries, as government expenditure can promote significant growth without the adverse effects of elevated debt servicing costs. However, as growing debt commitments limit resources available for lucrative public investment, fiscal policy efficiency may decline in heavily indebted countries^[15].

The monetarists, spearheaded by Milton Friedman, championed reduced government involvement in the economy. They contend that the primary cause of the public budget deficit is the state's involvement in economic activity through loans, which led to inflation, a recession, and slower economic growth. Keynesian presumptions regarding the purpose and effectiveness of fiscal measures were completely rejected by Friedman's monetary school. The enduring income hypothesis, which challenges the efficacy

of taxation for public expenditure funding, and the “Crowding Out effect”, which casts doubt on the effectiveness of borrowing for government spending, were two significant notions to bolster this argument. A group of post-Keynesian economists created modern monetary theory in the 1990s, and it views money as a state product. Because it never runs out of money, the state can sustain itself by creating money^[16].

The debt overhang theory is one of the most popular theoretical explanations for how unmanageable governmental debt might impede economic expansion. Fundamentally, the theory states that when a nation’s debt load is deemed excessively high, the possibility of future taxes or austerity measures to pay down that debt lessens the incentive for investment. This disincentive impact causes stalled capital accumulation, slower productivity growth, and ultimately poorer long-term development outcomes. This effect is especially severe in underdeveloped countries because institutional shortcomings diminish the efficacy of borrowed funds^[17]. Since investors anticipate paying greater taxes on future earnings to repay the borrowed funds, a mounting debt stock deters fresh investment and leaves governments and the private sector with little incentive to undertake profitable projects. This implies that a tax disincentive caused by debt accumulation lowers fiscal stability^[18]. Additionally, the theory suggests a nonlinear relationship, meaning that above a certain threshold, the effect of debt on macroeconomic stability changes from positive to negative.

The crowding-out effect stems from neoclassical economic theory, which contends that when governments finance deficits through heavy borrowing from the domestic financial system, they compete with private investors for limited loanable funds. Interest rates rise in response to increased demand for cash, making borrowing more costly for private businesses. As a result, investment from the private sector declined, thus limiting economic expansion. According to the crowding-out hypothesis, economic stability is at risk because the debt load limits the government’s ability to invest in crucial infrastructure. It suggests that rising government debt will burden future generations, particularly in the long run. Interest rates increase when governments utilize public borrowing or debt monetization to fund fiscal deficits because this increases the demand for credit in the stock market. In contrast to the goal of fiscal consolidation,

this reduces overall demand for goods and services^[19]. This research sheds light on the intricate relationship between public debt, fiscal sustainability, and economic growth. It emphasizes the need for domestic resource mobilization and sustainable debt management practices to improve fiscal stability in Nigeria.

2.2. Empirical Review

The nexus between public debt and fiscal sustainability has attracted significant interest in the literature in view of the large fiscal deficits, debt overhang and the resultant retarded growth that characterized most of the developing countries of the world. This section reviews some of the cross-sectional and Nigerian empirical investigations. The overall indication, however, shows that massive and expanding debt levels result in debt vulnerabilities for many countries, with a growing number of countries slipping into a severe state of debt distress. The results of these research efforts have been unreliable, primarily due to country-specific peculiarities, faulty estimation techniques that deviate from data-generating procedures, and the susceptibility of results to modifications in the array of control variables analysed and the time period investigated.

Nouaili (2025)^[16] investigated the relative contributions of foreign debt, investment, financial stability, and governance quality to economic development in 47 African countries between 2002 and 2022 using the first-differenced Generalized Method of Moments estimation technique. The results indicate that external debt often promotes economic growth by channelling resources into lucrative investments; however, it starts to impede growth once it surpasses 53.49% of GDP. The beneficial effects of external debt on economic growth are highlighted by increased financial stability and better governance. Munawar et al. (2025)^[17] used the Non-linear Auto-regressive Distributed Lag approach to assess the influence of Pakistan’s public debt on inflation between 1983 and 2024. The findings revealed that, while lowering the public debt to GDP ratio has no effect, increasing it has a positive and considerable influence on inflation and leads roughly two-thirds of tax revenue to be spent on debt servicing, threatening the country’s financial stability.

Kumar et al. (2025)^[9] examined the relationship between public debt, governance, and sustainable development in 35 developing nations by analysing time series data from

1991 to 2020 using the Generalized Method of Moments-Panel Vector Autoregression (GMM-PVAR) estimate procedure. The results show that, up to a certain point—27.5% of GDP—public debt helps emerging nations move closer to sustainable development. However, as debt levels rise over this point, the positive impact quickly reverses.

Samson and Osaron (2025)^[10] used the generalized method of moments to examine the relationship between fiscal policy burden from public debt and economic development in Sub-Saharan African nations between 1990 and 2022. The empirical data revealed that the weight of fiscal policy during that period significantly impeded economic growth. Godwin adopted the Dynamic Ordinary Least Squares method, investigated how Nigeria's national debt affected budgetary sustainability between 1980 and 2022. An increasing debt load would lead to budgetary unsustainability, according to the empirical findings.

Abubakar et al. (2025)^[20] investigated the extent to which fiscal laws and debt relief can enhance national debt sustainability in Sub-Saharan African countries using the generalized method of moments and panel data from 2000 to 2019. The empirical results confirmed that when accumulated public debt is directed toward productive public investment, it can help stimulate economic activity, government revenues, and, as a result, a higher primary balance, which improves the government's fiscal space. Ciaffi et al. (2024)^[21] evaluated the impact of fiscal policy on public debt sustainability using an impulse response function estimation technique and a dataset of 14 OECD countries considered over the 1981–2017 timeframe. According to the research, all fiscal policy shocks have long-lasting detrimental consequences on GDP and the public debt-to-GDP ratio, but government productive investment is the best means of guaranteeing public debt sustainability.

Abindaw et al. (2023)^[22] examined the effect of public debt on fiscal sustainability in Sub-Saharan African nations using panel data from 1980–2017 and the panel vector autoregressive (PVAR) technique. The study's conclusions demonstrate a negative correlation between public debt-to-GDP ratios, economic expansion rates, and fiscal sustainability. Patenema (2022)^[23] used data from 1990 to 2017 and the Arellano and Bond estimating technique to assess the impact of gross public debt on the economic sustainability of 80 low-income African countries. The research findings

showed that while debt scaling up is linked to these nations' progress toward sustainability, a growth in public debt is correlated with a greater adjusted net saving rate.

Enock et al. (2021)^[24] used the fiscal response function and the ARDL estimation procedure to assess Uganda's national debt sustainability from 1981–1982 to 2016–2017. The empirical results show that the government has improved its primary balance as a long-term, sustainable response to rising debt. The government's immediate response to the debt load puts the long-term sustainability of the debt at risk. Using time series data from 1961 to 2016 and the Dynamic Ordinary Least Squares estimation method, Saibu (2018)^[25] examined the impact of fiscal sustainability on macroeconomic performance in Nigeria. The empirical data indicated a limited response to fiscal sustainability in economic performance over the research period.

The preceding empirical assessment reveals a few facts: first, the studies are largely panel-based, with conclusions that are not readily applicable to Nigeria and only a handful of studies on Nigeria. This absence of country-specific studies is a key gap in present studies, and filling it is critical for developing successful macroeconomic policies because it highlights the unique economic circumstances of each country. The results of a single regression estimate are often extrapolated over a wide variety of economies with different debt loads and fiscal policy features in panel-based research. Conclusions derived from cross-sectional analysis may be deceptive since the data are inappropriate for assessing the countries' changing patterns and cross-country regressions are based on extremely improbable assumptions that the real data rarely meet. The best way to study debt management and fiscal policy trends is at the country-specific level because developing countries are so diverse^[26].

Second, the estimation technique is an important aspect. Prior research frequently employs methodologies that do not adequately address issues of endogeneity, structural breaks, or the dynamic nature of Nigeria's macroeconomic environment. Previous Nigerian studies' two-stage least squares, VECM, OLS, and VAR estimation methods do not account for short-run fluctuations and long-run equilibrium behaviour, leading to inaccurate coefficient values for study variables and a methodology gap. In order to improve the validity of co-integration relationships between a variety of $I(0)$ and $I(1)$ variables—which function amazingly well

with small sample sizes—this study used the more reliable ARDL methodology. This method makes it objectively possible to address model selection, estimation, inference, and adjustment rate in order to return the economy to a long-term equilibrium growth path following a shock.

Additionally, the majority of Nigerian empirical studies that were reviewed chose their objective and control variables at random when modelling the association between public debt and economic growth, failing to take into account relevant variables described in the literature. To avoid variable omission bias and address the apparent inconsistency in factors examined in previous research, this study divided debt into external and domestic loans and included certain established growth-related variables as well as the structural break element in a single multivariate model. This comprehensive model architecture guarantees an improved assessment of the debt-growth link while increasing the depth, clarity, and policy relevance of current knowledge by focusing on the Nigerian context within a modern time-series framework.

The majority of the evaluated studies either focus on earlier periods before the sharp rise in Nigeria's public debt that began in 2015 due to falling global oil prices and an expanding fiscal deficit, or they are outdated. Furthermore, several recent studies either rely on narrow data ranges or neglect the post-COVID-19 budgetary situation, which significantly altered Nigeria's debt sustainability indices. This analysis employed a longer and more recent dataset covering 43 years, which included Nigeria's recent increase in public debt as well as post-2015 budgetary revisions. This technique offers a more modern perspective on the relationship between debt and growth. The significance of utilizing an extended time series array in any cointegration investigation cannot be overstated.

3. Data and Methodology

This study combined a quantitative approach and an ex-post facto research strategy to find empirical answers to research questions using current data. The design is appropriate since the study examines relationships between macroeconomic factors as well as historical economic data that have already occurred and cannot be modified by the researcher. The time series data used in this study are entirely secondary and were gathered from reputable sources

such as the Central Bank of Nigeria (CBN), Debt Management Office (DMO), National Bureau of Statistics (NBS), World Bank, and International Monetary Fund (IMF) statistical databases using the desk survey method. Secondary data was chosen because it had been reviewed by professionals and other regulatory entities before dissemination. Secondary data is more accurate, less expensive, and saves time. It has also been employed in previous investigations, with positive and dependable outcomes. Although the credibility of the secondary data employed is unquestionable, the risk of random errors has not been excluded.

Using macroeconomic data that has been scientifically confirmed, the study examined the connection between the dynamics of public debt and the efficacy of fiscal policy in fostering macroeconomic stability. The dependent variable was fiscal stability (proxied by Real Gross Domestic Product (RGDP)), and the independent variables were External Debt Stock (EDS), Domestic Debt Stock (DDS), Debt Service Payment (DSP), Foreign Reserve Position (FRP), Interest Rate (INTR), Exchange Rate (EXCR), Inflation Rate (INFR), Gross Fixed Capital Formation (GFCF), Foreign Direct Investment (FDI), and Trade Openness (TOPP). World Development Indicators provided data on real GDP, domestic investment, and trade facilitation, while the Central Bank of Nigeria (CBN) and Debt Management Office (DMO) Statistical Bulletin provided data on foreign loans, domestic borrowing, debt service obligations, external reserve, and interest rates, and the National Bureau of Statistics (NBS) provided data on the price index.

Following Yusuf and Mohd's (2023)^[27] design, with slight revisions to satisfy the demands of the current study, an open multivariate debt-investment-growth model with essential control variables was described to evaluate the effects of public debt structure on fiscal stability in Nigeria. According to recent research, it is preferable to concentrate on a basic collection of causative factors that have historically been related to growth and evaluate the validity of new variables conditioned on the presence of the core set^[28, 29]. Since econometric evaluations are sensitive to insufficient data, research using a bivariate structure may be susceptible to ambiguity. To address ignored variable bias and mutual dependence difficulties, the study adjusted and modelled RGDP as a proxy for fiscal stability, incorporating all previously reported disaggregated debt, investment, and growth

variables.

A comprehensive framework such as this can reduce spurious regression findings, mitigate variable exclusion distortions, and improve the test statistics' overall reliability and effectiveness^[30]. According to the literature and the objective of the study, the model's functional form employed in this investigation is as follows:

$$RGDP = f(DDS, DSP, EDS, EXCR, FDI, FRP, GFCF, INFR, INTR, TOPP) \quad (1)$$

By converting variables to their natural logarithm, heteroscedasticity issues are significantly reduced or eliminated^[29]. As a result, nominal data on RGDP, EDS, DDS, DSP FRP, and FDI were log-transformed to stabilize the series' variance, minimize heteroscedasticity, and allow for proportional interpretation, while INTR, INFR, EXCR, and GFCF remained in percentage form. The modified Autoregressive Distributed Lag (ARDL) form of the estimated regression equation, expressed in its general form as an unrestricted error-correction model (UECM), is defined as follows:

$$\begin{aligned} \Delta \text{LnRGDP}_t &= \beta_0 + \sum_{i=0}^q \beta_1 \text{LnDDS}_t \\ &+ \sum_{i=0}^q \beta_2 \text{LnEDS}_t + \sum_{i=0}^q \beta_3 \text{LnDSP}_t \\ &+ \sum_{i=0}^q \beta_4 \text{LnFRP}_t + \sum_{i=0}^q \beta_5 \text{LnFDI}_t \\ &+ \sum_{i=0}^q \beta_6 \text{EXCR}_t + \sum_{i=0}^q \beta_7 \text{GFCF}_t \\ &+ \sum_{i=0}^q \beta_8 \text{INFR}_t + \sum_{i=0}^q \beta_9 \text{INTR}_t \\ &+ \sum_{i=0}^q \beta_{10} \text{TOPP}_t + \varnothing_{11} \text{LnRGDP}_t \\ &+ \varnothing_{12} \Delta \text{LnDDS}_t + \varnothing_{13} \Delta \text{LnEDS}_t + \varnothing_{14} \Delta \text{LnDSP}_t \\ &+ \varnothing_{15} \Delta \text{LnFRP}_t + \varnothing_{16} \Delta \text{LnFDI}_t + \varnothing_{17} \Delta \text{EXCR}_t \\ &+ \varnothing_{18} \Delta \text{GFCF}_t + \varnothing_{19} \Delta \text{INFR}_t + \varnothing_{20} \Delta \text{INTR}_t \\ &+ \varnothing_{21} \Delta \text{TOPP}_t + ECT_t + \varepsilon_t \end{aligned} \quad (2)$$

Where: RGDP = (Proxy for Fiscal Stability) Dependent variable. DDS, EDS, DSP, EXCR, FRP, FDI, GFCF, INTR, and TOPP = Independent variables of the model remain as earlier defined.

β_0 = Constant/Intercept and i is the lag indicator. $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9,$ and β_{10} are the long-run coefficients of the explanatory variables to be estimated, while \varnothing_{11} to \varnothing_{21} represent the short-run dynamic coefficients of the respective variables. These coefficients aid in estimating the model's convergence to equilibrium and the error correction strategy. According to economic theory, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9,$ and β_{10} can be positive or negative ($>$ or <0).

The first difference operator is denoted by Δ , where t represents a deterministic time trend from 1980–2022. The speed adjustment parameter, ECT_t , determines how quickly the variables return from short-run disequilibrium to long-run equilibrium following a disturbance. To reach long-term equilibrium, the coefficient needs to be negative, less than one, and statistically significant. The disturbance term (ξ) is not related to the x 's. A test of the disturbance term, ε , verifies the regression's effective lag length. If the error series is serially uncorrelated and represents a white noise process, the specified lag durations are enough. Endogeneity is less of an issue in Equation (2), which has no residual correlation^[30].

Estimation Procedure

Before developing an empirical estimate, the current study ran a unit root test to see if the focus variables were stationary. The test was required because time-series variables are evaluated using trends, which are frequently non-stationary and must be transformed to a stationary form before analysis. Non-stationary datasets frequently produce erroneous or deceptive conclusions. The current study uses the Phillips-Perron (PP) test, developed by Phillips and Perron (1988)^[31], and the conventional Augmented Dickey-Fuller (ADF) test, developed by Dickey and Fuller (1979)^[32], to test for stationarity of the study variables. Conventional unit root tests may produce distorted and inadequate empirical evidence on the order of variable integration if the series has a structural break. The long-term relationships between the variables may be impacted by such a huge economic catastrophe^[33]. In order to detect a structural break and the stationarity characteristics of the series, this study additionally employed the Zivot-Andrews (ZA) structural breakpoint unit root test.

The Autoregressive Distributed Lag simulations approach, noted for its innovative and dynamic character, was used to determine the predicted coefficients of the regressors in question across both shorter and longer time periods. Compared to older and more well-known cointegration techniques, this model has three major advantages. The model can provide long-term, accurate model estimators to independently scrutinise the associations between indicators over shorter and longer time periods. The ARDL technique works better with smaller and more constrained data samples, and it

does not need that all series be integrated in the same order; it can be used with order one, order zero, or a mixed order of integration^[26].

Prior to evaluating short and long-term parameters, the most effective ARDL model must be selected. Selecting the ARDL model with the lowest residual sum of squares (RSS) is essential because it includes lagged values for both dependent and independent variables. Since the Akaike information criterion (AIC) performs better with small sample sizes, it is used to independently identify the ideal lag time for each variable. Following the establishment of the optimum lag length, the bound testing approach is employed to verify the presence of cointegration. F-statistics are calculated using the Wald test and compared to Pesaran, Shin, and Smith’s (2001)^[34] lower and upper bound critical values. If the estimated F-statistic exceeds the upper bound critical value, the null hypothesis is rejected. If the estimated F-statistics is less than the lower bound critical value, the null hypothesis is not rejected, implying that no cointegration exists; if it is between the upper and lower bounds, the alternative is undefined.

Model misspecification can produce skewed results when evaluating time series data. The predictive accuracy of empirical results may be compromised by this circum-

stance. This study used several diagnostic tests to screen for heteroscedasticity, serial correlation, normality, and model specification problems. The CUSUM (Cumulative Sum of Recursive Residuals) and CUSUMsq (Cumulative Sum of Squares of Recursive Residuals) methods were used to further evaluate the goodness-of-fit of the estimated model and the structural stability of the calculated coefficients. The 5% significance level encompasses two straight lines that graphically illustrate these two datasets. The null hypothesis of stable parameters is rejected if any point exceeds the five percent confidence level.

4. Results and Discussion

4.1. Preliminary Analysis of Study Variables

In research, descriptive statistics are used to communicate the distributional or basic characteristics of data. This preliminary assessment provided an overview of the nominal data set and highlighted the key elements of the study variables in our model in order to ascertain whether the data series are normally distributed and suitable for an OLS regression. **Table 1** outlines the nominal statistical characteristics of the variables being considered.

Table 1. Descriptive Statistics of the Examined Variables in Nominal Form.

Variables	Mean	Maximum	Minimum	Std. Dev	Skewness	Kurtosis	J.B. Prob	Obs.
RGDP	374,325	840,643	137,793	227,893	0.62	1.85	0.11	43
DDS	3944	22,210	7.92	5815	1.63	4.66	0.23	43
DSP	362,017	2,405,468	1106	625,454	2.06	6.10	0.07	43
EDS	2639	18,702	1.87	4250	2.39	8.26	0.06	43
EXCR	121	550	0.56	129	1.44	4.91	0.00	43
FRP	20,118	53,001	1430	17,806	0.43	1.49	0.19	43
FDI	2401	8840	189.2	2317	1.26	3.74	0.39	43
GFCF	36.76	89.39	14.17	19.99	1.08	3.69	0.10	43
INFR	18.75	72.80	5.40	16.32	1.91	5.58	0.00	43
INTR	17.12	31.60	8.40	4.36	0.30	3.42	0.62	43
TOPP	31.89	53.0	9.0	12.48	-0.26	2.12	0.39	43

While the standard deviation measures in **Table 1** vary significantly from the mean values, their kurtosis suggests that our policy variables are normally distributed. RGDP, FRP, and TOPP, in particular, have kurtosis values less than 3, indicating that they are platykurtic, having fewer common and extreme outliers than the normal distribution. However, DDS, DSP, EDS, EXCR, FDI, GFCF, INFR, and INTR all have leptokurtic distributions with kurtosis values greater than three.

This indicates that these variables have higher-than-average kurtosis and a bigger mass in the tail of the population density function. **Table 1**’s skewness values, which highlight the data’s asymmetry, demonstrate that all variables—except TOPP—are positively skewed, with a very large right tail. Jarque-Bera statistics describe the skewness and kurtosis of sample data in comparison to a normal distribution. The nominal Jarque-Bera statistics for the RGDP, FRP, GFCF, INTR,

and TOPP data strongly support the null hypothesis, whereas the log-transformed DDS, EDS, DSP, and FDI series exhibited normal distributions. Because the Jarque-Bera probability values exceed 5%, these variables can be assumed to follow a normal distribution. Nonetheless, EXCR and INFR both showed significant Jarque-Bera probability values of less than 0.05, showing unequivocally that their residuals are abnormal. This implies that these variables are particularly sensitive to shocks and other economic fluctuations, which could have resulted in outliers and residual non-normality. However, the ARDL co-integration method used in this study is not dependent on normal data distribution^[19].

Correlation analysis is useful for determining the level of association among variables. A significant correlation between explicating variables may indicate multicollinearity, which may elevate standard errors and mislead coefficient estimates^[35]. The explanatory variables' linear dependency and multicollinearity were evaluated using the Pearson Product Moment Correlation coefficient. This correlation analysis does not suggest any causal relationship between the study's variables. **Table 2** displays the Correlation Coefficients for the explanatory factors in nominal form.

Table 2. Pearson's Correlation Coefficients for Explanatory Variables.

Correlation	DDS	EDS	DSP	FRP	FDI	EXCR	GFCF	INFR	INTR	TOPP
DDS	1.00									
EDS	0.74	1.00								
DSP	0.78	0.66	1.00							
FRP	0.66	0.39	0.48	1.00						
FDI	0.26	0.02	0.13	0.70	1.00					
EXCR	0.77	0.75	0.74	0.69	0.29	1.00				
GFCF	-0.47	-0.29	-0.33	-0.72	-0.53	-0.56	1.00			
INFR	-0.19	-0.12	-0.16	-0.38	-0.27	-0.25	0.16	1.00		
INTR	-0.22	-0.13	-0.19	-0.15	-0.04	-0.11	-0.37	-0.37	1.00	
TOPP	-0.13	-0.09	-0.01	0.12	0.28	0.03	-0.05	0.51	-0.37	1.00

Table 2 demonstrates that multicollinearity among the research variables is not a serious problem because the correlation coefficients of the explanatory variables fall below a tolerable acceptance limit of ± 0.80 . A high correlation coefficient of the explanatory variables, on the other hand, should not be interpreted as proof of a greater likelihood of multicollinearity since such values do not, by definition, undermine regression study findings, favour employing ridge regression, or suggest combining several distinct variables into a single new variable to address multicollinearity concerns. Similarly, research has shown that multicollinearity is not always a problem, and that the often-used strategy for dealing with it in regression analysis can sometimes create more problems than it solves^[29].

4.2. Test of Stationarity of Study Variables

Table 3 displays the outcomes of the traditional and structural breakpoint unit root tests.

Table 3 shows a similar outcome from both traditional and structural breakpoint unit root testing. At levels and first difference, every variable under study was stationary, but not

at the second difference. The dependent variable (RGDP) only attained stationarity after the first differencing, indicating that the conditions for using the ARDL approach were met.

4.3. Bounds Test to Co-Integration

The ARDL bounds test approach uses the F-test and evaluates the cumulative significance of the model's lagged level variables to ascertain whether a long-term relationship exists between the variables under investigation. The study's sample size is 43, with 11 parameters, and observations are yearly. Furthermore, given the restricted time series data, it is critical to find a balance between selecting a lag duration that is adequate to eliminate residual serial correlation issues and avoiding over-parameterization. Because of the small number of observations and the need to maintain degrees of freedom, an ideal lag length of 1 or 2 was selected and fitted to the dependent variable and dynamic regressors. This ensured that the chosen model was unaffected by serial correlation and that model dynamics were not impeded by insufficient lags. Based on the ideal lag length for each vari-

able in Equation (2), the most efficient of the top 20 predicted models was found to be (1, 2, 2, 0, 2, 2, 0, 1, 2). **Table 4**

presents the results of the approximated F-test and the ARDL bounds testing approach.

Table 3. ADF, PP and Zivot-Andrews Stationarity Tests Results.

Variables	ADF		PP Test			Zivot-Andrews			
	Level	1 st Diff.	Level	1 st Diff.	Remark	Break Date	Level	1 st Diff	Remark
LnRGDP	-1.079 ⁿ	-4.886 ^a	-0.149 ⁿ	-4.890 ^a	I(1)	2016	-2.986 ⁿ	-6.179 ^a	I(1)
LnDDS	-2.384 ⁿ	-4.791 ^a	-2.386 ⁿ	-4.791 ^a	I(1)	1996	-3.880 ⁿ	-5.817 ^a	I(1)
LnEDS	-2.420 ⁿ	-4.597 ^a	-2.286 ^b	-4.597 ^a	I(1)	2006	-3.325 ^b	-8.926 ^a	I(0)
LnDSP	-3.214 ^c	-8.698 ^a	-1.165 ^b	-8.899 ^a	I(1)	2002	-6.510 ^a	-10.697 ^a	I(0)
LnFRP	-3.215 ^c	-7.252 ^a	-2.688 ⁿ	-8.478 ^a	I(1)	2002	-4.924 ^a	-8.031 ^a	I(0)
LnFDI	-3.955 ^b	-10.565 ^a	-4.025 ^b	-12.018 ^a	I(0)	1984	-5.032 ^a	-11.392 ^a	I(0)
EXCR	-2.638 ⁿ	-3.827 ^a	-2.909 ⁿ	-3.867 ^a	I(1)	2019	-0.957 ⁿ	-5.259 ^a	I(1)
GFCF	-2.328 ⁿ	-4.968 ^a	-2.662 ⁿ	-4.898 ^a	I(1)	1985	-3.956	-6.658 ^a	I(1)
INFR	-3.135 ^b	-6.542 ^a	-2.999 ^b	-12.593 ^a	I(0)	1995	-6.107 ^a	-7.695 ^a	I(0)
INTR	-2.285 ⁿ	-5.396 ^a	-2.307 ⁿ	-7.025 ^a	I(1)	1993	-2.910 ⁿ	-8.396 ^a	I(1)
TOPP	-2.988 ^b	-8.355 ^a	-3.087 ^b	-9.952 ^a	I(0)	1991	-3.178 ⁿ	-8.703 ^a	I(1)

Notes: a, b and c denote the rejection of the null hypothesis at 1%, 5% and 10% significance levels respectively, while n denotes not significant.

Table 4. ARDL Bounds Test for Co-Integration Results.

Model	F-Statistics	K	Critical Values			Decision
			%	Lower Bound I(0)	Upper Bound I(1)	
LnRGDP = f(LnDDS, LnEDS, LnDSP, LnFRP, LnFDI, EXCR, GFCF, INFR, INTR, TOPP)	5.4835	10	1%	2.84	4.10	Reject H ₀ and accept H _A . Series are co-integrated
			2.5%	2.56	3.76	
			5%	2.33	3.46	
			10%	2.07	3.16	

Table 4 compares the calculated F-statistics for the ARDL co-integration test to Narayan’s (2005) critical values. The null hypothesis that there is no co-integration is rejected by the findings. A long-run analysis is required because the computed F-statistic value of 5.4835 is higher than the upper bound critical value of 4.10 at the one percent significance level, suggesting a robust long-term relationship between fiscal stability and the model’s explicitly stated public debt, investment, and growth predictors. The result is predicated on the idea that these variables move in unison throughout time and that any brief deviations from their interaction will ultimately return to equilibrium.

4.4. Long-Run Impact of Public Debt on Fiscal Sustainability in Nigeria

After verifying the co-integration between the variables under investigation, the study assesses the conditional ARDL long-run model for Equation (2) in order to ascertain the enduring connection between the variables in question and the

intricate patterns of Nigerian public debt, fiscal sustainability, and economic growth. **Table 5** shows the long-run estimates.

The long-run coefficient of Domestic Debt Stock (LnDDS) has a negative correlation with fiscal stability and is statistically significant at the one percent level, supporting the debt overhang and crowding-out hypothesis. According to **Table 5**’s results, if everything else is equal, a percentage increase in government domestic borrowing will worsen fiscal instability and reduce growth by 21.49%. The negative coefficient of domestic debt within the sample period suggests that domestic borrowing in Nigeria has not been effectively utilized to finance public projects and to deepen local debt markets, thereby providing instruments that can crowd in private financing under certain conditions. The increasing use of domestic borrowing by the government to finance growing fiscal deficits in Nigeria’s fiscal operations is demonstrated by the comparatively high coefficient value of domestic debt stock. As is the case in Nigeria, using short-term domestic debts with high interest rates to finance ongoing expenditures could put a heavy load on the budget,

causing fiscal instability and hampering economic growth. This helps to clarify why heavy domestic borrowing did not result in commensurate increases in social outcomes or in-

frastructure. The gap between borrowing and development accomplishments underlines the significance of openness, accountability, and effective fiscal oversight systems.

Table 5. ARDL Long-Run Estimated Results.

Variables	Coefficients	Std. Error	t-Statistic	p-Value
LnDDS	-0.2149	0.0724	-2.9686	0.0069***
LnEDS	0.1149	0.0234	4.9029	0.0005***
LnDSP	-0.0409	0.0142	-2.8654	0.0087***
LnFRP	-0.0865	0.0435	-1.9874	0.0416**
LnFDI	0.0831	0.0436	1.9082	0.0038***
EXCR	-0.0644	0.0206	3.1200	0.0059***
GFCF	-0.5985	0.1690	-3.5408	0.0025***
INFR	-0.0831	0.0436	-1.9082	0.0787 ^{NS}
INTR	0.0187	0.0066	2.8565	0.0089***
TOPP	0.4161	0.1172	3.5489	0.0025***

Notes: (***) Significant at the 1% level, (**) Significant at 5% level while NS denotes not significant.

The Central Bank of Nigeria’s financing of the government through Ways and Means advances and the monetization of fiscal deficits have increased domestic debt to an unmanageable level, causing inflation and endangering growth. Excessive levels of domestic debt might push out the private sector and restrict the range of countercyclical fiscal measures, which would exacerbate volatility and have detrimental effects on the economy. The consequences suggest that the government should boost non-oil revenue, lower domestic debts to a manageable level, and strengthen debt management measures in order to maintain fiscal stability and accelerate economic growth. The findings are consistent with past expectations and existing research by Osevwe-Okoroyibo et al. (2024)^[36], and Kabemba and Kabwe (2024)^[37], and Yusuf and Mohd (2023)^[27], who found a substantial adverse effect of domestic debt on economic growth in Nigeria, Ghana, and Zambia, respectively.

At the one percent level, the long-run coefficient of External Debt Stock (LnEDS) produced a statistically significant positive influence on fiscal stability, supporting its theoretically predicted sign. According to **Table 5**, across the study period, Nigeria’s fiscal stability increased by about 11.49% as a result of a percentage rise in government external borrowing while keeping other explanatory variables constant. Because overseas sources are more lenient and have longer tenures than domestic ones, governments typically borrow money from them. The positive and sizeable coefficient of external debt stock suggests that Project-specific external finance and concessional liabilities can be associated

with higher real output. This finding is consistent with Keynesian and endogenous growth perspectives that emphasize the potential of government borrowing to finance productive investments and to catalyze private-sector activity when deployed efficiently. Due to the limited levels of domestic savings in many developing countries, external debt is considered an attractive option for financing infrastructure development projects in situations where tax revenues are insufficient and the government is hesitant to risk economic stability by printing more money. When foreign debt is utilised judiciously, it can stimulate output, generate revenue and boost fiscal stability, hence facilitating the repayment of the debt and resulting in a favourable overall effect on the recipient economy. By its multiplier effect on private sector production activities, government external borrowing encouraged the expansion of private investment, as demonstrated by the beneficial effect of external debt stock on fiscal stability. This implies that the borrowed money’s rate of return on investment is high enough to compensate for its servicing and repayment, supporting fiscal stability. A number of studies, including Mugohera and Mahebe (2024)^[3] and Osevwe-Okoroyibo et al. (2024)^[36], discovered comparable outcomes in Ghana and Sub-Saharan Africa, respectively.

The long-run coefficient of external debt service payment (LnDSP), as expected, has a negative influence on fiscal stability and is significant at the 1% level. According to **Table 5**, a percentage point increase in external debt service payments while other explanatory variables remained constant resulted in a 4.09% fall in fiscal stability. Exter-

nal debt obligations, particularly when they are commercial or non-concessional (such as Eurobonds or certain bilateral loans), increase vulnerability to exchange rate swings and impose heavier future servicing burdens denominated in foreign currency. For Nigeria, episodes of naira depreciation have raised the domestic cost of servicing foreign currency debt, thereby squeezing fiscal space and undermining investment incentives^[8, 38]. The findings supported the crowding-out and debt overhang hypothesis, which proposed that when government debt accumulates to the point of financial recklessness, paying it off depletes valuable foreign exchange that could have been used for profitable infrastructure investments, resulting in fiscal instability and stalled growth. The findings are congruent with those of Godwin (2024)^[39], Yusuf and Mohd (2021)^[14], and Osevwe-Okoroyibo et al. (2024)^[36], who discovered that debt service payments had a significant negative impact on long-term economic growth in African countries such as Nigeria and Ghana.

Table 5 showed that the nominal Exchange Rate (EXCR) has a considerable negative impact on fiscal stability at the one percent level. Specifically, a 6.44% drop in fiscal stability was triggered by a percentage increase in the Naira to US dollar exchange rate, while other explanatory factors stayed unchanged. Generally, having a stable economic policy that mitigates the adverse effects of exchange rate volatility on the economy will help to stabilise the cost of doing business, investors' confidence and inclusive growth. Exchange rate volatility and unpredictability affect investor confidence, which increases the likelihood that risk-averse investors may cut back on their investments. However, this positive result is offset by the opposite effect of raising the price of variable inputs, particularly imported raw materials, which reduces local investment. Nigeria's macroeconomic stability and growth are severely hampered by exchange rate unpredictability. This is because investing in a volatile climate comes at a high cost, which eventually hinders economic growth. Exchange rate swings can cause inflation and solvency concerns, jeopardizing a country's financial stability and susceptibility to foreign shocks. The findings are consistent with previous research, such as the studies of Michael (2024)^[33], and Jerry et al. (2024)^[12], which demonstrated that exchange rate fluctuations had a considerable negative impact on economic growth.

Table 5 indicates that, in accordance with a priori ex-

pectations, the long-run coefficient of foreign direct investment inflow (LnFDI) demonstrated a positive association with fiscal stability that is noteworthy at the one percent level. Keeping all explanatory factors equal, a percentage increase in FDI inflow promotes fiscal stability by roughly 8.31%. FDI is seen as a feasible economic growth driver for developing nations like Nigeria since it is seen to contribute valuable cash, new technologies, marketing tactics, management skills, and a reduction in poverty in the host economy, hence encouraging fiscal stability. These could help poor countries break the cycle of destitution and underdevelopment. The results are consistent with other studies by Yusuf (2023)^[40] and Sharaf et al. (2024)^[13], which discovered that FDI significantly boosted economic growth in Nigeria and Brazil, respectively.

Contrary to initial expectations, the estimated coefficient of Foreign Reserve Position (LnFRP) has a negative impact on fiscal stability at the five percent probability level. Clearly, a percentage increase in international reserve stock, all other things being equal, resulted in a decline of around 8.65% in long-run fiscal stability. Countries seek to accumulate a large stock of foreign exchange reserves in order to offset balance-of-payments deficits, manage international transactions, fulfil external obligations, address temporary and unanticipated gaps in the international payments system to which their economies may be exposed, and provide foreign-exchange assistance and funding. Trade surpluses offer foreign exchange reserves and enhance economic growth, particularly in countries with a solid manufacturing base. The coefficient's negative sign indicates that Nigeria's over-reliance on oil exports as a source of foreign exchange and government revenue has exacerbated the country's economic weaknesses, causing widespread trade deficits, foreign reserve shortages, instability in exchange rates, investment cuts, fiscal crisis, and reduced economic growth. Fiscal diversification is more than just a desirable goal for Nigeria's economy; it is required for its continued prosperity. The outcome confirms the findings of Yusuf (2023)^[35], Yusuf and Mohd (2023)^[26], and Kashif et al. (2017)^[41], who found that retaining foreign reserves had a substantial detrimental impact on long-term economic growth in Brazil and Nigeria, respectively.

At the one percent level, the long-run coefficient of Gross Fixed Capital Formation (GFCF) showed a negative

impact on fiscal stability. **Table 5** shows that a deterioration in fiscal stability of roughly 59.85% was triggered by a percentage increase in GFCF *ceteris paribus*. Despite the importance of private investment in increasing efficiency, creating employment opportunities, and alleviating poverty, the findings showed that private investment in Nigeria remains comparatively modest and disappointing, resulting in fiscal instability within the sample period. The negative and sizeable coefficient of GFCF suggests that although private investment contributes to growth, it may be constrained in Nigeria by infrastructure bottlenecks, credit market frictions, and policy uncertainty. Private investment in Nigeria faces major hurdles like macroeconomic instability (inflation, exchange volatility), poor infrastructure (power, roads), limited access to finance, regulatory uncertainty, corruption, high public debt crowding out private borrowing, and challenges in governance/execution, all impacting investor confidence and returns despite Nigeria's large and young market potential. Nigeria's infrastructure gap is glaring. Roads, transport, clean water, sanitation, etc., are lagging behind. Inflation erodes the purchasing power of families even as unemployment, especially among youth, remains a ticking time bomb. Millions of Nigerians still lack access to electricity despite the country's vast gas reserves. The economy loses about \$26 billion annually to poor power supply^[5]. Businesses spend more on self-generation than on innovation. Poor infrastructure raises business costs and stifles growth. As businesses continue to struggle to survive, access to reliable electricity is stifling the growth of industries and generating a significant source of fiscal instability in Nigeria. The result supported earlier empirical research by Yusuf (2023)^[40], Michael (2024)^[33], and Jerry et al. (2024)^[12], which found a strong inverse link between domestic capital accumulation and economic growth in sub-Saharan African nations, Ghana, and Nigeria, respectively.

The long-run coefficient of Inflation Rate (INFR) generated a negative impact on fiscal stability that is statistically insignificant at an acceptable level of probability. Keeping inflation under control is critical to maintaining macroeconomic stability. Most developing countries' public debt has an inflationary effect because they borrow to finance consumption and recurring expenses, which increases overall consumption compared to supply, resulting in inflation. Low inflation is seen to be vital for providing sufficient motiva-

tion to investors and encouraging the development of fixed-income asset markets. The negative sign of this variable suggests that huge rises in the overall trajectory of prices of goods and services in Nigeria, caused mostly by food price inflation, will reduce disposable income and plunge households into distress. Compared to headline inflation, food inflation is thought to be more variable and significantly important for social stability, wealth, and income inequities. Furthermore, assuming supply-side inflationary trends continue and the overall demand for food commodities does not decline, food market values are anticipated to stay high^[42]. Nonetheless, the variable's probability value indicates that, in this analysis, the inflation rate has no statistically meaningful effect on fiscal stability.

The long-run coefficient of Interest Rate (INTR) in **Table 5** had a significant positive impact on fiscal stability at the 1% level. A percentage increase in interest rates is expected to result in a 1.87% increase in fiscal stability. The results corroborate the McKinnon-Shaw (1973) theory, which maintains that a high interest rate increases bank lending and savings, promoting fiscal growth and economic stability. High long-term interest rates, however, may discourage private investment and limit economic prospects. The cost of the national debt is anticipated to rise due to increased demands for public spending. As a result, we expect a net capital transfer from the private to the public sectors. Interest rates increase as a result, and private spending by both individuals and businesses decreases. The results were in line with those of Samson and Osaron (2025)^[10] and Sharaf et al. (2024)^[13], who discovered that real interest rates significantly boosted long-term economic growth in Brazil and Sub-Saharan African nations, respectively.

The long-run results in **Table 5** show that Trade Openness (TOPP) had a significant beneficial effect on fiscal stability at the 1% level of probability. As a result, a rise in trade openness will boost fiscal stability by roughly 41.61%, assuming all other factors remain constant. These findings indicate that countries with higher trade openness may achieve more efficient resource allocation, increase overall factor effectiveness via knowledge and technology sharing, improve access to foreign markets for goods and services, and boost long-term economic growth and fiscal stability. The results are consistent with those of Abdifatahi (2024)^[43], Yusuf (2023)^[35], and El-Naser (2023)^[44], who found evidence of

a positive influence of trade openness on economic growth in their studies.

4.5. Short-Run Effects of Public Debt on Fiscal Stability in Nigeria

Table 6 presents the short-run coefficients for the impact of public debt on Nigeria’s fiscal stability. Using the appropriate lag length, the study estimated an Error Correction Model (ECM) for the long-run relationship in Equation (2).

In terms of coefficient signs and significance levels, Table 6 shows that the examined variables’ short-term behaviour did not change significantly. For a single equation, the error-correction coefficient must be between -1 and 0 , otherwise, it is undesirable. Since the estimated error correc-

tion term (-0.7533) is statistically significant and negative, it satisfies the econometric requirements, indicating the efficacy of the feedback system. The calculated coefficient of the lagged error correction term ($ECT(-1)$) had the expected sign, indicating a clear long-term interaction between Nigeria’s multiple indices of public debt and fiscal stability during the review period. The relationship is significant at the 1% level, meaning that 75.33% of the current year’s departure from the long-run equilibrium level of fiscal stability is regained the next year. The economy will overcome any short-term difficulties and return to its long-term sustainable fiscal stability trajectory for growth in about 1.33 years due to the quick speed of adjustment. The calculated result has no autocorrelation due to the high Durbin-Watson value, and the equation has a high overall goodness-of-fit.

Table 6. Short Run Estimated ARDL Results.

Variables	Coefficients	Std. Error	t-Statistics	Prob. Value
D(LnDDS)	-0.1079	0.0465	-2.3237	0.0357**
D(LnDDS(-1))	-0.1732	0.0504	-3.4322	0.0040***
D(LnEDS)	-0.0310	0.0094	-3.3065	0.0045***
D(LnEDS(-1))	-0.0413	0.0131	-3.1633	0.0070***
D(LnDSP)	-0.0054	0.0059	-0.9256	0.0215**
D(LnFRP)	-0.0618	0.0135	4.5599	0.0004***
D(LnFRP(-1))	-0.0387	0.0127	-3.0453	0.0087***
D(LnFDI)	0.0443	0.0089	-4.9556	0.0002***
D(LnFDI(-1))	-0.0331	0.0084	-3.9226	0.0015***
D(EXCR)	-0.0018	0.0003	-6.5313	0.0000***
D(EXCR(-1))	0.0010	0.0003	5.7464	0.0001***
D(GFCF)	-0.0011	0.0009	-1.2406	0.2326 ^{NS}
D(GFCF(-1))	0.0036	0.0012	2.7879	0.0145**
D(INFR)	-0.0010	0.0003	-3.8892	0.0013***
D(INTR)	-0.0005	0.0023	-0.2176	0.0359**
D(TOPP)	-0.0029	0.0008	-3.8379	0.0018***
D(TOPP(-1))	0.0025	0.0006	3.9363	0.0016**
Constant	4.7184	0.7471	6.3151	0.0000***
ECM(-1)	-0.7533	0.0761	-9.9004	0.0000***

Note: $R^2 = 0.9008$, Adjusted $R^2 = 0.8474$, F-Statistic = 16.8704, Prob (F-Statistic) = 0.0000, DW Statistic = 2.5213. (***) Significant at the 1% level, (**) Significant at 5% level while NS denotes Not Significant.

The current level of Domestic Debt Stock $D(LnDDS)$, which is consistent with long-run findings, has a negative and significant impact on the current level of fiscal stability with a 5% probability. As a result, a percentage increase in government domestic borrowing resulted in a 10.79% decrease in the current rate of fiscal stability. In keeping with the long-run result, the one-year lag coefficient of domestic debt stock $D(LnDDS(-1))$ is inversely related to the current level of fiscal stability and statistically significant at the one percent level. A surge in previous domestic borrowings led

to a 17.32% deterioration in fiscal stability. Governmental debt can be detrimental to the state of the economy, even if it is often necessary to pay for budget shortfalls. The study confirmed the idea of a domestic debt overhang by showing that raising the current level of domestic debt would lower the current rate of fiscal stability because of the high domestic implied interest rate. Large and persistent budget deficits can exacerbate fiscal imbalances and impede economic growth.

The current level of foreign debt stock $D(LnEDS)$ in contrast to the long-run result has an inverse association

with the current rate of fiscal stability, particularly at the 1% level. According to the findings in **Table 6**, a percentage increase in the existing rate of government external borrowing while holding other explanatory variables constant led to a 3.10% decrease in the current level of fiscal stability. Similarly, at the one percent probability level, the one-year lagged coefficient metric, or prior value of public external debt $D(\text{LnEDS}(-1))$, had a significant negative impact on the current rate of fiscal consolidation. It is clear that the current rate of fiscal stability falls by approximately 4.13% for every percentage point increase in prior external borrowing. The negative signs associated with both public debt coefficients support the crowding-out effect of public debt on economic growth, emphasizing the negative effects of high public debt servicing costs on government revenue. Conversely, the low coefficient value of external debt indicates that external debt makes up a comparatively smaller percentage of Nigeria's total debt burden. The long- and short-run analyses of the consequences of disaggregated public debt on fiscal stability revealed that the proceeds from such debts have not been used productively to enable debt service and eventual liquidation, hence driving sustainable growth. To support improved economic growth, the government must work to boost revenue, particularly from non-oil sources, as well as reduce deficit financing to a viable level, which has contributed to the buildup of massive public debts.

The short-run coefficient of external debt service payment $D(\text{LnDSP})$, like the long-run outcome, is inversely connected to present fiscal stability and substantial at the five percent level. As a result, a percentage rise in the present external debt service payment is related to a 0.54% decrease in fiscal stability. Developing economies typically need aid in raising funds and funding increased public spending. Consequently, they count on foreign borrowing to accomplish their development targets while also dealing with budget deficits and trade imbalances. Foreign debt, on the other hand, might lead to an excessive debt overhang, which, if unmanageable, can cause economic uncertainty and instability. Excessive liabilities shift capital and foreign cash from domestic investment towards principal and interest payments. When a country's government fails to pay its obligations on time, its creditworthiness diminishes, and if this tendency persists, the country may struggle to borrow money for new initiatives.

Table 6 showed a significant negative relationship between the current level of foreign reserve holding $D(\text{LnFRP})$ and the current rate of fiscal stability at the one percent level of probability. This indicates that, under all other circumstances, a percentage increase in the current level of foreign reserve holding will cause the current rate of fiscal stability to decline by approximately 6.18%. The one-period lagged value of foreign reserve holdings, $D(\text{LnFRP}(-1))$, also had a significant negative impact on current fiscal stability at the one percent level. As a result, a percentage point increase in the previous stock of foreign reserve holdings results in a 3.87% reduction in investment and fiscal stability.

A one-year lagged indicator of FDI inflow $D(\text{LnFDI}(-1))$ exhibited an inverse relationship with the current level of fiscal stability, significant at the one percent level. Additionally, **Table 6** provided evidence of a substantial positive effect of the current level of FDI inflow $D(\text{LnFDI})$ on the current rate of fiscal stability, also at the one percent probability level. This implies that a percentage increase in the existing level of FDI inflow would result in a boost of roughly 4.43% in the current rate of fiscal stability *ceteris paribus*. The current level of fiscal stability has dropped by roughly 3.31% due to a percentage increase in the preceding level of FDI inflows. Foreign direct investment is an important source of capital that complements local investment, creates new job possibilities, and acts as the primary channel for technical transfer. Technology transfer and spillover boost total factor productivity and resource utilization efficiency, promoting fiscal stability.

The nominal exchange rate in the current era, $D(\text{EXCR})$, is consistent with the long-run finding and has a significant negative impact on the current level of fiscal stability. Thus, a percentage increase in the Naira-to-US Dollar exchange rate resulted in a 0.18% decrease in fiscal stability, despite the fact that its one-year lag value $D(\text{EXCR}(-1))$ is positively associated with the current level of fiscal stability and significant at the one percent level. As a result, an increase in the variable's one-year lag value raises the current rate of fiscal stability by around 10%. While the one-year lagged value of private investment $D(\text{GFCF}(-1))$ had a significant positive impact on the current level of fiscal stability at the 5% probability level, the coefficient of the present level of domestic capital formation $D(\text{GFCF})$ had an insignificant negative influence on the current level of fiscal stability

based on the long-run results. Consequently, a percentage increase in the preceding level of private investment boosted fiscal stability by 0.36%. This implies that an increase in domestic investment enhances economic growth, consistent with endogenous growth theory, which emphasizes the role of capital accumulation in fostering long-term growth. The positive sign for $D(GFCF(-1))$ shows that where private investment occurs it remains an engine of growth, reinforcing the policy priority of enabling private-sector-friendly conditions.

According to **Table 6**, the current level of fiscal stability at the one percent level is greatly influenced negatively by the short-run coefficient of the present rate of inflation $D(INFR)$, which is in agreement with the long-run results. It appears that an overall rise in Nigeria’s current pricing level is expected to result in a 0.10% reduction in fiscal stability. Unlike the long-run result, the present interest rate $D(INTR)$ has an immense negative influence on current fiscal stability. According to **Table 6**, a percentage rise in the present cost of borrowing resulted in an almost 0.05% drop in the current level of fiscal stability. The current level of fiscal stability at the one percent level was significantly impacted negatively by the existing level of trade openness $D(TOPP)$ in comparison to the long-

run outcome. According to **Table 6**, a percentage increase in trade openness reduces fiscal stability by approximately 0.29%, whereas the one-year lag coefficient of trade openness $D(TOPP(-1))$, compatible with the long-run result, had a reverse impact of boosting fiscal stability and was significant at the one percent probability level.

4.6. Short-Run Diagnostic Tests

Table 7 displays the results of different diagnostic and robustness tests performed to guarantee that errors behave correctly and that econometric estimations are correct and reliable.

The diagnostics checking statistics shown in **Table 7** show no evidence of non-normality, serial correlation, heteroscedasticity, or model misspecification errors, hence the null hypothesis cannot be rejected. The estimated model’s parameters are within the critical bounds at a 5% significance level, according to the parameter stability test utilizing the CUSUM and CUSUM of squares tests (**Figures 1 and 2**). This demonstrates that the predicted model is extremely precise, and the computed results are reliable and appropriate for policymaking.

Table 7. Short-Run Diagnostics Tests Results.

Test	Null Hypothesis	F-Statistic	Prob. Value
Jarque-Bera	There is Normal Distribution	0.8471	0.6547
Breusch Godfrey	No Serial Auto-Correlation	2.7382	0.0931
Breusch-Pagan-Godfrey	No Heteroscedasticity	1.0868	0.4408
Ramsey RESET	No misspecification	0.0156	0.9022

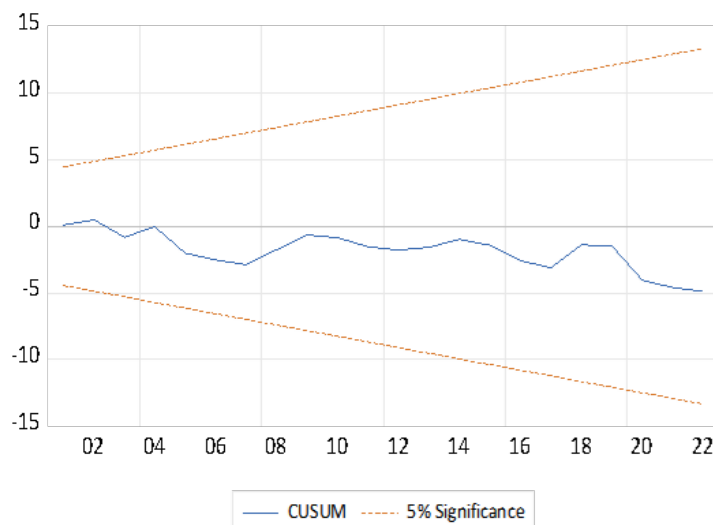


Figure 1. Stability Test (CUSUM) TEST.

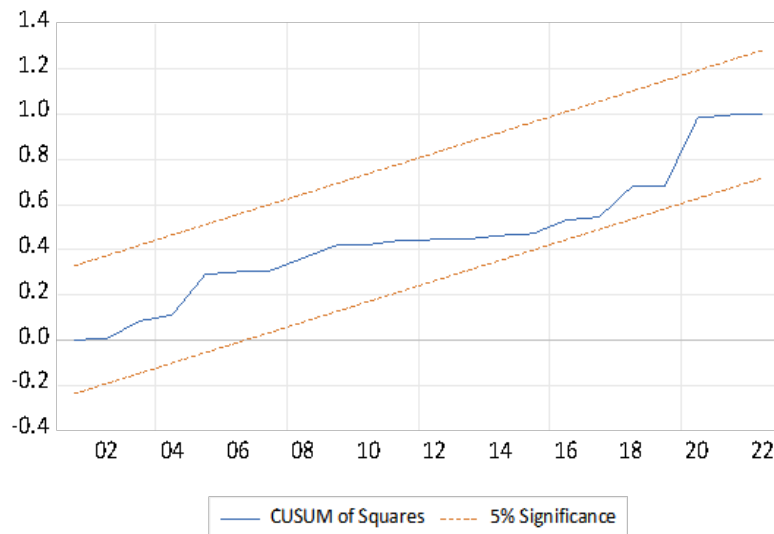


Figure 2. Stability Tests (CUSUM) of Squares Test.

5. Conclusions

Nigeria’s public debt trajectory shows a cyclical pattern of accumulation, alleviation, and continued escalation, influenced by institutional limits, structural flaws in revenue mobilization, volatile oil prices, and fiscal mismanagement. While managing fiscal and public debt sustainability continues to be a difficult task for Nigerian policymakers in their pursuit of a sustainable fiscal strategy, the high level of debt is restricting the government’s fiscal space and capacity to respond to economic shocks. Using annual time series data spanning the years 1980–2022, a time of significant macroeconomic, political, and fiscal shifts, the current analysis offers insightful information about the intricate relationships between public debt, fiscal sustainability, and economic growth in Nigeria. In order to complete this undertaking, an array of control variables, including debt service payment, exchange rate, foreign reserve holding, foreign direct investment inflow, inflation rate, interest rate, gross private investment, and degree of trade openness, was used to specify and estimate a robust growth model function. After data stationarity was established, the ARDL cointegration technique was employed for data analysis. The findings confirmed with statistical significance that domestic debt, debt servicing, external reserve holdings, and exchange rate all had a statistically significant negative impact on fiscal stability in the long and short run. External borrowing, interest rates, and trade openness, which enhanced long-term fiscal stability, inhibited it in the short run. Foreign direct invest-

ment inflows boosted fiscal stability in both the long and short term. Private investment caused a significant decline in fiscal sustainability in the long run, whereas inflation rates had an undesirable effect on fiscal stability in the short run.

The purpose of economic assessment is to help policymakers make better decisions and to guarantee that appropriate policies are adopted in response to the changing circumstances in the Nigerian economy. The study’s conclusions indicate that Nigeria should strive to increase external borrowing by expanding access to international capital markets while decreasing its reliance on domestic debt as a portion of total public debt, since increased domestic borrowing has been demonstrated to have a major detrimental effect on macroeconomic stability. Concessional financing should be pursued wherever feasible since it offers lower interest rates and longer payback terms. Commercial or non-concessional debt is especially risky for countries such as Nigeria with volatile export earnings and weak currency stability as it exposes them to substantial rollover and foreign exchange risks. A careful review of the debt’s currency structure and annual stress testing of exchange-rate vulnerabilities would help to ensure the sustainability of external funding.

The broadening of the domestic financial markets, particularly the government bond and secondary markets, to lessen the crowding-out effect of domestic borrowing on private investment. In order to prevent domestic borrowing from undermining economic productivity, the government should also increase credit guarantee programs and loosen administrative restrictions on private-sector lending. To

lessen Nigeria's unsustainable reliance on public borrowing, the federal government should broaden the tax base by regulating the large informal sector, deploying digital tax-administration systems, ensuring compliance through data-matching technologies, and enhancing institutional coordination between the federal and state revenue agencies. Increased revenue generation would lessen the demand for debt accumulation and expand fiscal space for growth-enhancing investment.

The necessity of strictly enforcing borrowing regulations, especially those found in the Fiscal Responsibility Act of 2007, which mandates that borrowing be limited to capital projects and human capital development. The federal and state governments should mandate quarterly public disclosures of borrowing and debt-service profiles, bolster the Fiscal Responsibility Commission's monitoring role, and subject all significant borrowing decisions to independent financial and economic evaluations. To guarantee openness, compliance, and institutional responsibility, the National Assembly must examine public debt reports and impose legally enforceable penalties for infractions. To ensure that borrowed funds yield measurable economic returns, government should set up a national project-screening system that assesses proposed capital projects using risk assessments, cost-benefit analyses, and anticipated growth contributions. Project performance audits should be published on a regular basis to provide openness. eliminate redundancy, decrease cost overruns, safeguard alignment with national development plans and guarantee that debt-financed investments produce long-term financial gains.

In resource-dependent economies like Nigeria, fluctuations in oil prices have frequently led to increases in borrowing, budget deficits, and debt problems. The diversification of Nigeria's economy away from excessive reliance on oil earnings, which renders the country's debt profile highly susceptible to fluctuations in commodity prices will reduce dependency on borrowing, stabilize revenue flows and lessen fiscal fragility. Strengthening public investment management mechanisms to ensure that borrowed funds produce measurable economic returns. Governance quality and investment efficiency are important factors in determining whether public debt contributes to growth. The government should establish a national project-screening mechanism that evaluates proposed capital projects based on cost-benefit

analyses, risk assessments, and anticipated growth contributions. Regularly publishing project performance audits would increase transparency and ensure that debt-financed projects deliver long-term economic benefits.

Weak governance lessens the developmental impact of debt while increasing the danger of capital flight and project failure. Infrastructure development, investor-friendly legislation, and administrative reforms can all encourage private sector activity, draw in foreign direct investment, improve the investment climate, and provide sustainable growth. The study also suggests managing exchange rate swings by creating a fixed or managed float exchange rate system while keeping interest rates stable in order to promote macroeconomic stability, as these variables have proven to be counterproductive when allowed to oscillate.

As with any empirical analysis, the study's conclusions should be interpreted cautiously because they are based on data from a specific time period, a particular econometric method, and a country-specific attribute. Although the current study yielded useful empirical results and policy recommendations for Nigeria, it is important to recognize its limitations, which are mainly related to data availability and reliability, the use of proxy variables, the possibility of bias from omitted variables, and methodological constraints that should be addressed in future research. Further studies in this field could examine the asymmetric effects of public debt on Nigeria's fiscal stability while taking into consideration other macroeconomic variables like employment and the balance of payments using a time-varying modelling technique, like the Quantile ARDL or Nonlinear ARDL, and determine the point at which public debt starts to impede Nigeria's economic growth.

Author Contributions

Conceptualization, A.Y.; methodology, A.Y.; software, A.Y.; validation, A.Y.; formal analysis and investigation: A.Y. and A.H.; investigation: A.Y. and A.H.; resources: A.Y. and A.H.; data curation: A.Y. and A.H.; writing—original draft preparation: A.Y. and A.H.; writing—review and editing: A.Y. and A.H.; visualization: A.Y.; supervision: A.Y.; project administration: A.Y. and A.H.; funding acquisition: A.Y. and A.H. Both authors have read and agreed to the published version of the manuscript.

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Informed Consent Statement

Not applicable.

Data Availability Statement

The study uses secondary data sources obtained publicly from the Central Bank of Nigeria and World Development Indicators statistical database (<https://data.worldbank.org/indicator>).

Conflicts of Interest

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

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