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Optimal Government Debt and Economic Growth in Nigeria: A Wavering Illusion

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Abstract

Developing economies rely on government debt to finance budget deficits. Nevertheless, debt incurred beyond a certain limit becomes detrimental to the economy. This study examined the optimal point beyond which government debt impairs economic performance in Nigeria, using annual time series data from various issues of the Statistical Bulletin of the Central Bank of Nigeria, the Debt Management Office, and data from the World Development Indicators (WDI). Gross Domestic Product (GDP) was used as a proxy for economic growth and served as the dependent variable, while external debt, domestic debt, debt servicing, interest rate, exchange rate, capital (proxied by gross capital formation), labour (proxied by the labour force participation rate), and foreign capital inflow (proxied by foreign direct investment) were considered as independent variables. The test mechanisms adopted were the unit root test, the bounds test for cointegration, and the Autoregressive Distributed Lag (ARDL) technique. The study revealed a debt inflection point for external debt in Nigeria at 66.1 percent and 43 percent for domestic debt, implying that beyond these points, external and domestic debts are not sustainable. The policy implication of this study is the need for the government to ensure that public debt management policies align with the established debt-growth maximising threshold. Moreover, the government is encouraged to implement fiscal reforms that would support improved public debt management

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

and the acceleration of economic growth, based on evidence that the recent trend in debt servicing is detrimental to growth.

INTRODUCTION

Globally, government borrowing is employed as a tool of macroeconomic management to address budget deficits and promote economic growth. The justification for government borrowing stems from neoclassical growth models, which advocate for borrowing by capital-scarce countries to enhance capital accumulation and, consequently, per capita output. While some economists support increased fiscal stimulus, others argue that rising debt levels hinder economic growth and, therefore, advocate for a reduction in national debt profiles. Government debt is typically classified as the sum of external and domestic debt. Indeed, much of the notable growth experienced in developing countries such as Nigeria since the 1960s can be attributed to debt-related financing.

Government debt is considered an important source of funding in developing nations. In recent years, foreign debt has become a major concern in countries such as the Republic of Benin, Togo, Guinea, Liberia, Sierra Leone, Ghana, and Nigeria. The debt crisis of the early 1980s destabilised many low-income developing economies, leading to economic distortions such as high inflation rates. As such, determining the optimal level of debt has become central to discussions on economic growth in both advanced and emerging economies. This discourse gained renewed momentum following the influential findings of Reinhart and Rogoff (2010), who reported a threshold effect of government debt, suggesting that a debt-to-Gross Domestic Product (GDP) ratio of 90 percent or more could negatively affect a nation's economic performance. Their findings have inspired ongoing debates on whether macroeconomic policy regarding government borrowing should be encouraged or restrained.

Previous studies have primarily focused on the impact of government debt on economic growth in Nigeria and elsewhere (e.g., Boboye and Ojo, 2012; Ogunmuyiwa, 2011; Amaeteng and Amoako-Adu, 2002; Krugman, 2010; Hassan and Akhter, 2012). However, these studies did not investigate the threshold beyond which public debt becomes detrimental to the economy. Understanding this threshold is crucial, as it informs the government of its borrowing limits and assists in policy formulation. Consequently, there is a need to determine the level at which government debt becomes optimal. Studies have been conducted in various regions to establish such thresholds (Schalevik, 2004; Abbas and Christensen, 2007; Greenidge, Craigwell, Thomas, and Drakes, 2012; Grenade and Wright, 2014; Vighneswara, 2015; Chudik et al., 2015; Mupunga and Le Roux, 2015). In Nigeria, three significant studies have investigated

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Transnational Journal of Finance,
Management and Governance (TJFMG)
Volume 1 Issue 1, July 2025 - ISSN: 3090-9423

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

optimal public debt thresholds: Ikudaisi et al. (2015), Omotosho et al. (2016), and Eboreime and Sunday (2017). Notably, the findings of these studies vary. Eboreime and Sunday (2017) concluded that the optimal total debt-to-GDP threshold for Nigeria is 55.2 percent, while Omotosho et al. (2016) proposed thresholds of 21.4 percent and 26.9 percent for domestic and external debt, respectively. Meanwhile, Ikudaisi et al. (2015) identified an optimal total public debt-to-GDP threshold of 73.7 percent. This lack of consensus and the recent trend of rising debt servicing in Nigeria (DMO, 2017) justify a re-examination of the optimal public debt-to-GDP threshold.

Given the increasing demands on government and the frequent inability to meet these needs within a single fiscal year, governments often resort to borrowing to offset revenue shortfalls. Such debt is incurred through fiscal deficits, with borrowing from both domestic and international markets to finance national expenditures. For developing countries, deficit budgeting has become a principal strategy for funding public spending due to the persistent challenge of mobilising sufficient domestic resources (Murwirapachena, Maredza, & Choga, 2013; Wakeel & Ullah, 2013). Nigeria exemplifies this issue, as projected revenues rarely align with expected expenditures. According to Umeora (2013), excessive government bureaucracy and the high cost of providing essential infrastructure have contributed to persistent annual deficits over the decades. A significant factor exacerbating this situation is Nigeria's over-reliance on oil, which negatively affects revenue projections whenever global oil prices fall. Supporting this view, Wosowei (2013) noted that Nigeria has been trapped in a cycle of deficits since the oil market collapse of the early 1980s. Historically, Nigeria's deficit growth accelerated following the civil war in 1970, consistent with Reinhart and Rogoff's (2010) assertion that wars often precipitate rising national debt.

Debt, in itself, is not inherently harmful; its impact depends on how borrowed funds are utilised. When borrowings are directed towards capital formation, they can contribute to future real income and enable governments to repay debt over time. However, when borrowing is used predominantly to finance recurrent expenditure as is often the case in Nigeria, debt levels may become unsustainable. An unsustainable debt burden undermines creditor confidence in a nation's ability to repay and may result in the suspension of further credit facilities. Where additional credit is offered, it often comes with stringent conditions such as risk premiums, tax increases, and currency devaluation—measures that may lead to reduced domestic savings, capital flight, and, ultimately, financial crises or balance-of-payments problems. Udoka and Ogege (2012) observed that public debt could diminish productive efficiency (through misallocation of resources) or impose undue burdens on specific population groups.

In exploring the impact of debt on a country's economy, various approaches have been adopted. One of the more debated areas is the non-linear relationship between debt and growth. Reinhart and Rogoff (2010) argued that growth slows significantly when the debt-to-GDP ratio surpasses a threshold of 90 percent. Similarly, Kaur and

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Transnational Journal of Finance,
Management and Governance (TJFMG)
Volume 1 Issue 1, July 2025 - ISSN: 3090-9423

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

Mukherjee (2014) noted that several economists believe growth is hampered once debt exceeds certain levels. However, as Chudik, Mohaddes, Pesaran, and Raissi (2017) observed, there is no consensus on the precise threshold beyond which debt negatively affects growth, with values varying significantly across both advanced and emerging economies. This lack of agreement is problematic for Nigeria, where policymakers often reference debt-to-GDP thresholds to justify further borrowing, claiming the country retains sufficient borrowing capacity due to its relatively low ratio.

This study contributes to the literature by using updated data that includes periods of heightened public debt in Nigeria. Since government debt is a recognised means of financing budget deficits, it is crucial to determine the saturation point beyond which it begins to harm economic growth. These concerns form the basis of the present study, which seeks to identify the optimal threshold of total government debt in Nigeria, beyond which economic growth begins to decline.

2.0 THE THEORY
2.1 Classical Theory of Public Debt
Classical economists viewed public debt as detrimental to the economy, particularly when public borrowing undermines the financial discipline of the budget process and restricts the private sector's access to credit. They adhered to the *laissez-faire* principle, believing that the functions of the state should be minimal, limited to maintaining internal law and order, defending against external aggression, and overseeing select public works. According to this view, full employment exists within the economy, and there is perfect competition and mobility of the factors of production. Consequently, they argued that government should not interfere with the smooth operation of economic activities and that in the event of any economic disruption, the economy would automatically restore equilibrium. Once the government confines itself to its minimal functions, public resources can be reserved for other developmental purposes. They further contended that government should neither require increased funding through public debt nor engage in wasteful or unproductive expenditure.

Smith (1776) identified the problems associated with public debt as stemming from rising government expenditure and the relative ease with which merchants could lend to the state. He argued that the availability of loans during times of need encouraged governments to avoid maintaining budgetary discipline during peacetime. Consequently, in times of war, states resorted to loans to finance additional expenditure. Smith rejected the notion that national debt constitutes additional capital for an economy, insisting instead that such funds represent a transfer from private to public hands. In his view, borrowing to finance wars and other unproductive expenses diverts capital away from productive uses.

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Management and Governance (TJFMG)
Volume 1 Issue 1, July 2025 - ISSN: 3090-9423

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

Say (1954), in his famous *law of markets*, stated that "supply creates its own demand" and asserted that the economy is self-regulating. He thus recommended minimal government intervention. Say opposed public debt, arguing that there is a significant distinction between an individual borrower and a borrowing government. The latter typically borrows for unproductive consumption and expenditure. He stressed that public borrowing is not only barren due to capital being consumed and lost, but also because it burdens the nation with recurring interest payments. He contended that these annual interest payments cannot be considered a net addition to capital.

Ricardo (1973) described public debt as one of the most destructive mechanisms ever invented to afflict nations. While building on Smith and Say's arguments, he introduced key modifications. Ricardo argued that the main issue with national debt lies in the transfer of interest payments, rather than the loss of the initial capital. He explained that if, for example, the annual expenditure amounted to twenty million pounds and this amount was raised through loans, then twenty million pounds would be withdrawn from the nation's productive capital. The million pounds per annum subsequently raised through taxation to pay the interest would simply be transferred from taxpayers to creditors. He maintained that the existence of public debt does not affect a nation's capacity to pay taxes; however, raising taxes to meet debt obligations could lead to capital flight and the relocation of capital to other countries.

2.2   Neo-Classical Growth Theory

The neo-classical growth theory emerged in 1956, when Robert Solow introduced a formal model positing that labour productivity (i.e., output per worker) is the key driver of economic growth. Within this model, technological change assumes a more significant role than capital accumulation. Output (Y) is seen as a function of technology, labour, physical capital, and foreign capital, expressed as:

Y = f (A, K, L, F)

Where:

- Y = Aggregate output
- A = Technological progress
- K = Stock of manufactured capital
- L = Quantity of labour employed
- F = Foreign capital (as indicated by Say, 1954)

In this formulation, K, A, and L are the primary production factors explicitly included. Each factor contributes to output, and their relative importance is indicated by the exponents in the equation. Productivity is assumed to increase with technological advancement, as well as improvements in organisation and production practices.

Within this framework, an increase in government expenditure may be justified when it is directed toward education and health services—investments widely regarded

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

as crucial to human capital development. It is on this basis that the neoclassical growth theory is adopted in this study. Public debt used to finance health, education, and development projects is considered productive, as it has the potential to enhance economic growth through improvements in labour, capital, and technology (Eze, Nweke, and Atuma, 2019).

2.3   Review of Threshold Analysis and Economic Growth

2.3.1 Evidence from Other Countries

Empirical findings from various countries support the widely accepted view that there is no universally applicable public debt threshold. Threshold levels of debt vary across nations, reflecting differences in economic structure, governance, and fiscal policy. Kaur and Mukherjee (2014) examined public debt sustainability and threshold levels in India over the period 1980–81 to 2012–13 using Ordinary Least Squares (OLS). Their findings suggest that India's debt position is sustainable in the long run. The study revealed a statistically significant non-linear relationship between public debt and economic growth, indicating that higher debt levels negatively impact growth. The estimated debt threshold was 61 percent of GDP (below the actual level of 66 percent as of March 2013), prompting a recommendation for credible fiscal consolidation.

Mencinger, Aristovnik, and Verbič (2014) conducted a panel data analysis of 25 European Union (EU) member states and found a significant non-linear impact of public debt on annual GDP per capita growth rates. For older EU member states, the debt-to-GDP turning point was between 80 and 94 percent, while for newer member states it was notably lower, at 53 to 54 percent.

In Zimbabwe, Mupunga and Le Roux (2015) used a bivariate quadratic growth equation to estimate the growth-maximising public debt threshold. They confirmed an inverted U-shaped relationship between public debt and economic growth, with the optimal threshold ranging between 45 and 50 percent of GDP. Baaziz, Guesmi, Heller, and Lahiani (2015) investigated the debt-growth relationship in South Africa from 1980 to 2014 using a non-linear Smooth Transition Regression (STR) model. Their results showed that public debt becomes detrimental to growth once it exceeds 31.37 percent of GDP.

Chudik and Rother (2016) examined whether the relationship between public debt and economic growth varies with debt levels. Using dynamic heterogeneous panel data models with cross-sectional dependence and covering 40 countries from 1965 to 2010, they found no evidence of a universally applicable debt threshold. Nonetheless, the accumulation of public debt had a consistently negative impact on output growth. Javier, Pérez, and Rojas (2017) investigated the optimal debt threshold for Spain using Vector Auto Regressions (VAR) and Monte Carlo simulations. The results indicated a prudent debt anchor of 60 percent of GDP, aligned with market expectations as measured by sovereign yield spreads.

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Transnational Journal of Finance,
Management and Governance (TJFMG)
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Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

Sadiku, Bexheti, and Sadiku (2018) explored the impact of national debt on economic growth in the Republic of Macedonia using quarterly data from 1999Q1 to 2016Q4. Employing the Vector Error Correction Model (VECM), Johansen co-integration, and Granger causality tests, they found a long-run negative relationship between initial debt levels and growth. A 10 percent point increase in the debt-to-GDP ratio was associated with a 1.3 percentage point decline in real GDP growth. In contrast, no strong short-run relationship was found. Government expenditure, trade openness, and gross investment were shown to have a positive and significant long-term impact on growth.

In a cross-country study involving 152 nations, Butkus and Seputiene (2018) examined whether debt thresholds are influenced by government effectiveness. Using the Generalised Method of Moments (GMM) for the 1996–2016 period, they found evidence of an inverted U-shaped debt-growth relationship. The turning point varied according to the level of government effectiveness.

Khanfir (2019) studied the non-linear relationship between public debt and economic growth in four North African countries (Tunisia, Algeria, Morocco, and Egypt) from 2003 to 2012. Applying a Panel Threshold Regression (PTR) model, the debt threshold was found to be 42.8 percent of GDP. Beyond this level, public debt negatively affected growth. The study recommended fiscal consolidation and debt reduction to support economic expansion.

In a separate study on European countries, Hu (2019) analysed the debt-growth relationship using large cross-sectional panel data. The short-run effect of public debt on GDP growth was found to be positive and significant. However, this effect turned negative and lost significance at a debt-to-GDP ratio of 109 percent. The study also found that countries with higher credit ratings had higher debt thresholds and more pronounced threshold effects.

Juergen (2019) used a panel autoregressive distributed lag (ARDL) model to determine debt thresholds for 25 EU member states from 1996 to 2017. The study confirmed that public debt negatively affects growth in both the short and long term. A 10 percent increase in government debt was associated with an immediate 0.72 percent decline in growth for highly indebted countries. Interestingly, this negative impact was found to be independent of the initial debt-to-GDP ratio. Ndoricimpa (2020) explored public debt thresholds in Africa using a panel smooth transition regression model. The study found a threshold in the range of 62–66 percent for the full sample of African countries. For middle-income and resource-intensive economies, the debt threshold was slightly lower, estimated at 58–63 percent.

2.3.2   Evidence from Nigeria

The sensitivity of public debt as a means of cushioning shortfalls in revenue and the subsequent burden it imposes has led to many studies focusing on how it affects the

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

economy. In Nigeria, most empirical studies have found a significant positive impact of public debt on GDP. However, the findings of many studies show a negative impact of public debt on GDP at the turning point and threshold levels, which differ in each study.

Omotosho, Bawa, and Doguwa (2016) investigated the existence of threshold effects in the relationship between public debt and economic growth in Nigeria, using quarterly data from 2005 to 2015. The study found empirical support for an inverted U-shaped relationship between public debt types and economic growth, with total public debt as a percentage of GDP showing a 73.70 percent threshold level.

Eboreime and Sunday (2017) analysed the threshold effect of public debt on growth from 1981 to 2015. By adopting the framework of the autoregressive distributed lag (ARDL), findings showed that the optimal total public debt–GDP threshold for Nigeria is 55.2 percent. The paper recommends caution in the accumulation of domestic debts while encouraging more external borrowings on advantageous terms.

Ebi and Imoke (2017) investigated the debt–growth relationship in Nigeria for the period 1970–2014. Using the Error Correction Model (ECM) technique, the result showed public debt to gross domestic product (GDP) ratio to be positive, while the squared term of public debt to GDP was negative and statistically significant at the 5 percent level in the different equations. The result supported the presence of non-linearity, and the optimal debt-carrying capacity of Nigeria was found to be a 29.7 percent debt–GDP ratio. This result was also analysed under the framework of Dynamic Ordinary Least Squares (DOLS).

Mary, Sunday, and Haruna (2019) investigated the public debt ratio to GDP over the period 1986 to 2017. Findings showed a significant relationship between government debt and Nigeria's economic performance. Government debt is growth-enhancing at low levels but growth-retarding at higher levels, with the optimal government debt estimated at 9.98 percent of the gross domestic product (GDP).

It should be noted that the existence of non-linearity has been established in each study; however, each study differs in its threshold levels. Even though the studies were carried out during almost the same period, the wide differences among their threshold levels are curious. More curious is the high threshold level reported by Omotosho et al. (2016) and the very low level reported by Mary et al. (2019), as well as the differing results reported by Eboreime and Sunday (2017) and Ebi and Imoke (2017), whose studies were conducted in the same year. These results therefore indicate that the question of what constitutes a proper threshold level in Nigeria is still unsettled.

2.4   Brief review of Nigeria's Debt Structure
(a) Domestic Debt Profiles in Nigeria
The domestic debt profile in Nigeria is characterised by a diversification of debt instruments, which comprise Federal Government Bonds (FGBs), Nigerian Treasury

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

Bills (NTBs), Treasury Bonds, Development Stocks (DS), promissory notes, Sukuk, and Savings Bonds, among others (DMO, 2018). These instruments have both unique and similar features, including maturity dates (short-term, medium-term, or long-term), interest rates (fixed or floating), and the specific application of each debt instrument. In government development plans, borrowings are included as additional sources of revenue for the execution of various projects. These projects are expected to be directed towards productive sectors, thereby fostering economic growth. Where this objective is not achieved due to fund diversion and mismanagement, debt levels begin to accumulate, placing intense pressure on other sources of government revenue (DMO, 2019).

In 2009, five instruments (FGBs, NTBs, Treasury Bonds, Development Stocks, and promissory notes) contributed to the level of domestic debt in Nigeria. This number was reduced to four in 2010 with the exclusion of promissory notes. From 2011 to 2016, the instruments were limited to FGBs, NTBs, and Treasury Bonds. In 2017 and 2020, however, Federal Government Savings Bonds were introduced, in addition to the existing three instruments. Ngerebo-A (2014) argued that Nigeria's domestic debt has been on the rise over the decades, resulting in a decline in total output and services.

Holders of FGBs in the form of debt securities (liabilities) lend to the government over a specified and determinable period (DMO, 2018). This type of bond is considered by the DMO to be one of the safest due to the relative certainty of capital repayment and the timely payment of associated interest. The interest income earned from these securities is also tax-free (DMO, 2018). According to the DMO (2018), the bonds are issued to finance government fiscal deficits in a non-inflationary and sustainable manner, to enhance fiscal discipline, to refinance maturing debt obligations, and to establish a benchmark yield curve. This benchmark serves as a reference for pricing bonds issued by other entities, particularly private sector issuers, and helps to develop and ensure liquidity in the domestic bond market on a sustainable basis, among other purposes (DMO, 2018). Public debts are thus used by the government primarily to finance budgeted expenditures, implement monetary policies, and develop instruments to deepen the financial market (Lotto and Mmari, 2018; Igbodika, Jessie, and Andabai, 2016).

The Treasury Certificate, first issued in Nigeria in 1968, was one of the largest securities between 1983 and 1988 (Ude and Ekesiobi, 2014). Scholars have argued that Treasury Certificates (TCs) surpassed Treasury Bills (TBs), which were issued to deepen the domestic money market by increasing the short-term investment options available. TBs, however, were introduced in 1983 to minimise the service obligations on domestic debt arising from liberalisation, and the TC was abolished in 1996 (Ude and Ekesiobi, 2014; Audu and Abula, 2001).

Sukuk is an instrument issued by the Nigerian government in the form of certificates to fund the construction and rehabilitation of key economic infrastructure

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

projects (DMO, 2018). Sukuk differs from conventional bonds in terms of ownership structure, the nature of funds raised and utilised, and the sale process. Categories of investors in Sukuk include retail investors, high-net-worth individuals, institutional investors (such as banks, insurance firms, and asset managers), ethically inclined investors, cooperative societies, religious organisations, and state investment companies, among others (DMO, 2018).

Table 1: Federal government domestic debt stock by instrument as at December 31, 2024

Instrument	Amount in Naira	% Proportion
FGN Bonds	13.96 trillion	72.56
Nigerian Treasury Bills	3.8 trillion	19.68
Nigerian Treasury Bonds	76 billion	0.39
FGN Savings Bonds	16.4 billion	0.09
FGN Sukuk	612.5 billion	3.18
FGN Green Bond	25.7 billion	0.13
Promissory Notes	762.5 billion	3.96
Total	**19.2 trillion**	**100%**

Source: Debts Management Office (2024).

In terms of structure, 72.56 percent of FG domestic debt in the fiscal year 2021 is locked in FGN Bonds, mostly long-term securities, while 19.68 percent is locked in Nigerian Treasury Bills, 0.39 percent in Nigerian Treasury Bonds, and 0.09 percent in FGN Savings Bonds. FGN Sukuk holds 3.18 percent, FGN Green Bond holds 0.13 percent, and promissory notes hold 3.96 percent (see Table 1). The implication is that structurally, these domestic debt instruments contributed to the rising level of domestic debt in Nigeria (DMO, 2021). Ngerebo (2014), Ude and Ekesiobo (2014), and Igbodika *et al*. (2016), however, argued that Nigeria's domestic debt had been on the increase over the decades, resulting in a decline in total output of goods and services.

Domestic debt increase in Nigeria has taken centre stage in the economy as the domestic debt profile has been rising astronomically, and if not controlled could create some unfavourable consequences, such as crowding out private sector investment, poor GDP growth, etc. (Iweala, 2010). An escalating debt profile presents serious obstacles to a nation's path to economic growth and development. The cost of servicing public debt (domestic and external) may expand beyond the capacity of the economy to cope, thereby impacting negatively on the ability to achieve the desired fiscal and monetary policy objectives (Sanusi, 2002). Furthermore, a rising debt burden may constrain the governments' ability to undertake more productive investment programmes.

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

Table 2: Domestic debt profiles

Years	Federal Government (Amount in Billion Naira)	State Government (Amount in Billion Naira)	Local Government (Amount in Billion Naira)	Total Domestic Debt (Amount in Billion Naira)	% Change in Total Domestic Debt
2011	5,622.8	1,233.3	52.5	6,908.6	-
2012	6,537.5	1,551.7	57.4	8,146.6	17.92%
2013	7,119.0	1,537.5	8.3	8,664.7	6.36%
2014	7,904.0	1,655.2	39.7	9,598.9	10.78%
2015	8,837.0	2,503.3	12.0	11,352.3	18.27%
2016	11,058.2	2,958.5	19.1	14,035.8	23.64%
2017	12,578.8	3,348.8	220.2	16,147.8	15.05%
2018	12,774.4	3,853.4	N/A	16,627.8	2.97%
2019	14.27	4.28	N/A	18.55	14.99%
2020	16.02	4.78	N/A	20.8	52.72%
2021	19.24	5.28	N/A	21.75	61.22%

Source: *CBN Statistical Bulletin (2024).*

Statistics obtained from DMO indicate that the total domestic debts at national and sub-national levels jumped from the 2011 level of N6.91 trillion to N21.75 trillion in the fiscal year 2021. The domestic debt profile had grown at an annual average rate of 15.34 percent between 2012 and 2017. Growth in domestic debt at 14.99 percent, 52.72 percent, and 61.22 percent was more aggressive in the fiscal years 2016, 2020, and 2021, respectively (see Table 2). The sharp increase in Nigeria's domestic debt stock over the years was attributable largely to the failure to embark on necessary adjustment, particularly at the time of declining revenue that resulted in growing fiscal deficits and further domestic debt accumulation. Secondly, the banking system, mainly the CBN, remains the dominant holder of federal government securities. Borrowings from the CBN amount to the injection of high-powered money into the system, which has serious adverse implications on price and exchange rate stability. The borrowed money must be prudently utilised in the execution of productive projects in order to enhance the capacity for repayment of both the principal and interest as they fall due (Sanusi, 2003). Effective debt management requires that borrowed resources must be productively utilised such that the economic and social rate of returns is higher than the future cost of servicing the loan. A debt problem would naturally ensue when the resources that should have been deployed for the execution of productive projects are employed in the financing of current or past consumption (Anyafo, 1996).

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Transnational Journal of Finance,
Management and Governance (TJFMG)
Volume 1 Issue 1, July 2025 - ISSN: 3090-9423

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

Table 3: Composition analysis of public domestic debt

Years	Federal Government as a % of Total Domestic Debt	State Government as a Percentage of Total Domestic Debt	Local Government as a Percentage of Total Domestic Debt
2011	81.39%	17.85%	0.76%
2012	80.25%	19.05%	0.70%
2013	82.16%	17.74%	0.10%
2014	82.34%	17.24%	0.41%
2015	77.84%	22.05%	0.11%
2016	78.79%	21.08%	0.14%
2017	77.90%	20.74%	1.36%
2018	79.90%	19.65%	0.45%
2019	80.2%	18.25%	1.55%
2020	81.5%	18.20%	0.3%
2023	83.6%	16.20%	0.2%

Source: *CBN Statistical Bulletin (2023).*

In the fiscal year 2011, the federal government's domestic debt dominated the domestic debt structure of Nigeria and accounted for 81.39% of domestic debt obligations. State and local governments shared 17.85 percent and 0.76 percent of the public debt obligation over the last ten years. The composition changed slightly to 83.6%, 16.20% and 0.2% for federal, state and local government in the fiscal year 2023 implying that there is an increase in domestic debt profile.

(b) The Structure of Nigeria's External Debt Profile
Nigeria has contracted several debt obligations from external sources, as discussed succinctly below. Table 4 sheds further light on this:
1. (i) Official Debt: This consists of Paris Club debt, multilateral debts, and bilateral debts.

(ii) This includes uninsured short-term trade arrears contracted through instruments such as bills for collection and open accounts. Commercial bank debts acquired through loans or letters of credit are referred to in this context as London Club debts.

A significant portion of Nigeria's external debt is owed to fifteen creditor countries belonging to the Paris Club. Paris Club debts comprise government-to-government credit or market-based term loans guaranteed by various Export Credit Agencies of the creditor countries. The Paris Club is a cartel of creditor countries that serves as an informational forum where debtor nations experiencing repayment difficulties negotiate debt rescheduling with their creditors. It is an informal group with no permanent members and operates on the principle of consensus.

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

The Paris Club member countries to which Nigeria was indebted include Australia, the USA, the UK, Belgium, Russia, Finland, Spain, Israel, France, Switzerland, Germany, Denmark, Italy, Japan, and the Netherlands. As at 31 December 2004, the total amount owed to these members was US$35.9 billion. In 2006, Nigeria exited the Paris Club following a final payment of US$12 billion, thereby clearing its Paris Club debt portfolio.

2. The Second Category: Multilateral Debts
These are project loans owed to multilateral financial institutions such as the World Bank Group, the African Development Bank Group, the European Investment Bank, IFAD, and the ECOWAS Fund. As at December 2004, Nigeria owed US$2.8 billion to multilateral institutions. This figure rose significantly to US$17.83 billion as at March 2023 (Table 4).

3. The Third Category: Bilateral Debts (Non-Paris Club)
These are debts owed to countries that are not members of the Paris Club and whose debts are not insured by Export Credit Agencies. As at December 2004, Nigeria owed US$0.05 billion to this category of creditors. By March 2023, this had increased to US$4.812 billion (Table 4). Debt service payments to this source in 2001 and 2002 amounted to US$33.81 million and US$34.9 million, respectively.

4. The Fourth Category: Commercial Bank Debts
These are further divided into two groups:

(I) London Club: This is a group of commercial banks that collaborate to negotiate the restructuring of their claims against debtor countries. London Club debts consist of arrears on commercial bank term loans, as well as some arrears on letters of credit, bills for collection, open accounts, dividends, and airline remittances. As at December 2004, Nigeria owed US$1.4 billion under this category (Adepoju et al., 2007).

(ii) Central Bank of Nigeria (CBN) Promissory Notes: These represent trade arrears incurred by private Nigerian entities between 1981 and 1986. Promissory notes are now categorised as Federal Government of Nigeria debt instruments. The arrears were formally converted into promissory notes in January 1988. The debt stock was authorised for quarterly redemption, ending on 5 January 2010. The outstanding balance as at 31 December 2004 stood at US$0.8 billion (Adepoju et al., 2007). Currently, Nigeria has no outstanding promissory note debt.

Annual trends from 2007 indicate that Nigeria's external debt burden has been rising gradually and continuously, despite the liquidation of nearly 80 percent of the nation's external debt through the 2006 Paris Club agreement. According to the Debt Management Office, as at March 2021, multilateral loans, bilateral loans, and commercial debts accounted for 54.26 percent, 12.73 percent, and 22.47 percent, respectively, of Nigeria's public external debt. Specifically, multilateral debt stood at US$17.83 billion, or 54.52 percent of Nigeria's external debt stock (Table 4).

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

Table 4: Nigeria's external debt stock as at March 31, 2024 in billions USD

Category	Outstanding	Percentage of Total
Multilateral		
International Monetary fund	3,477.79	
World Bank Group	11,097.68	
International Development Association	410.23	
Int'l Bank for reconstruction and Dev.		
African Development Bank Group		
African Development Bank	1,591.42	
African Development fund	942.51	
African Growing together	0.21	
Arab Bank for Economic Dev. in Africa	5.88	
European Development fund	51.33	
Islamic Development Bank	29.72	
Int'l fund for agricultural development	223.28	
Sub total	**17,830.05**	54.26%
Bilateral		
China (Exim Bank of China)	3,402.45	
France (Agency Franchaise Development)	74.60	
India (Exim Bank of India)	34.59	
Germany (Kreditransact for Wiederaufbua)	183.74	
Japan (Japan Int'l cooperation agency)	74.60	
Sub total	**4,182.06**	12.73%
Commercial		
Eurobonds	10,368.35	
Diaspora bonds	300.00	
Sub total	**10,368.35**	22.47%
Promissory notes*		
Promissory notes	179.53	
Sub total	**179.53**	0.55%
Grand total	**32,859.99**	**100%**

Source: *CBN Statistical Bulletin (2024).*

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Transnational Journal of Finance,
Management and Governance (TJFMG)
Volume 1 Issue 1, July 2025 - ISSN: 3090-9423

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]
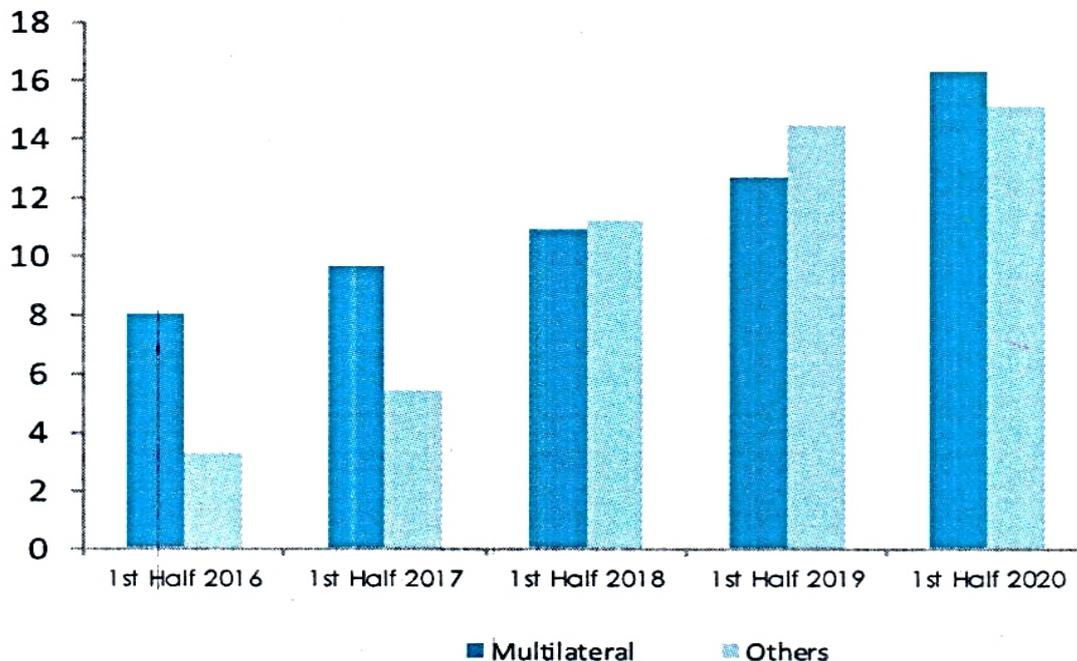
Figure 1: Breakdown of external debt stock, first half 2016 – first half of 2023 (US $billion). ***Source:*** *Data from Debt Management Office (2024)*

Judging from the above scenario, foreign financing comprised of loans from commercial (35.5 percent of total external debt), multilateral (52.0 percent), and bilateral sources (12.5 percent). Compared to the first half of 2019, the proportions showed that FGN's increased preference for multilateral and bilateral loans, relative to commercial loans. The foreign debt portfolio mix was influenced, largely, by interest cost, tenor, and adjoining borrowing terms and conditions.

3.0 The Method of Study

To determine the optimal threshold for public debt/economic growth relationship in Nigeria, we relied on the approach adopted by Nnah, (2020) and Kaur and Mukherjee (2014), with some modifications. We disintegrated the models to account for both domestic and external threshold levels in debt sustainability in Nigeria. The model is thus presented by Equation 1 and 2 as:

$$Y_t = \beta_0 + \beta_1(DD) + \beta_2(DD)^2 + \beta_4 ER + \beta_5 K + \beta_6 L + \beta_7 F + t \qquad (1)$$

$$Y_t = \beta_0 + \beta_1(ED) + \beta_2(ED)^2 + \beta_4 IR + \beta_5 K + \beta_6 L + \beta_7 F + t \qquad (2)$$

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

The equations (1 and 2) turn out that public debt/economic growth relationship is economically beneficial if and only if β_1 is positively up to a certain level, and β_2 is also positive. However, if β_2 turns out to be negative, the indication is that at that point, the public debt/economic growth relationship is not economically beneficial beyond that level.

The optimal threshold level of debt could now be obtained by combining the β_1 and β_2 of equations 1 and 2 with some scalar in the following arrangement:
Optimal debt threshold level = (β_1/β_2) (-1/2).

Generally, specifications of this nature are estimated based on the researchers' objective. For some, to avoid the internal correlation between the quadratic terms, a system of generalised methods of moments is used (Ekong, 2021). For others, because they want to determine the point in time where debt is unsustainable, autoregressive distributed lag methods are used (Nnah, 2020, and Kaur and Mukherjee, 2014). We relied on the analytical part by Nnah (2020) in our analysis. Even though some of the variables are endogenous, the ARDL provides unbiased long-run estimates using the simultaneity method of assessing both long-run and short-run effects of one variable on another (Nnah, 2020; Bentzen and Engsted, 2001).

The theoretical model followed for this study is of the ARDL form.

$$Y_t = \beta_0 + \sum_{i=1}^{p} \beta_1 Y_{t-1} + \sum_{i=0}^{q_1} \beta_2 ED_{t-1} + \sum_{i=0}^{q_2} \beta_3 DD_{t-1} + \sum_{i=0}^{q_3} \beta_4 DS_{t-1} + \sum_{i=0}^{q_4} \beta_5 ER_{t-1}$$

$$+ \sum_{i=0}^{q_5} \beta_6 L_{t-1} + \sum_{i=0}^{q_6} \beta_7 K_{t-1} + \sum_{i=0}^{q_7} \beta_8 F_{t-1} + \beta_9 ED_{t-1} + \beta_{10} DD_{t-1} + \beta_{11} DS_{t-1} + \beta_{12} ER_{t-1}$$

$$+ \beta_{13} L_{t-1} + \beta_{14} K_{t-1} + \beta_{15} F_{t-1} \quad U_t \qquad (3)$$

Where; Y_t = real GDP (N' Trillion), Y_{t-1} = Lags of real GDP, ED = External Debt (N' Trillion), ED_{t-1} = Lags of external debt, DD = Domestic debt (N' Trillion), DD_{t-1} = Lags of domestic debt, DS = Debt Servicing (N' Trillion), DS_{t-1} = Lags of Debt Servicing, INTR = Interest rate, $INTR_{t-1}$ = Lags of Interest rate, ER = Exchange Rate, ER_{t-1} = Lags of Exchange Rate, K = Capital (proxied by gross capital formation (NTrillion), K_{t-1} = Lags of capital formation, L = Labour (Proxied by Labour Force Participation Rate), L_{t-1} = Lags of labour force participation, F = foreign capital inflow (Proxied by foreign direct investment ($Billion), U_t = Error Term, $\beta_1 - \beta_{15}$ = Model Coefficients

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Volume 1 Issue 1, July 2025 - ISSN: 3090-9423

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

4.0 Analysis of Data

4.1 Determining the Optimal Threshold for Public Debt/Economic Growth Relationship in Nigeria

Table 5: Descriptive properties of the variables

Variable	GDP	ED	DD	DS	IR	EXC	LAB RATE	IR US	FDI	GFCF
Mean	37016.4	2311.9	3594.8	3.9708	17,3098	114.16	60.0817	6.9971	2.5314	21.1312
Median	8134.1	648.81	1016.9	4.2608	17.5000	111.70	60.2500	6.9200	1.8700	22.0520
Maximum	1735.7	1585.23	1942.56	7.9308	29.8000	401.98	75.6000	18.8700	8.8400	33.0400
Minimum	144.03	2.3312	11.1926	73944	7.7500	0.6052	55.2700	3.2500	0.1900	9.8970
Std. Dev.	498.25	3497.6	5162.09	2.1608	4.6379	106.78	3.4987	3.4698	2.5358	5.4094
Skewness	1.2841	2.3427	1.5365	0.2185	0.2692	0.9524	3.0160	1.1478	1.1566	-0.1769
Kurtosis	3.4475	8.3588	4.2469	1.9085	3.5173	3.3218	13.7382	4.7985	3.1834	2.6998
JarqueBera	11.6104	86.5632	18.7899	2.3615	0.9529	6.3760	259.15	14.5278	9.1982	0.3679
Prob.	0.0030	0.0000	0.0083	0.3071	0.6217	0.0413	0.0000	0.0007	0.0161	0.8319
Observations	41	41	41	41	41	41	41	41	41	41

Source: Author's research (2024).

As shown in Table 5, all variables in the study exhibit evidence of originating from a clustered population. For instance, all variables were positively skewed, except for gross fixed capital formation, which was negatively skewed (−0.1769), while labour rate and external debt were symmetrically distributed. All variables also displayed acceptable levels of kurtosis, with debt servicing and exchange rate being the most platykurtic. The Jarque-Bera probability statistics indicate that the variables were all multivariate normal, with gross fixed capital formation (0.83), interest rate (0.62), and debt servicing (0.31) being the most normally distributed.

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

Table 6: Correlation of the variables

	DD	ED	DS	IR	LAB RATE	IR US	GDP	GFCF	FDI	EXC
DD	1									
ED	0.83028	1								
DS	-0.24989	0.06676	1							
IR	-0.19759	-0.11127	0.53185	1						
LAB RATE	039292	-0.24039	-0.04618	-0.28532	1					
IR US	0.59052	-0.44763	-0.02375	-0.27107	0.61343	1				
GDP	0.99219	0.78834	-0.29349	-0.19701	-0.40910	-0.62497	1			
GFCF	0.00128	0.38915	0.31115	0.07295	0.17100	-0.00438	-0.03112	1		
FDI	0.29807	0.01278	-0.31873	-0.00104	-0.25107	-0.57804	0.38823	-0.16208	1	
EXC	0.93756	0.85098	-0.10547	-0.08796	-0.40275	-0.68227	0.93864	0.08391	0.37913	1
	DD	ED	DS	IR	LAB RATE	IR US	GDP	GFCF	FDI	EXC

Source: Author's research (2024).

Table 6 shows that the dependent variable (GDP) was positively correlated with key independent variables such as external debt (0.788) and domestic debt (0.992), as well as some control variables like foreign direct investment (0.3882) and exchange rate (0.939). However, debt servicing and both foreign and domestic interest rates were negatively correlated with GDP. Other variables in the system exhibited varying levels of correlation. For instance, external debt was positively correlated with debt servicing (0.067) and domestic debt (0.803), while domestic debt was negatively correlated with debt servicing (−0.249). Overall, the variables demonstrated different degrees of association.

The results of the PP and DF-GLS unit root tests are reported in Table 7. The PP test indicates that all variables were non-stationary at levels apart from IR, lab rate, and IRF. Applying the DF-GLS test, all variables were non-stationary at levels apart from GFCF and Lab-rate. This implies that the null hypothesis of non-stationarity for all the variables apart from IR, lab rate, IRF, and GFCF, which were rejected at levels, was rejected; others were rejected at the first difference of each series. Most importantly, the result shows that we can confidently apply the ADRL methodology to the model.

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

Table 7: Unit root test

Variables	PP Level	Prob	PP 1st Diff	Prob	DF-GLS Level	Prob	DF-GLS 1st Diff	Prob
GDP	12.4388	1.0000	-11.1264*	0.0000	-1.3414	0.1919	-7.5457*	0.0000
ED	2.5967	1.0000	-8.0518*	0.0000	0.5169	0.6111	-1.9888***	0.0540
DD	17.8498	1.0000	-10.3551*	0.0000	-1.9276	0.5647	-6.0803*	0.0000
DS	-1.7597	0.3945	-4.3194*	0.0015	-1.8308***	0.0762	-4.1886*	0.0002
EXC	2.9733	1.0000	-3.9332*	0.0043	3.0966	0.0036	-4.0458*	0.0002
FDI	-1.6642	0.4413	-7.2760*	0.0000	-1.4126	0.1661	-7.4375*	0.0000
GFCF	-2.3086	0.1743	-5.2646*	0.0001	-3.1198*	0.0035		
IR	-3.3630**	0.0184			-1.2118	0.4217	-8.9363*	0.0000
LAB RATE	-7.4175*	0.0000			-2.0236**	0.0499		
IRF	-3.9476*	0.0040			-0.0052	0.9959	-2.8819*	0.0005

Note: *,**,*** represent significance at 1%, 5% and 10% respectively.

Source: Author's extraction from eview12.

In achieving this objective, the results disaggregated models of equation 1 and 2 is presented in Table 8.

Table 8: Long run estimates

Dependent Variable: Δlog (GDP)

Variables	Equa. 1	Equa. 2
Δlog(ED)	0.115895***	
Δlog(ED^2)	-0.087686***	
Δlog(DD)		0.138182***
Δlog(DD^2)		-0.161252**
Δlog(EXC)	0.878302***	
Δlog(IR)		1.275573**
Δlog(IRF)	-3.455959***	
Δlog(GFCF)	1.079457***	6.527323**
Δlog(LAB RATE)	12.84140***	1.508742***
Δlog(FDI)	-0.106379***	-0.058944**

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Volume 1 Issue 1, July 2025 - ISSN: 3090-9423

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

C	4.194784***	3.740798***
R^2	0.96	0.95
Adjusted R^2	0.94	0.91
F-statistic	2950.885	4569.227
Prob.(F-statistic)	0.00000	0.00000
DW	2.334049	2.723434

Source: Author's extracted from E-views 12

Note: *,** indicates significance in 1 & 5 percent level of significance**
Δ is the difference operator
Computation of Optimal Debt Threshold Level (ODTL)
From Equations 1 and 2
Optimal debt threshold level (ODTL) = (1/2) (½)

$$\text{Equation 1: External debt} = \frac{0.1159}{-0.0877} \times -0.5 = 0.06607 \times 100 = 66.1\%$$

$$\text{Equation 2: Domestic debt} = \frac{0.1382}{0.1613} \times -0.5 = 0.4284 \times 100 = 43\%$$

The result of the model (Equation 1) shows that, over time, external debt positively impacted economic growth. Specifically, a one-time increase in external debt raised economic growth by at least 0.12 percent, and this effect was statistically significant at the 1 percent level. This suggests that the government retains the capacity to borrow without jeopardising the economy. However, continuous reliance on external debt (as indicated by the quadratic term) reduces economic growth. In this case, a 1 percent increase in the quadratic term over time reduced economic growth by nearly 0.9 percent, and this effect was statistically significant at the 5 percent level. This indicates a non-linear (i.e., inverted U-shaped) relationship between economic growth and external debt in Nigeria. The result aligns with general theoretical assumptions and empirical findings, which show that beyond a certain debt turning point, a negative effect on growth occurs.

Interestingly, the results from Table 8 show that the estimates were correctly signed. The implication is that, beyond a certain point, debt-financed growth becomes economically retrogressive. Therefore, this threshold must continually be identified to ensure productive caution and economic stabilisation. After extracting β_1 and β_2 from Equation (1) and combining them with an appropriate scalar, the optimal external debt threshold for Nigeria was found to be 66.1 percent of GDP.

The threshold effect of domestic debt on the Nigerian economy, as specified in Equation 2, was also investigated, and the result is reported in Table 8. The findings show that, initially, domestic debt positively influenced economic growth, with a unit

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Volume 1 Issue 1, July 2025 - ISSN: 3090-9423

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

increase in domestic debt raising growth by 0.14 percent. This effect was statistically significant at the 1 percent level. However, further increases in domestic debt negatively impacted economic growth by up to 0.16 percent per unit increase, significant at the 5 percent level. This also suggests that the relationship between domestic debt and economic growth is non-linear. The non-linear threshold impact was calculated to be 43 percent. This implies that any domestic debt level above 43 percent of the country's GDP would be detrimental to the economy.

The general implication of these results is that, in the long run, debt levels exceeding 66.1 percent for external debt and 43 percent for domestic debt will lead to declining economic growth.

These findings are consistent with those of other studies (Omotosho, Bawa, and Doguwa, 2016; Ndoricimpa, 2020), which independently identified debt inflection points of 49.4 and 30.9 percent and 58–63 percent for external and domestic debts, respectively. This study should serve as a guide for economic managers in negotiating debt contracts. For example, the Debt Management Office (DMO) has warned that 73 percent of generated revenue in 2024 will be used for debt servicing. This underscores the need to avoid any debt accumulation beyond the recommended thresholds to sustain economic growth.

Finally, the model stability check for the disaggregated threshold models is presented in Figure 2. All estimates conformed to the assumptions of classical least squares regression and are, therefore, unbiased. Moreover, all estimates fall within the acceptable bandwidth, confirming the stability of the results.
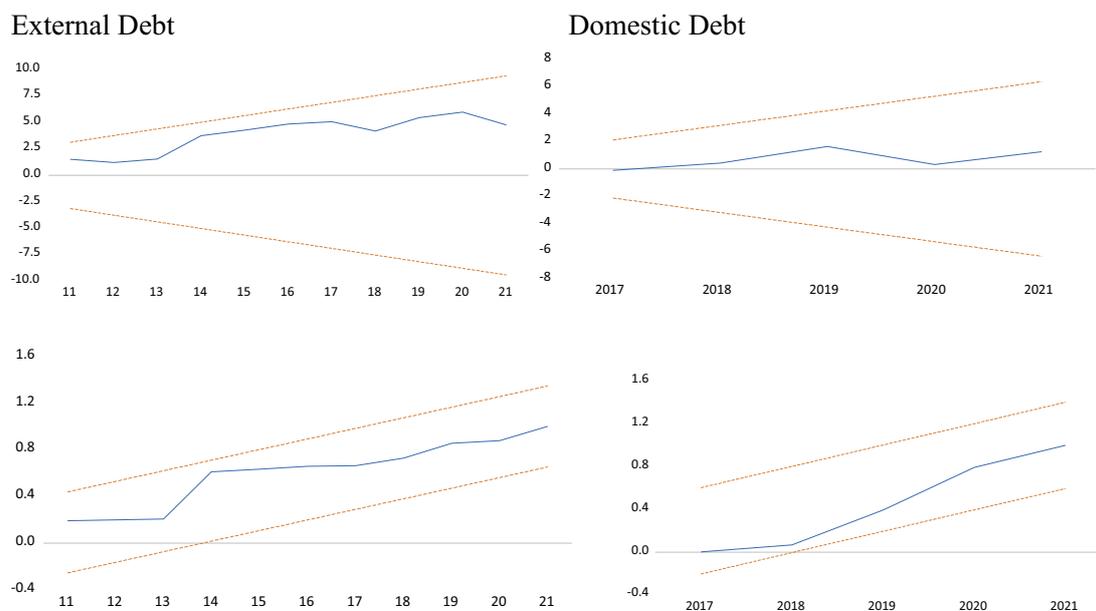

Figure 2: Models stability test
Source: Author's extracted from E views 12.

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

CONCLUSION AND RECOMMENDATIONS

In this study, we investigated the optimal threshold level for debt sustainability in Nigeria using country-specific data spanning from 1981 to 2024. An autoregressive distributed lag (ARDL) model was employed to estimate the results. When the disaggregated threshold analysis of external and domestic debt was conducted, it was observed that the relationship between debt and economic growth becomes non-linear beyond certain points. The identified threshold was 66.1 percent for external debt and 43 percent for domestic debt. We argued that surpassing these thresholds renders debt accumulation economically harmful and retrogressive. Our findings provide a timely perspective for future planning, especially considering the warning by Nigeria's Debt Management Office that up to 73 percent of the country's revenue for 2024 may be used for debt servicing. The results are consistent with existing literature. Based on our findings, we offer the following recommendations:

i. The government should ensure that external debt accumulation remains below 66 percent of gross domestic product (GDP). The assessment of external debt provides a reliable approximation of Nigeria's overall indebtedness, as external debt has historically constituted the bulk of public debt in the country. Our analysis revealed that continued reliance on external debt (as indicated by the quadratic term) reduces output growth, indicating a non-linear (i.e., inverted U-shaped) relationship between output growth and external debt. This finding aligns with empirical studies showing that, beyond a certain turning point, debt begins to negatively affect growth. Policymakers should therefore adopt the established Optimal Debt Threshold Level (ODTL) as a benchmark.

ii. The government should maintain domestic debt accumulation below 43 percent of GDP. Our analysis suggests that while domestic debt contributes positively to economic growth, any further increase beyond this threshold negatively affects output growth. This confirms that the relationship between domestic debt and output growth is also non-linear. Fiscal authorities should therefore take the established ODTL for domestic debt into account when formulating debt policies.

iii. It is recommended that deliberate policies be implemented to ensure that debt accumulation in Nigeria aligns with the country's long-term growth objectives.

iv. The established threshold regarding the impact of debt on growth should serve as a reminder that debt contracts must be evaluated from both sustainability and growth dividend perspectives. The most critical factor in public debt management is the sustainability of such debt. Kaur and Mukherjee (2014) observed that sustainable public debt levels vary across countries depending on country-specific circumstances. They asserted that the rate of public debt growth should be lower than the GDP growth rate. However, our study reveals that while Nigeria's

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Management and Governance (TJFMG)
Volume 1 Issue 1, July 2025 - ISSN: 3090-9423

Benson Edet Ekpenyong, Ph.D[1] & Uduak Michael Ekong, Ph.D[2]

GDP growth has remained sluggish over the years, the rate of public debt growth continues to accelerate. Even after the 2014 economic rebasing that positioned Nigeria as Africa's largest economy, the country's GDP growth rate has lagged behind the growth rate of public debt. Based on this scenario, debt sustainability in Nigeria appears unattainable. Therefore, the established optimal debt threshold levels should serve as a guiding reference for fiscal authorities when contracting new debt.

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