NIGERIA'S PUBLIC DEBT: STRUCTURE AND IMPLICATIONS FOR SUSTAINABLE ECONOMIC GROWTH

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ABSTRACT

This study empirically examines the debt profile in Nigeria and its implications on the country's sustainable economic growth. Using data for the period 1982 through 2021, the study employed the autoregressive distributed lag (ARDL) approach to investigate the impact of domestic debt, external debt, and total debt on Nigeria's economic growth. The result of the ARDL bounds test for cointegration indicated that a long-run relationship exists between the various debt profiles and economic growth. Further, both the ARDL short-run dynamic estimates and the ARDL long run levels estimates revealed that domestic debt, external debt, and total debt have negative and significant impacts on economic growth, depicting that the Nigeria's public debt has wielded a negative and substantial sway on economic growth both in the short and long-run. The implication of this findings rests on the crowding-out effect of Nigeria's public debt, prompting the need for maintaining a sustainable debt level, along with using public debt for productive purposes rather than for consumption expenditures. There is need for the government to diversify the revenue base away from oil, and rationalization of expenditure to the productive sector of the economy should be encouraged

Classification JEL: E62; H60; O47.
Keywords: Debt Overhang, Debt Crowding Out Effect, Debt Servicing, Economic Growth, Debt Burden.

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1.0 Introduction

The act of savings is the deferment of present consumption, while debt entails the sacrifice of future consumption for the present consumption. Thus, some critics of debt accumulation have opined that "debt is a burden for the future generation". It is argued that "the issuance of public debt becomes a burden on the future generation whenever such issuance brings about low subtraction in the welfare of the subsequent generation compared with that of the generation living in the advent of the issuance" (Otaki, 2015). However, Lerner (1944), questioned the future generation burden of debt. He contended that there exists no future cost accumulated from the issuance because the redemption is just a type of transfer inside a country. Although Lerner looks overly enthusiastic about levying tax, both Ricardo and Lerner make the same case that the tax linked with redemption is a transfer within the same country since public debt is not foreign but domestic (Ricardo, 1821). This has been derived from his emphasis on "functional finance," often known as the "aggregate demand management policy", and its purpose (Otaki, 2015).

Barro (1974) argued that "each generation optimizes utility by incorporating their budget constraint and its descendent if it is altruistic to just its future generation". This is a case for the recovery and taxation across generations. In light of this, he maintained that the financial benefit from the issuing of public debt is totally offset by the associated future tax burden.

Governments borrow to bridge the breach between revenue and expenditure. Debt is crucial for developing economies, which are perpetually constrained by a lack of resources (World Bank, 2020). Public debt is therefore a key instrument for the State to offset public expenditures, principally when it is arduous to increase taxes and cut public spending (Yusuf & Mohd, 2021). One of the ways to hasten economic growth is by borrowing strategically to fund critical public infrastructure that will propel private sector investment and overall economic growth. On the other hand, excessive borrowing without sufficient investment planning might result in a heavy debt burden and higher interest costs. The economy will ultimately suffer some consequences from this situation (Joy & Panda, 2020). Since high public debt may cause uncertainty and impede economic growth, it is also regarded as a significant issue for countries with fragile economic frameworks (Masuch, Moshammer, & Pierluigi, 2016).

The neoclassical growth models, "which recommend borrowing for capital-scarce nations to raise their capital accumulation and steady-state level of production per capita, serve as the basis for the argument for government borrowing" (Madow, Nimonka, Brigitte, & Camarero, 2021). The presence of global economic crises has given nations (particularly emerging economies) more motivation to borrow since they are frequently required to boost expenditure levels in the face of decline in capital inflows (Ogbonna, Ibenta, Chris-Ejiogu, & Atsanan, 2019; Yusuf & Mohd, 2021). According to conventional wisdom, public debt boosts output and aggregate demand, which has a favourable short-term impact on economic growth. Theoretical underpinnings, however, acknowledge a long-term negative debt-growth association via crowding out of private investments (Serieux & Yiagadeesen, 2001).

Through higher long-term interest rates, greater inflation, and more future distortionary taxes, public debt can stifle private investment and jeopardize economic progress (Mhlaba, Phiri, & Nsiah, 2019). The economy may suffer greatly if domestic borrowing is used extensively, in that domestic interest rates are greater than those of other countries, servicing domestic debt can account for a sizeable portion of a government's revenue (Yusuf & Mohd, 2021). Domestic borrowing costs can swiftly grow along with an increase in debt

outstanding, particularly in markets with limited liquidity. Higher interest rates would eventually discourage investments and stifle private investments. Eventually, the lesser investment results in a lower steady-state capital stock and production level. Thus, a larger overall long-term effect of debt would be lower total production, which in turn would lead to decreased spending and worsen economic outcomes. As each generation burdens the next by leaving behind a decreased total stock of capital, this is also known as the burden of public debt (Àkos & Istvàn, 2019; Yusuf & Mohd, 2021).

Another way to finance capital expenditure is through external debt. According to Adepoju, Salau, & Obayelu (2007), "the vicious loop of low productivity, low income, and low savings characterizes emerging nations in Africa and contributes to their insufficient internal capital development". Therefore, in order to close the resource gap, these countries require technical, administrative, and financial assistance from Bretton wood Institutions. However, in emerging countries, foreign debt is a significant barrier to capital development. The burden and dynamics of external debt demonstrate that they have a minimal impact on funding economic growth in emerging nations. Most of the time, the principal itself and the associated debt service obligations compound the debt problems for the countries.

In light of the aforementioned, "foreign debt turns into a interminable process of increasing poverty, excessive exploitation of workers, and a barrier to progress in emerging countries" (Folorunso & Felix, 2008). Ayadi, Toluwase, Ayadi, & Chatterjee (2003) claimed that the "burden of foreign debt has significantly reduced the involvement of developing nations in the global economy and that the related debt payment responsibilities continue to be a barrier to economic growth and development" (Folorunso & Felix, 2008). Due to the burden of debt, there has been little capital accumulation (resulting in the depletion of foreign reserves) and little use of flexible financing policies to combine small and medium-sized businesses; causing an indirect impact on poverty, literacy, and employment (Folorunso & Felix, 2008).

Despite Modigliani and Miller's (1965) contrary views, classical finance theory, upheld by Solomon (1963), Weston (1963) and Lintner (1963) holds that "leverage is advantageous for business growth". However, if the value of products and services created by debt financing surpassed the expenses of such debt, the economy would be better off with a sizable mixture of both domestic and external loans. This position hinges on the assumption that the administrative and interest costs associated with borrowing are lower than the operational incomes. Operating earnings roughly represent "the value of products and services produced in the economy when applied to the macro economy" (Ujuju & Oboro, 2017).

If debt build-up fosters economic expansion and citizens' wellbeing, it is considered advantageous. However, Todaro and Smith (2009), vigorously contended that when debts are not properly managed, particularly in less developed nations, "the resulting debt burden might be heavy and burdensome with serious detrimental socioeconomic effects". If governments in developing nations utilize leverage to finance socially and economically beneficial public sector initiatives, leverage's desirability presumably arises from the financial and economic potential (Ujuju & Oboro, 2017). These include transportation, health care delivery services, and power supply; as the rapid growth of the public and commercial sectors of the developing economies depends on infrastructural development.

A conventional debt measure that relates a country's debt stock to its productive capacity is the debt stock to GDP ratio. As a result, the bigger a country's debt stock is in comparison to its output, the bigger its debt burden. The debt/GDP ratio in Nigeria has been rising substantially in recent years which is an indication of a

greater debt burden for the economy. The ratio was increased from 0.13% in 1982 to 1.5% in 1989, averaging 0.56% during the period, 1982 and 1989. The 1990s witnessed a substantial increase in the debt/GDP ratio, it deteriorated to 14.0% in 1999 from 1.8% in 1990, indicating an average of 5.0% within the period. The ratio remained on the double-digit within 2000 and 2005 with an average of 15.5% before improving to an average of 6.9% between 2006 and 2010 arising from huge external debt settlement by the Obasanjo administration between 2006 and 2007. Subsequent years recorded double digits debt/GDP ratios, from 11.21% in 2011 to 15.7% in 2015 but worsening to 29.1% in 2018. Between 2011 and 2021, the debt/GDP ratio averaged 24.0%, with a record high of 47.8% in 2021.

Given the debt/GDP ratios adumbrated above, the severity of Nigeria's debt burden is incontrovertible, especially when this is juxtaposed within the context of the dwindling revenue profile. The implication is a situation of debt overhang with serious negative impacts on the government spending on key sectors of the economy, as well as private sector investment in Nigeria. This on the face value could induce the crowding out effect of private sector investment as a result of the rising debt burden? In other words, could the rising public debt exert a negative effect on the growth of the Nigerian economy? It is on this background that this study seeks to investigate the implication of the Nigeria's rising public debt profile on the output growth. Specifically, the study seeks to investigate the impact of the domestic debt, external debt, and total debt on the real GDP growth of Nigeria. This study utilizes recent data to explore this issue with a more robust framework that should aid the determination of both the short-run and the long-run effect of public debt on growth. In doing so, the public debt is disaggregated into domestic, external and total debt and their individual influence on economic growth is being examined using a separate model.

This paper is structured in five main sections. The introduction section is followed by the stylized facts on Nigeria's public debt profile as Section 2. Section 3 presents the theoretical and empirical literature review. Section 4 outlines the methodology deployed in the study, while Section 5 contains the empirical findings and discussion of policy implications. Section 6 presents the conclusion and policy recommendations of the study.

2. Stylized Facts on Nigeria's Public Debt Profile

The structure of Nigeria's debt is categorized into the internal (domestic) debt and external (foreign) debt. While the domestic debt entails raised by the government from individuals, institutions, etc. within the country using debt instruments like Treasury Bills, FGN Bonds, Treasury Certificates, Promissory Note, FGN Sukuk, Treasury Bonds, Development Stocks, FGN Green Bonds, and FGN Savings Bond. The foreign debt entails government borrowing from persons or institutions outside the country. Such debt has been categorized to emanate from multilateral, bilateral, and commercial (Paris Club, London Club, Euro Bond, Diaspora Bonds, etc.) sources.

The reflection of Nigeria debt structure is presented in Table 1 (see appendix). For the purpose of emphasis, recent values of the different debt structure are presented from the first quarter of 2015 to the first quarter of 2022. The debt covers the external and domestic debts of the Federal Government of Nigeria (FGN), the States, and the Federal Capital Territory (FCT). Figure 1.1 presents the trend in these debts' components over the years.

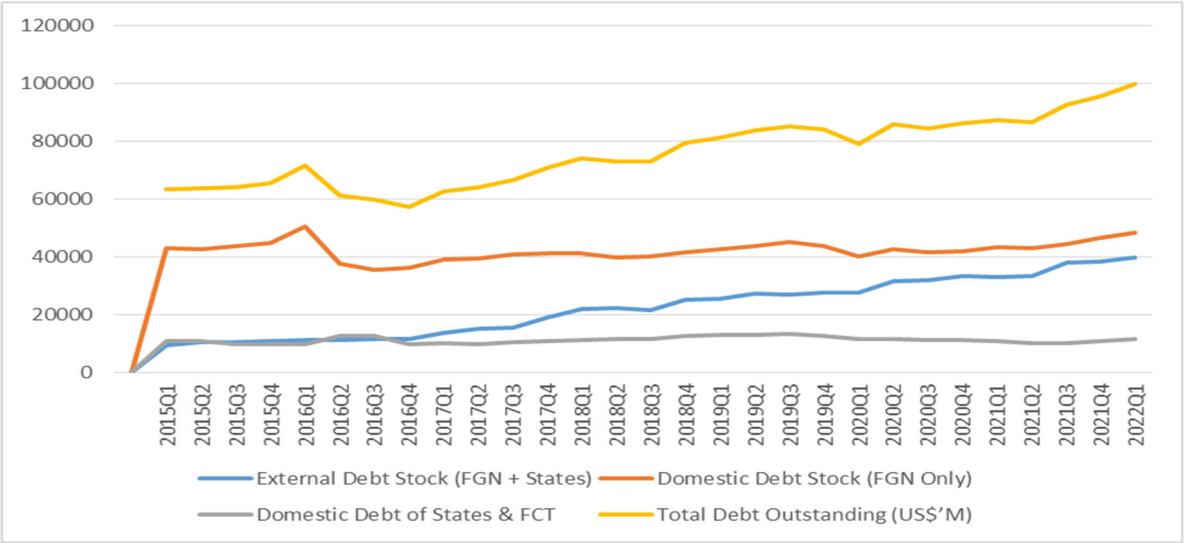

Figure 1: Trend of Public Debt Stock - External and Domestic Debt of the FGN, States and FCT

With the external debt stock of the FGN and the States standing at US$9,464.11 million or 14.90% of total debt stock in the first quarter of 2015, the Nigerian economy witnessed a massive rise in the external debt profile to the tune of US$13,807.59 million or 21.96% in the first quarter of 2017. This was followed by the continuous rising trend up to US$27,162.63 million or 32.38% of the total debt stock in the second quarter of 2019. This rising trend continued till the fourth quarter of 2020 where it reached US$33,348.08 million or 38.60% of the total debt stock, it eased marginally to US$32,859.99 million or 37.67% of total debt stock. Subsequently, the Nigerian economy maintained a persistent rising trend of external debt stock, up to US$37,955.09 million or 40.98% of the total debt stock in the third quarter of 2021 and rising to US$39,969.19 million or 39.94% of the total debt stock as at the first quarter of 2022 (Debt Management Office, 2022a).

On the domestic debt front, the total domestic debt by the federal government was estimated at US$43,185.51 million or 68% of the total debt stock in the first quarter of 2015 which rose markedly to US$50,609.41 million or 70.63% of the total debt stock as at the first quarter of 2016. The domestic debt stock of the federal government has been vacillating over the years. For instance, it was 62.16% of the total debt stock in the first quarter of 2017 and continued to decline steadily up to 52.19% of the total debt stock as at second quarter of 2019 which later rose to 53.03% of the total debt stock in the third quarter of 2019. Subsequently, a declining trend sets in based on its percentage composition on the total debt stock. For example, it was 50.77% in the first quarter of 2020 before declining to 48.68% in the fourth quarter of 2020 and then rose again to 49.88% in the first quarter of 2021. The domestic debt of the FGN stood at US$43,040.09 million or 49.72% of the total debt stock in the second quarter of 2021 and rose sharply to US$48,452.26 million or 48.42% of the total debt stock in the first quarter of 2022 (Debt Management Office, 2022a).

At the States and Federal Capital Territory (FCT) level, the debt profile followed an oscillating pattern. While it was US$10,856.52 million or 17.10% of the total debt stock in the first quarter of 2015, it declined to US$9,852.25 million or 13.75% of the total debt stock in the first quarter of 2016 before rising again to US$12,706.91 million or 21.24% of the total debt stock in the third quarter of 2016. This oscillating pattern continued where the domestic debt of the States and FCT was put at US$12,944.58 million or

15.43% of the total debt stock in the second quarter of 2019 as against US$11,514.21 million or 15.73% of the total debt stock in the third quarter of 2018. The domestic debt stock declined further to US$10,997.86 million or 13% of the total debt stock in third quarter of 2020 before a further decline to US$10,233.44 million or 11.05% of the total debt stock was recorded in the third quarter of 2021. The domestic debt stock of the States and the FGN rose substantially to US$11,648.44 million or 11.64% of the total debt stock in the first quarter of 2022 (Debt Management Office, 2022a).

With the use of annual data, we can therefore capture the behaviour of both the domestic and external debt outstanding of the FGN as Figure 2 can clearly indicate.

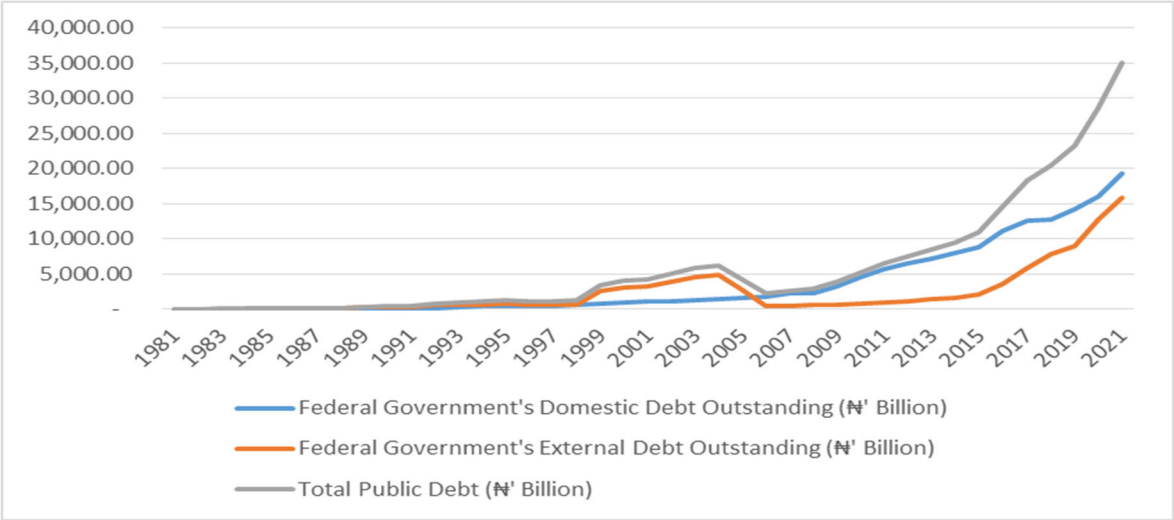

Figure 2: Trend of domestic, foreign, and total debt outstanding in Nigeria

It can be pointed out clearly from Figure 2 that while the total debt stock of the Federal Government was below N5,000 billion in all categories (domestic and external), in the 1980s and 1990s, the debt stock rose slightly above N5,000 billion as at 2003 before sliding below the stated value in 2006 through 2009. Thereafter, a sharp increase in all the debt categories emerged due to the need to finance infrastructure. While the total debt rose above N35,000 billion in 2021, the domestic debt outstanding was close to N20,000 billion while the external debt outstanding was a bit above N15,000 billion. Precisely, the total debt stock of the government was put at N35,097.788 billion while the domestic debt outstanding and external debt outstanding were N19,242.56 billion and N15,855.23 billion respectively (Central Bank of Nigeria, 2021).

Given the rising trend of public debt, it is imperative to note that such will follow a rising debt servicing obligations. As Table 2 (see appendix) can clearly indicate, there have been frequent changes in the external debt service of the government over the years. Table 2 contains the debt service attributable to bilateral, multilateral, commercial, and other external debt obligations of the government. At the multilateral level, the debt service rose from US$36,889.67 million or 33.75% of the total debt service in the first quarter of 2015 to US$138,650.80 million or 41.88% of the total debt service in the fourth quarter of 2015. This was followed by a substantial decline to US$36,632.25 million or 61.25% of the total debt service in the fourth quarter of 2016. The period 2017Q1 to 2019Q4 was marked with high volatility in the debt servicing to multilateral debts. While it was 39.70% of the total debt stock in 2017Q1, it rose to 58.34% in 2017Q4 before plunging to 10.52% in 2018Q3 and 7.25% in 2019Q3. Subsequent years were marked by a somewhat rising debt service to multilateral sources such as US$114,522.43 million or 24.23% of the total debt service in 2020Q1; and US$134,044.34 or 13.36% of the total debt service in 2021Q1. This continued up to a record high of

US$173,401,723.38 million or 24.99% of the total debt service in 2022Q1 as against US$92,978.06 million in 2021Q4 (Debt Management Office, 2022b).

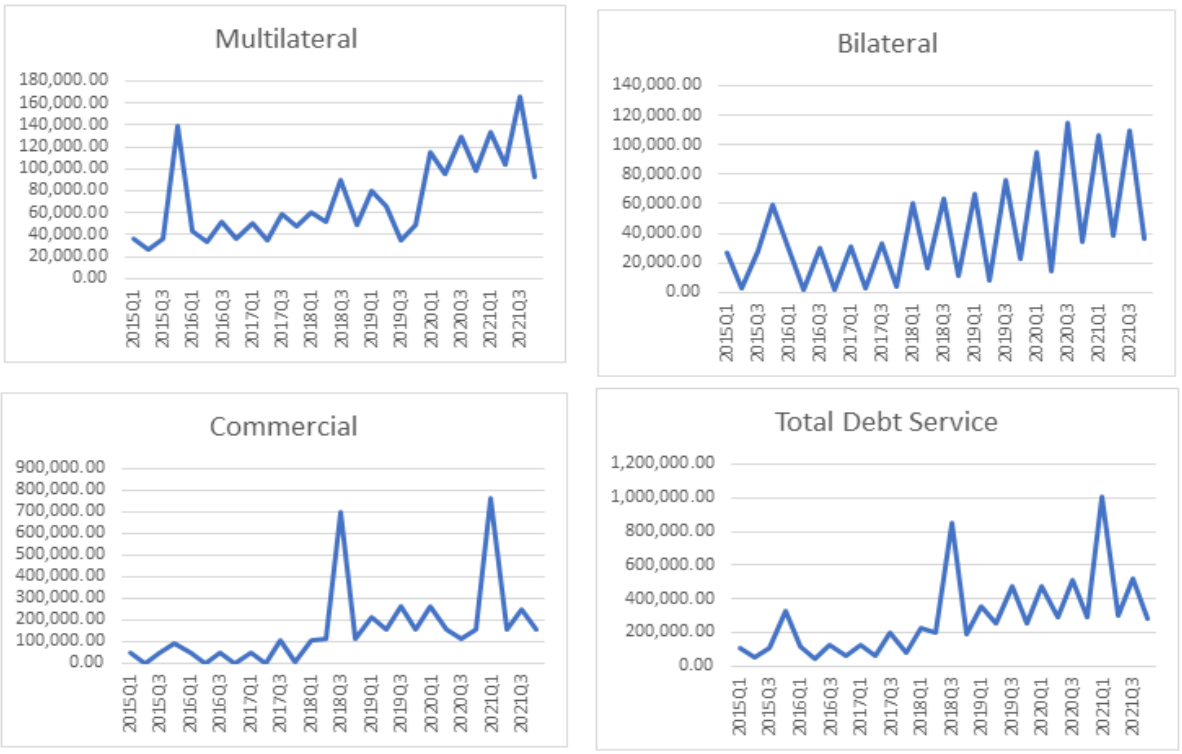

Figure 3: Trend of debt service components in Nigeria

The bilateral debt servicing constituted 24.51% of the total debt service in 2015Q1 which remained highly volatile, reaching 25.66% in 2015Q3 and 3.98% in 2016Q2. The bilateral debt service was put at US$4,282.91 million or 5.31% of the total debt service in 2017Q4 which continued to be highly volatile and averaging US$43,446.63 million or 12.02% of the total debt stock within 2018Q1 and 2020Q2. The third quarter of 2020 was marked with huge debt service in respect to bilateral debt which stood at US$ 114,596.67 million or 22.60% as against US$ 14,260.19 million or 4.97% in 2020Q2. The bilateral debt servicing continued to rise substantially, reaching US$106,329.35 million in 2021Q1, US$109,252.61 million in 2021Q3, and a whooping US$ 129,290,093.99 million or 18.63% in 2022Q1 (Debt Management Office, 2022b).

The commercial debt servicing was scanty in the 2015Q1 through 2017Q2 with an average of US$39,941.00 million or 22.09% of the total debt servicing. Subsequent years revealed that the commercial debt servicing accounted for the greatest proportion of the total debt servicing in Nigeria. For example, it averaged US$193,183.09 or 54.69% of the total debt service between 2017Q3 2019Q4. This further increased to an average of US$251,859.89 million or 54.97% of the total debt service between 2020Q1 and 2021Q4 (Debt Management Office, 2022b).

Whether these rising trend in the public debt stock and the debt servicing has an influence (positive or negative) on the Nigerian economy will further be empirically ascertained to reveal the implications of the rising public borrowing on the economy.

3.0 Literature Review

3.1 Theoretical Literature

Some of the theories explored in this study include the Harrod-Domar growth model, the growth-cum-debt theory, debt overhang theory, the crowding out theory of public debt, the liquidity constraint hypothesis, the direct effect of debt hypothesis, and the debt Laffer Curve.

3.1.1 The Harrod-Domar Growth Model

The Harrod-Domar growth model demonstrates a clear relationship between savings and economic growth. The idea states that an economy's rate of growth depends on the amount of national saving and the productivity of capital investment. Therefore, "a higher rate of output growth will result from an increased savings rate and capital's marginal productivity" (Todaro & Smith, 2011). The concept states that policies that boost investment by raising savings and make better use of existing investment through technical developments are necessary for economic growth (Harrod, 1939; Domar, 1946). The Harrod-Domar model has been used to explain the relationship between debt and economic growth in emerging countries, despite its original purpose being to explain the cause of economic growth. The reason for this is that "in such countries, labour supply is assumed to be ample, but physical capital is limited, resulting in slower economic growth." Moreover, developing nations do not have the per capita income to encourage high savings rates, which prevents them from making enough investments to build up their capital stocks (Ekong, Effiong, & Inyang, 2021). The "capital that assists developing economies in filling finance gaps in order to accelerate growth" is defined as borrowing from outside sources (Eaton, 1993).

3.1.2 The Growth-cum-Debt Theory

Chenery and Strout (1966) established the growth-cum-debt theory, which is based on the emblematic neoclassical growth model. External borrowing, according to the theory, is utilized to bridge the gap between domestic savings and investments. External borrowing contributes favourably to economic growth when capital mobility is complete (allowing nations to borrow and lend). The growth-cum-debt paradigm makes the assumption that debt was taken on in order to make investments, and that these investments will boost economic growth (Nyong, 2005). The benefits and drawbacks of borrowing throughout the process of economic growth are taken into account when evaluating debt capacity using the growth-cum-debt model (Ekong, Effiong, & Inyang, 2021). The primary idea is that a country's ability to service debt will be maintained as long as debt contribute significantly to growth over time. According to the model, in order to sustain debt servicing capacity over time, production growth should equal or surpass the cost of borrowing, as measured by the interest rate (Hjertholm, 1999).

3.1.3 Debt Overhang Theory

Krugman (1988) anticipated the possibility that a country's cumulative debt may surpass its repayment capabilities in the near future. In other words, the predicted cost of debt servicing will start to discourage both internal and foreign investments, because efforts to achieve economic expansion through lucrative operations would still result in increased debt acquisition (Omodero, 2019). Debt overhang dampens economic growth by discouraging private-sector internal and foreign investments that might otherwise support economic progress (Krugman, 1988). Potential investors would be deterred on the grounds that they would be less eager to incur

investment costs today in order to increase future output since governments would tax them more heavily the higher the production (Gordon & Cosimo, 2018). By reducing the public resources available for investment in infrastructure and human capital, debt service may daunt growth (Coccia, 2017). Due to the uncertainty and bad incentive effects that debt overhang causes, private investment programmes are hampered (Spilioti & Vamvoukas, 2015).

Debt overhang is a major contributor to stifling economic growth in heavily indebted countries (Yusuf & Mohd, 2021). As Àkos and Istvàn (2019) highlighted in the context of impoverished nations, servicing enormous public debts depletes the indebted country's revenue to the point that the country's potential to return to development trajectory is bleak, even if the country implements effective reform programmes. A high debt ratio also precipitates capital flight by heightening the danger of depreciation and taxes, and hence the urge to safeguard the true worth of financial assets (Yusuf & Mohd, 2021).

3.1.4 Crowding Out Theory of Public Debt

Consistent with the crowding out hypothesis, debt servicing may become such a burden that government income may no longer be enough for the provision of public services that complement private investment and increase private sector engagement in the economy (Omodero, 2019). As a result, Serieux & Yiagadeesen (2001) noted that "significant debt obligation infers that the government's short-term earnings must be spent to service the debt, squeezing out public investment in the economy". Due to the fact that certain private and public investments are complementary, reducing public investment may result in a decline in private investment (Diaz-Alejandro, 1981; Taylor, 1983). In line with Panizza, Sturzenegger, and Zettelmeyer (2010), excessive domestic borrowing causes financial instability, crowds out the private sector, and lowers public sector investment due to the negative effects of debt servicing.

The funding of the government's deficit through domestic and foreign borrowing may lead to higher interest rates, less disposable income, and higher wages, all of which weakens corporate profitability and, thus, private investment. As a result, this might deter or crowd out private investment and reduce the amount of production in an economy (Spilioti & Vamvoukas, 2015). Fiscal expansion, according to the Keynesians, has the inclination to boost aggregate demand for private sector products via the multiplier, thus, supporting the rise of private investment.

3.1.5 The Liquidity Constraint Hypothesis

Through the balance of payments account, the liquidity constraint hypothesis (LCH) measures the growth effect of a very large debt ratio. This concept, also known as the 'import compression effect', holds that "governments with a large debt load require a sufficient influx of foreign money to service the debt". When a country's currency is not marketable on the international market, this scenario has a specific need (Senadza, Fiagbe, & Quartey, 2018). When debt service becomes difficult due to poor exports and capital inflows, as well as insufficient reserves, a government may turn to devaluation, import substitution, or export promotion to attract foreign exchange inflows (Serieux & Yiagadeesen, 2001). As a result of price increases in critical imported commodities such as inputs and capital items, import compression may develop, leading to low growth (Taylor, 1983; Senadza, Fiagbe, & Quartey, 2018; Inyang & Effiong, 2020).

3.1.6 The Direct Effect of Debt Hypothesis

Fosu (1996) proposed the direct impact of debt hypothesis (DEDH), which emphasizes the beneficial effects of foreign debt on growth. According to this theory, even if foreign debt is insignificant in the savings and investment function, it can still have an impact on output growth via its impacts on factor productivity and growth mix (Fosu, 1996; Senadza, Fiagbe, & Quartey, 2018). Though the debt overhang, crowding out effect, and liquidity restriction theories all claim that external debt can drag down investments, Fosu (1999) contends that it can also stifle the efficiency of the of production factors that drive growth.

3.1.7 The Debt Laffer Curve (DLC) Theory

A nonlinear link between foreign debt and growth was proposed by Cohen (1993). He asserts that "economic stagnation results from exceeding a threshold of debt, which may stifle growth." Consistent with Senadza, Fiagbe, & Quartey (2018), the DLC illustrates the link concerning the face value of debt and investment by stating that repayment ability starts to decrease if outstanding debt goes beyond a certain threshold. Borrowing above such a level result in debt overhang and debt servicing issues, thus stifling growth (Pattillo, Poirson, & Ricci, 2002).

3.3 Empirical Literature

Various scholars have explored the debt-growth nexus over the years. With regards to the Nigerian and South African economies, Folorunso & Felix (2008) investigated the impact of foreign borrowing on the growth. The result revealed that the debt service ratio accelerated production growth in Nigeria but slowed it in South Africa. The basis for their results was the settlement patterns. At that time, Nigeria barely repaid a small portion of her foreign debt, but South Africa repaid its debt substantially. Furthermore, while debt servicing is expected to have a deleterious influence on output growth in Nigeria, the higher the debt, the more likely it retards output growth.

In order to determine the appropriate level of debt for economic growth, Nasa (2009) used Hansen's endogenous threshold model to estimate the debt threshold using data for 56 countries from 1970 to 2000. The study found a threshold ratio of 45% for debt to GDP, meaning that public debt starts to adversely impact growth in output once this point is exceeded.

Malik, Hayat, & Hayat (2010) used the OLS to analyze the link between foreign debt and economic growth in Pakistan, between 1972 and 2005. The report that, "external borrowing has a deleterious and significant association with growth", pointing that an increase in external borrowing will limit economic growth. Similarly, empirical result suggests that "debt servicing has a significant and detrimental impact on GDP growth", implying that rising debt servicing costs will likely reduce economic growth.

The impact of foreign debt on the Pakistani economy from 1972 to 2010 was studied by Rais & Anwar (2012) using the OLS regression technique. The study observed that because both kinds of debt (domestic and foreign) are not used and managed well, they have a detrimental influence on the economy of the country. On the other hand, the study found that positive results may be achieved if debt is effectively managed and mostly used in productive areas.

Chinaemerem & Anayochukwu (2013) studied the impact of foreign loan financing on Nigerian economic development using time series data from 1969 to 2011. The Vector Error Correction Model (VECM) was used

for estimation. The findings of the VECM revealed that foreign debt financing had a favourable and considerable impact on Nigeria's economic development. The findings revealed that debt financing in terms of London Club had a beneficial effect on economic growth. However, the findings revealed that Paris debt, multilateral debt, and promissory loan funding had a considerable detrimental impact on Nigeria's economic growth.

Forgha, Mbella, & Ngangnchi (2014) explored how foreign debt affects Cameroon's economic growth via investments. The study made use of annual data from 1980 to 2013 using the two-stage least squares method. Their findings demonstrated that investments enhance development in the Cameroonian economy whereas debt slows growth.

Omotosho, Bawa, & Doguwa (2016) studied the likelihood of threshold effects in the connection between public debt and economic progress in Nigeria using quarterly data. Overall, they found empirical support for a reversed U-shape association between various types of governmental borrowing and economic expansion. The model results suggested a threshold level of 73.70% for total public borrowing as a percentage of GDP, whereas the expected inflexion points for foreign and domestic debts were 49.4% and 30.9%, respectively. The authors concluded that debt accumulation over the projected threshold levels may be harmful to economic growth.

Ujuju & Oboro (2017) used simple and multiple regression analysis to demonstrate an empirical association between the structure of Nigeria's public indebtedness and the country's economic performance from 1990 to 2015. According to the findings, the effect of aggregate public debt on Nigeria's GDP is positive and substantial. Further, external debt has a negative and significant impact on Nigeria's GDP, but domestic debt has a positive and significant impact. The study concluded that Nigeria's public debts are useful in forecasting partial fluctuations in the country's economic performance.

Ndubuisi (2017) used annual data from 1985 to 2015 to examine the impact of external debt on the Nigerian economy. The Johannsen cointegration test, the ECM, and the OLS approaches were used to evaluate the data. The results showed that while foreign debt stock had a large beneficial influence on Nigeria's economic growth, debt servicing had a negative impact on economic growth. This, however, runs counter to Ujuju & Oboro's (2017) findings, which showed that foreign debt had a negative impact on Nigeria's GDP.

Eze, Nweke, & Atuma (2019) investigated the bearing of government debt on the Nigerian economy. Data obtained were analyzed using the ARDL technique and the Chow breakpoint test from 1981 to 2017. The findings showed that "external debt had a negative and significant impact on GDP in Nigeria", but the influence of domestic debt was negative but inconsequential. This supports the result of Ndubuisi (2017) that reported a negative effect of foreign debt on economic growth.

Inyang & Effiong (2020) investigated the sway of external debt on economic growth of Nigeria from 1981 to 2019 with the aid of the ARDL approach. The study revealed "a positive but insignificant influence of debt burden on growth; while the effect of debt overhang and debt crowding out were all negative and significant in influencing economic growth". The study put forth a recommendation that external debt should be channelled through good investment channels to prevent the negative consequences of diversion of resources.

Yusuf & Mohd (2021) investigated the effect of government debt on Nigeria's economic growth from 1980 to 2018 using the ARDL method. The study's conclusions showed that while foreign debt stimulated growth in the near term, it hindered it over the long run. While having a detrimental effect on short-run growth, domestic

debt has a significant positive influence on long-term growth. Growth was hampered by both short-term and long-term debt service obligations, supporting the impact of the debt overhang.

The study of Ekong, Effiong & Inyang (2021) was aimed to determine the influence of public debt on the Nigerian economy, as well as identifying an optimal debt threshold. With data from 1981 through 2019, the study employed the ARDL approach and threshold regression analysis. The findings revealed that the effect of domestic debt and external debt on economic growth were all negative and significant, which supports the debt crowding out theory. Further, the study estimated a threshold of 15.021% for Debt/GDP ratio that could be sustainable for growth. the study suggested for a proper management of public debt to avoid undesirable policy outcomes.

Recent study by Aiyedogbon, Zhuravka, Korneyev, Banchuk-Petrosova, & Kravchenko (2022) explored "the short-run ad long-run weight of debt on Nigeria's economic growth". With data for the period 1990 through 2020 and analysed using autoregressive distributed lag (ARDL) bounds testing approach which revealed existence of long run relationship between debt and economic growth. Further, the results also showed that external debt and debt service significantly and negatively impact on economic growth, while that of domestic debt positively influenced economic growth. The report advocated for the government to favour domestic borrowing more than foreign borrowing, which should only be used in emergencies.

The literature is mixed with findings of both negative and positive effect of debt on growth. This creates a gap for further investigation since there have been no consensus on the actual direction of the effect of public debt on the growth of an economy.

4.0 Methodology

4.1 The Model

Our concern is a growth model that takes debt into consideration. By introducing a traditional linear production function where output (Y) is being defined as a function of labour (L) and capital (K), we can introduce the debt variable with other control variables as follows:

$$RGDP = f(GFCF, LABR, DDGDP, GEGDP, INF, MSGDP, TOPN) \quad (1)$$

$$RGDP = f(GFCF, LABR, EDGDP, GEGDP, INF, MSGDP, TOPN) \quad (2)$$

$$RGDP = f(GFCF, LABR, DGDP, GEGDP, INF, MSGDP, TOPN) \quad (3)$$

Where

RGDP = economic growth (% growth rate of real GDP)

GFCF = capital stock (gross fixed capital formation, % of GDP)

LABR = labour (working population, % of GDP)

DGDP = total debt (% of GDP)

DDGDP = domestic debt (% of GDP)

EDGDP = external debt (% of GDP)

GEGDP = government expenditure (% of GDP)

INF = inflation measured as a % of consumer price index

MSGDP = financial development (broad money supply as a ratio of GDP, %)

TOPN = trade openness (trade as % of GDP)

Equation (1) captures the growth model where domestic debt is captured as one of the independent variables representing debt, while Equation (2) captures the growth model where external debt is considered as one of the independent variables. In Equation (3), the growth model is specified with a consideration of the total debt of the nation. These equations are transformed econometrically as follows:

$$RGDP = \alpha_0 + \alpha_1 GFCF + \alpha_2 LABR + \alpha_3 DDGDP + \alpha_4 GEGDP + \alpha_5 INF + \alpha_6 MSGDP + \alpha_7 TOPN + \mu \quad (4)$$

$$RGDP = \beta_0 + \beta_1 GFCF + \beta_2 LABR + \beta_3 EDGDP + \beta_4 GEGDP + \beta_5 INF + \beta_6 MSGDP + \beta_7 TOPN + \mu \quad (5)$$

$$RGDP = \gamma_0 + \gamma_1 GFCF + \gamma_2 LABR + \gamma_3 DGDP + \gamma_4 GEGDP + \gamma_5 INF + \gamma_6 MSGDP + \gamma_7 TOPN + \mu \quad (6)$$

Of which the $\alpha's$, $\beta's$, and $\gamma's$ are the parameters to be estimated, the variables are as earlier defined, and μ is the stochastic term assumed to be normally distributed.

4.2 a priori Expectation

The a priori expectation follows that labour force (LABR), capital (GFCF), government expenditure (GEGDP), financial deepening (MSGDP) will impact positively on economic growth (RGDP). The effect of inflation and trade openness on growth is expected to be either positive or negative; while we are not sure of the effect of the different debt structure on the growth of the Nigeria economy. This is because following the growth-cum-debt hypothesis, debt will put forth a positive influence on growth, while the debt overhang and debt crowing out effect suggests that rising debt can cause a deleterious impact on growth by crowding out private sector investments.

4.3 Nature and Sources of Data

The data utilized in this study are time series in nature spanning from 1982 to 2021. The data so utilized were obtained from the Central Bank of Nigeria (CBN) (2021) statistical bulletin, the World Bank (WB) (2021) database, and the Debt Management Office. Data on trade openness, labour force, and inflation rate were got-ten from the WB database while that of debt, financial development, government expenditure, RGDP, and GFCF were all acquired from the CBN statistical bulletin. Quarterly data which were used in the stylized facts were obtained from the Debt Management Office (DMO) publication on various issues.

4.4 Technique of Analysis

The technique of analysis utilized in this study follows Pesaran, Shin, and Smith (2001) autoregressive distrib-uted lag (ARDL) approach. This approach sufficiently assists in the estimation of both the short-run and the long-run models, with the long-run estimation being sacrosanct if cointegration which is done through the bounds testing approach exists (Narayan, 2005). The ARDL approach is tenable when the variables' order of

integration is mixed including 1(0) and 1(1). Thus, the ARDL entails the following processes:

4.4.1 Unit Root Test

The unit root test is performed to establish the order of integration of the time series variables. As stated earlier, the variables must be in mixed order of integration where some are at levels I(0) and others are at first difference I(1) before the ARDL approach could be considered appropriate. In this study, we utilize the Augmented Dickey-Fuller (ADF) unit root test developed by Dickey & Fuller (1979) based on the constant and trend assumption. In its general form, the model for the test is specified thus;

$$\Delta m_t = \varphi + \delta t + \beta_1 m_{t-1} + \sum_{i=1}^{v} \rho_i \Delta m_{t-i} + \varepsilon_t \qquad (7)$$

Of which the variable to be tested for unit root is m, v represents the lag length which is to be automatically selected, t captures the trend, φ represents the drift or constant terms, the summation part of the model represents the augmented component of the test to account for serial correlation, Δ indicates the change, and ε is the error term. The test is conducted by testing the null hypothesis that $\beta_1 = 1$ as against the alternative that $\beta_1 < 1$. The rejection of the null hypothesis implies that there is no unit root. This is only obtainable when the ADF statistic is more negative than the 5% critical value of the test.

4.4.2 Cointegration Analysis

The use of the ARDL bounds test for cointegration is derived from the integration of some of the variables at levels and others at first difference. This method of cointegration analysis developed by Pesaran, Shin and Smith (2001) is appropriate in this scenario compared to the usual Engel-Granger cointegration test which is valid when all the variables are stationary at first difference. The general form of the test s specified below;

$$\Delta RGDP'_t = \tau'_0 + \pi_i' X_i' + \sum_{i=1}^{v} \gamma_i' \Delta RGDP'_{t-i} + \sum_{i=0}^{f} \vartheta'_i \Delta X'_{t-i} + \epsilon_t \qquad (8)$$

Of which *X* signifies all the independent variables in the model, *v* is the optimal lag length of the dependent variables while *f* captures that of the independent variables. The parameter π_i' signifies the long-run estimates of the model's while γ_i' and ϑ'_i symbolize the short-run parameters. The use of prime implies that the specified models are for Model I, Model II, and Model III if expressed in a specific form.

The F-statistic, which is utilized for the test, is produced by estimating the Equation (8). To determine whether the null hypothesis is accepted or rejected, the Wald test techniques-based F-statistics test is utilized. This may be achieved by comparing the Pesaran, Shin, & Smith (2001) bound critical values with the theoretical F-statistics value. When the estimated F-statistics exceed both the I(0) and I(1) critical values, cointegration is present and the null hypothesis is overruled. On the other hand, the null hypothesis is validated and there is no

cointegration among the variables if the estimated F-statistics fall short of the I(0) and I(1) critical value. In the meanwhile, if the predicted F-statistic value falls between the I(0) and I(1) critical values, result is inconclusive. In this case, determining the order of integration of the variables requires the use of the standard cointegration technique.

4.4.3 Error Correction Model

The error correction model (ECM) is used to discover a variable's short- and long-term dynamics around its stable equilibrium value. The possibility of error correction of short-run distortions demands that the sign of the ECM coefficient be less than zero and statistically significant. The bigger the ECM coefficient (in absolute term), the faster the model adjusts to long-run equilibrium. The coefficient, denoted by ζ, is reflected in Equation (9) were we specify the error correction model.

$$\Delta RGDP'_t = \tau'_0 + \sum_{i=1}^{n} \gamma_i{}'\Delta RGDP'_{t-i} + \sum_{i=0}^{m} \vartheta'_i \Delta X'_{t-i} + \zeta ECM_{t-1} + \epsilon_t \qquad (9)$$

The only difference between Equation (8) and Equation (9) is the introduction of the ECM term in the later plus the exclusion of the long-run component of the model. The ECM term, ζ, measures how fast any distortions in the short-run will likely be corrected in the model to attain long-run equilibrium. This forms the basis for the estimation of the dynamic short-run model and the long-run models.

5.0 Empirical Findings

5.1 Descriptive Statistics

With our time series variables being used in the study, Table 3 captures the descriptive properties of each of the variables.

Table 3: Descriptive Properties of the Variables

	RGDP	DDGDP	DGDP	EDGDP	GEGDP	GFCF	INF	LABR	MSGDP	TOPN
Mean	3.446	6.159	11.1430	4.983	4.484	27.249	19.493	0.206	15.546	32.416
Median	3.921	3.757	6.813	2.469	3.727	26.597	12.936	0.221	12.899	33.871
Maximum	15.329	26.222	47.828	21.606	16.576	70.056	76.758	0.263	24.895	53.277
Minimum	-10.924	0.081	0.129	0.047	0.058	13.787	0.223	0.137	8.464	9.135
Std. Dev.	4.810	7.013	11.309	5.617	4.391	12.718	17.343	0.047	5.360	12.090
Skewness	-0.418	1.310	1.472	1.262	0.941	1.308	1.889	-0.228	0.506	-0.380
Kurtosis	4.249	3.704	4.936	3.552	3.228	5.319	5.637	1.357	1.588	2.395
Jarque-Bera	3.771	12.270	20.715	11.127	5.994	20.381	35.405	4.843	5.034	1.572
Probability	0.151	0.002	0.000	0.003	0.049	0.000	0.000	0.088	0.080	0.455
Observations	40	40	40	40	40	40	40	40	40	40

Source: Researchers Computation

The real GDP growth (RGDP) averaged 3.446% within the forty (40) years times considered, and having a standard deviation of 4.810%. The maximum value of RGDP is reported to be 15.329% while the minimum value is obtained to be -10.924%. RGDP has an elongated tail to the left hand side of the distribution given that the distribution is negatively skewed with a coefficient of -0.418; and it is also leptokurtic as the coeffi-

cient of kurtosis being 4.810 is greater than 3. The distribution is reported to be normally distributed since the Jarque-Bera statistic is not significant at the 5% level. The total debt as a percentage of GDP (DGDP) averaged 11.1430% with a standard deviation of 11.309%, and it is a leptokurtic distribution with a positive skewness. Domestic debt as a percentage of GDP (DDGDP) has a mean of 6.159% with a standard deviation od 7.013%, and having a maximum and minimum value of 26.222% and 0.081% respectively. The distribution is positively skewed and leptokurtic in nature, with the null hypothesis of no normality being upheld since the Jarque-Bera statistic is significant at the 5% level. Similarly, the external debt as a percentage of GDP (EDGDP) has a mean value of 4.983% with a spread of 5.617%, having recorded a maximum and minimum values of 21.606% and 0.047% respective. The distribution is positively skewed and leptokurtic given that the skewness coefficient is +1.262 and the coefficient of kurtosis being +3.552.

Similar description can be done for other variables. For instance, financial depth (MSGDP) averaged 15.546% with a standard deviation of 5.360% and has a minimum and maximum values of 8.464% and 24.895% respectively. The distribution is positively skewed as given by the coefficient of skewness being +0.506, and is platykurtic since the coefficient of kurtosis being 1.588 is less than 3. The MSGDP is also normally distributed as given by the insignificance of the Jarque-Bera statistic at the 5% level. It can also be reported that trade openness (TOPN) has a mean value of 32.416% and a standard deviation of 12.090%, and having a maximum and minimum values of 53.277% and 9.135% respectively. The distribution of TOPN is negatively skewed as reflected by the skewness coefficient of -0.380, and it is also platykurtic since the coefficient of kurtosis being +3.395 is less than 3. The distribution is normally distributed given that at the 5% level, the Jarque-Bera statistic is not significant.

5.2 Correlation Analysis

The correlation matrix obtained in Table 4 reflects the direction of the relationship among the variables. While a positive sign reflects a direct relationship, a negative sign captures an inverse relationship between two variables.

Table 4: Correlation Matrix of the Variables

	RGDP	DDGDP	DGDP	EDGDP	GEGDP	GFCF	INF	LABR	MSGDP	TOPN
RGDP	1									
DDGDP	-0.023	1								
DGDP	0.055	0.917	1							
EDGDP	0.141	0.599	0.868	1						
GEGDP	0.105	0.962	0.894	0.600	1					
GFCF	-0.522	-0.694	-0.613	-0.368	-0.755	1				
INF	-0.230	-0.280	-0.252	-0.159	-0.366	0.238	1			
LABR	-0.199	-0.807	-0.615	-0.230	-0.847	0.759	0.362	1		
MSGDP	0.055	0.865	0.689	0.308	0.865	-0.739	-0.250	-0.899	1	
TOPN	0.485	0.057	0.150	0.232	0.194	-0.387	-0.129	-0.144	0.048	1

Source: Researchers Computation

It is notable from Table 4 that DDGDP, GFCF, INF, and LABR all have an inverse relationship with RGDP. While the relationship between: RGDP and DDGDP, RGDP and INF, as well as RGDP and LABR are all weak given that their correlation coefficients are far below 0.5, the relationship between RGDP and GFCF is fairly strong given the correlation coefficient of -0.522. This implies that the RGDP moves in an opposite direction with the above variables. On the contrary, DGDP, EDGDP, GEGDP, MSGDP, and TOPN all have a direct relationship with RGDP; implying that RGDP moves in the same direction with the above mentioned variables. The relationship between RGDP and DGDP, RGDP and EDGDP, RGDP and GEGDP, and RGDP and MSGDP are very weak given that none of the correlation coefficients are up to 0.5. Meanwhile, the correlation between RGDP and TOPN is fairly high given the correlation coefficient of +0.485. It can be observed that DDGDP, DGDP, and EDGDP have strong correlations among themselves. For instance, the correlation coefficient between DDGDP and DGDP is +0.917; the correlation coefficient between DDGDP and EDGDP is +0.599; and the correlation coefficient between DGDP and EDGDP is +0.868. Using all of them in the same model will result in multicollinearity which can affect the reliability of the parameter estimates. Thus, our separate models aid in avoiding such a technical problem.

5.3 Unit Root Test

The time series variables are such that they can be affected by the effect of time. It therefore becomes pertinent to ascertain their unit root properties in order to detect their order of integration. The test is done using the ADF test, with the constant and trend assumption being utilized because they significantly affect the variables. Table 5 captures the result, where I(0) means that the variable is stationary at level and I(1) means that the variables becomes stationary after first difference.

Table 5: Augmented Dickey-Fuller Unit Root Test Result

Variables	ADF Statistic	5% Critical Value	Order of Integration
RGDP	-3.9209	-3.5298	I(0)
DDGDP	-4.3547	-3.5366	I(1)
DGDP	-3.7929	-3.5331	I(1)
EDGDP	-3.6047	-3.5331	I(1)
GEGDP	-3.6238	-3.5485	I(1)
GFCF	-5.283	-3.5403	I(1)
INF	-4.0407	-3.5331	I(0)
LABR	-5.3892	-3.5331	I(1)
MSGDP	-5.6346	-3.5331	I(1)
TOPN	-4.3386	-3.5684	I(1)

Source: Researchers Computation

It is clear from Table 5 that while RGDP and INF were stationary at level I(0), the rest of the variables only became stationary after first difference I(1). The stationarity of the variables is driven upon the ADF statistic being more negative than the 5% critical value of the test. Being that the variables are stationary at levels and first difference (I(0) and I(1)), it is pertinent to check whether they are cointegrated. This is best done with the use of the autoregressive distributed lag (ARDL) bounds test. Given that our study utilizes three models, the cointegration test is conducted for each of them.

5.4 Cointegration Analysis

To detect whether the variables are integrated, given that they are not all stationary at levels, the cointegration test is conducted for the three models and the result presented in Table 6, Table 7, and Table 8 for Model I, Model II, and Model III respectively.

Table 6: ARDL Bounds Test for Cointegration Result for Model I

Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	6.6744	10%	1.92	2.89
k	7	5%	2.17	3.21
		2.5%	2.43	3.51
		1%	2.73	3.9

Source: Researchers Computation

Table 6 captures the test for levels relationship in Model I where we capture the influence of domestic debt on economic growth. As a rule, the significance of the F-statistic implies that the variables are cointegrated. The result portrays that the F-statistic of 6.6744 is greater than the 5% lower and upper bounds. In that regards, the null hypothesis is rejected hence, there is a long-run relationship between domestic debt and economic growth.

Table 7: ARDL Bounds Test for Cointegration Result for Model II

Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	171.0975	10%	1.92	2.89
k	7	5%	2.17	3.21
		2.5%	2.43	3.51
		1%	2.73	3.9

Source: Researchers Computation

For Table 7, we test for the existence of a long-run relationship concerning external debt and economic growth in Nigeria. Being that the F-statistic of 171.0975 is greater than the 5% lower bound (2.17) and upper bound (3.21), the null hypothesis is rejected. Therefore, there is a long-run relationship concerning external debt and economic growth.

Table 8: ARDL Bounds Test for Cointegration Result for Model III

Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	277.3305	10%	1.92	2.89
k	7	5%	2.17	3.21
		2.5%	2.43	3.51
		1%	2.73	3.9

Source: Researchers Computation

The test for long-run relationship between total public debt and economic growth in Nigeria is conducted using the output in Table 8. It is clear that the F-statistic of 277.3305 is outside the 5% lower bound (2.17) and upper bound (3.21) values. Therefore, there is a long-run relationship concerning total public debt and economic growth in Nigeria.

Given that cointegration exist in all the three models, the analysis will proceed to estimating both the dynamic short-run and long-run models. This is done using the ARDL approach.

5.5 Autoregressive Distributed Lag (ARDL) Short-Run Regression

The ARDL short-run dynamic estimates of the models captures the impacts of the identified explanatory variables on economic growth in the short-run.

Table 9: Short-Run Dynamic Estimates for Model I

Variable	Coefficient	Standard Error	t-Statistic	Probability
Δ(GFCF)	0.0502	0.0127	3.9706	0.0008***
Δ(GFCF(-1))	0.0476	0.0121	3.9246	0.0009***
Δ(LABR)	-8.4416	0.1960	-7.0582	0.0000***
Δ(LABR(-1))	-3.4080	0.9314	-3.6590	0.0050**
Δ(DDGDP)	-0.6212	0.0586	-10.5951	0.0000***
Δ(GEGDP)	0.2947	0.0670	4.3990	0.0003***
Δ(MSGDP)	-0.0605	0.0264	-2.2924	0.0335**
Δ(MSGDP(-1))	-0.1139	0.0443	-2.5712	0.0187**
Δ(TOPN)	0.0015	0.0057	0.2595	0.7981
Δ(TOPN(-1))	-0.0250	0.0065	-3.8226	0.0011**
ECM(-1)	-0.3442	0.0455	-9.2392	0.0000***
R-squared	0.9976		Adjusted R-squared	0.9967

Source: Researchers Computation

In Table 9, we capture the ARDL short-run dynamic estimates of Model I. The result indicates that changes in GFCF, Δ(GFCF), along with its one period lag, Δ(GFCF(-1)), both impact a positive and significant short-run influence on economic growth. A 1% increase in GFCF is associated with a 0.0502% decrease in economic growth; while its one period lag increases economic growth by 0.0476% on the average. Changes in labour force, Δ(LABR), along with its one-period lag, Δ(LABR(-1)), both exert a negative and significant effect on economic growth. A 1% increase in labour force prompted economic growth to decline by 8.4416% on the average, while its one-period lag reduces economic growth by 3.4080% on the average. The implication of this negative effect of labour on growth as against the normal positive effect can be validated given the rising unemployment rate in the Nigeria. Thus, the finding supports the Okun's postulation of an inverse relationship between unemployment and growth. Therefore, labour underutilization will retard growth in an economy.

Changes in domestic debt, Δ(DDGDP), which is the core variable of our concern is observed to wield a negative and significant short-run effect on economic growth of Nigeria. A 1% increase in domestic debt is likely to cause a 0.6212% decrease in economic growth. This finding supports the crowding out effect of public debt. Hence, domestic public debt crowds out private sector investment which is deleterious to growth. Conversely, changes in government expenditure, Δ(GEGDP), is observed to put forth a positive and significant short-run influence on the growth of the Nigerian economy. A 1% increase in government expenditure is likely to cause economic growth to increase by 0.2947% on the average. This captures the importance of government in the macro economy, which is in line with the Keynesian underpinnings that the government have a significant role to play in driving the economy to a desirable level.

The financial depth, Δ(MSGDP), plus its one-period lag, Δ(MSGDP(-1)), both wielded a negative and significant short-run impact on the economic growth of Nigeria. From the coefficients, a unit percent increase in financial depth reduces economic growth by 0.0605% on the average while its one-period lag reduces eco-

nomic growth by 0.1139% on the average. This negative influence can be linked to the negative role of financial globalization along with financial repression on the economy. The degree of openness of the economy (trade openness) is observed to put forth a positive but insignificant short-run influence on economic growth, while its one-period lag put forth a negative and insignificant effect. Thus, the past value of trade openness reduces economic growth by 0.0250% on average. This negative effect points to the fact that an unregulated liberalization of the economy is likely to supress domestic business enterprises which will turn out to be disastrous on the overall growth of the economy.

The error correction mechanism (ECM) which meets the statistical criteria (being significant), less than one and a priori expectation (being negative), fulfils the conditions for error correction. From the coefficient (-0.3442), 34.42% of the short-run variations in economic growth is corrected every year in order for the restoration of equilibrium to be feasible in the long-run. The model explains 99.76% of the total distortions in economic growth, portraying that the model is robust enough and a good fit in predicting economic growth in Nigeria in the midst of domestic debt.

Table 10: Short-Run Dynamic Estimates for Model II

Variable	Coefficient	Standard Error	t-Statistic	Probability
Δ(GFCF)	0.0052	0.0207	0.2524	0.8033
Δ(GFCF(-1))	0.0555	0.0191	2.8994	0.0089**
Δ(LABR)	-7.7212	1.0854	-7.1137	0.0000***
Δ(EDGDP)	-0.1932	0.0376	-5.1437	0.0000***
Δ(GEGDP)	0.2844	0.0973	2.9222	0.0084**
Δ(GEGDP(-1))	0.3529	0.0986	3.5797	0.0019**
Δ(MSGDP)	-0.0708	0.0420	-1.6877	0.1070
Δ(TOPN)	-0.0033	0.0091	-0.3595	0.7230
Δ(TOPN(-1))	-0.0517	0.0100	-5.1798	0.0000***
ECM(-1)	-0.9380	0.0202	-46.4309	0.0000***
R-squared	0.9935		Adjusted R-squared	0.9914

Source: Researchers Computation

The short-run effect of GFCF on economic growth along with its one-period is noted to be positive in Model II. While the effect of the changes in GFCF is insignificant, the effect of its one-period lag is significant. Thus, the previous period GFCF(-1) increases economic growth by 0.0555% on the average. Labour force put forth a negative and substantial influence on economic growth. From its coefficient, a unit percent increase in labour force put forth a 7.7212% decline in economic growth. As stated earlier, this is an outcome of the rising unemployment in the economy coupled with the rising population. In a similar manner, external debt is observed to wield a negative and significant influence on economic growth in the short-run. As the coefficient could portray, a 1% increase in external debt leads to a 0.1932% decrease in economic growth. This also centres on the crowding out effect of external debt given the rising trend in debt service obligations.

Government expenditure plus its one-period lag unanimously put forth a positive and substantial sway on economic growth, thereby validating the important role of the government in macroeconomic stability. A 1% increase in government expenditure is associated with a 0.2844% increase in economic growth, while its one-period lag increases RGDP by 0.3529% on the average. Both financial debt and trade openness wielded a

negative influence on economic growth. while the effect of financial depth is significant, that of trade openness is insignificant. However, the one-period lag of trade openness put forth a significant influence. Thus, while a unit percent increase in financial depth reduces economic growth by 0.0708%, the previous year's trade openness reduces growth by an average of 0.0517% in the short-run.

The error correction mechanism measuring the speed of adjustments in the short-run disequilibrium to long-run equilibrium portrays that 93.80% of the short-run distortions in the Model II are amended yearly in order to restore a long-run equilibrium in the model. Meanwhile, the R-squared portrays that the model accounts for 99.35% of the entire short-run variations in the model which is a good fit.

Table 11: Short-Run Dynamic Estimates for Model III

Variable	Coefficient	Standard Error	t-Statistic	Probability
Δ(GFCF)	0.0229	0.0165	1.3864	0.1809
Δ(GFCF(-1))	0.0620	0.0153	4.0593	0.0006***
Δ(LABR)	-6.8456	1.6776	-5.8132	0.0000***
Δ(DGDP)	-0.1898	0.0257	-7.3826	0.0000***
Δ(GEGDP)	0.3722	0.0827	4.5031	0.0002***
Δ(GEGDP(-1))	0.2821	0.0829	3.4018	0.0028***
Δ(MSGDP)	-0.0633	0.0333	-1.9004	0.0719*
Δ(TOPN)	-0.0061	0.0072	-0.8399	0.4109
Δ(TOPN(-1))	-0.0466	0.0080	-5.8365	0.0000***
ECM(-1)	-0.9568	0.0162	-59.1132	0.0000***
R-squared	0.9959		Adjusted R-squared	0.9946

Source: Researchers Computation

The result in Table 11 captures the estimates of our short-run parameters for Model III. It can be obtained here that while changes in GFCF put forth a positive but insignificant influence on growth, the influence of its one-period lag is positive and significant. Consequently, the previous year's GFCF was substantial in increasing RGDP by 0.0620% on the average. The effect of labour force in the model also appear negative and significant, implying that it has been causing a decline in economic growth.

The effect of total debt on economic growth is observed to be negative and significant in the short-run. This implies that the total debt of Nigeria has been detrimental to the growth of the economy. A 1% increase in total debt is expected to bring about a 0.1898% decline in economic growth. This validates the debt crowding out effect and the debt overhang hypothesis which suggest an inverse relationship between debt and economic growth. Government expenditure in addition to its one-period lag showcases a positive and significant influence on growth, pointing to the importance of the government sector in a modern economy. Trade openness and financial debt both put forth an insignificant influence on growth at the 5% level. Meanwhile, their effect is noted to be negative on growth. However, the negative effect of the one-period lag of trade openness is significant, reducing economic growth by 0.0446% in the short-run.

The short-run error correction mechanism satisfies both the statistical and a priori expectation by being negative and statistically significant at the 1% level. The ECM indicates that 95.68% of the short-run discrepancies in economic growth for Model III is adjusted on yearly basis for the restoration of equilibrium in the long-run. On the explanatory power of the model, the R-squared indicates that the explanatory variables jointly explain 99.59% of the overall changes in economic growth indicating a good of fit.

5.6 Autoregressive Distributed Lag (ARDL) Long-Run Regression

The long-run estimates of the models captures the effect of the explanatory variables on economic growth after the necessary short-run adjustments had been made.

Table 12: Long-Run Levels Estimates for Model I

Variable	Coefficient	Standard Error	t-Statistic	Probability
GFCF	0.0298	0.0195	1.5268	0.1433
LABR	-7.7458	3.8448	-2.0146	0.0583*
DDGDP	-0.3526	0.0354	-9.9669	0.0000***
GEGDP	0.3262	0.0584	5.5883	0.0000***
INF	-0.0031	0.0029	-1.0687	0.2986
MSGDP	0.1723	0.0336	5.1349	0.0001***
TOPN	0.0160	0.0060	2.6653	0.0153**
C	1.6445	1.0509	1.5648	0.1341

Source: Researchers Computation

The long-run effect of the explanatory variables on the growth model of Model I is captured in Table 12 where it is observed that while capital wielded a positive but insignificant influence on RGDP, the effect of labour remains negative and significant even in the long-run. A 1% increase in the labour force is likely to generate a 7.7458% decrease in economic growth. This is counter intuitive probably due to declining labour productivity in Nigeria. Even in the long-run, the domestic debt still put forth a negative and significant long-run effect on economic growth. A 1% increase in domestic debt will cause the long-run economic growth to plummet by 0.3526% on the average. This, as stated earlier, is attributed to the crowding out effect of the domestic debt on the private sector investments which is sacrosanct for growth.

While the effect of the government expenditure in the economy is observed to be positive and significant in the long-run, the effect of inflation is observed to be negative though such effect is considered to be insignificant based on our findings. This further portrays the long-term role of the government in macroeconomic stability hence, a 1% increase in government expenditure in the economy will propel economic growth by 0.3262% on the average. The long-run effect of both financial depth and trade openness has turned out to be positive and significant in the long-run as opposed to its negative short-run effect. This portrays that as the financial system keeps developing, it will accelerate the required growth within the economy. Similarly, as the economy continues to learn along the learning curve of globalization, it will be able to reap the required benefits over time. Hence, a 1% increase in financial depth and trade openness will call for a 0.1723% and 0.0160% increase respectively in economic growth.

In Model II, the long-run estimates of the explanatory variables are as adumbrated in Table 13 where we observe GFCF still yields a positive, though insignificant, effect on economic growth. Meanwhile, the effect of labour force has turn out to be positive in the long-run, though such effect is not significant.

Table 13: Long-Run Levels Estimates for Model II

Variable	Coefficient	Standard Error	t-Statistic	Probability
GFCF	0.0627	0.0457	1.3703	0.1858
LABR	6.9079	10.5899	0.6523	0.5216
EDGDP	-0.1344	0.0386	-3.4810	0.0024**
GEGDP	-0.0419	0.1157	-0.3624	0.7209
INF	-0.0023	0.0071	-0.3206	0.7519
MSGDP	0.1750	0.0805	2.1736	0.0419**
TOPN	0.0472	0.0125	3.7659	0.0012**
C	-3.7829	3.2137	-1.1771	0.2530

Source: Researchers Computation

It is also observable from Table 13 that external debt, government expenditure in the economy, and inflation rate all had negative impact on Nigeria's economic growth. However, only the effect of external debt seems to be significant. This finding further support the debt crowding out effect on private sector investment in the economy. Hence, a percentage increase in external debt will bring about a 0.1344% decreases in economic growth in Nigeria. The effect of financial debt and trade openness in the long-run as regards to Model II as against their negative short-run effect. Hence, a 1% percent increase in MSGDP and TOPN will bring about a 0.1750% and 0.0472% increase in economic growth in the long-run respectively.

Table 14 captures the long-run regression estimates of the explanatory variables as they affect economic growth in the midst of total debt.

Table 14: Long-Run Levels Estimates for Model III

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GFCF	0.0607	0.0354	1.7138	0.1020
LABR	7.5567	7.7003	0.9814	0.3381
DGDP	-0.1134	0.0217	-5.2228	0.0000***
GEGDP	0.1230	0.1041	1.1815	0.2513
INF	-0.0026	0.0054	-0.4914	0.6285
MSGDP	0.2052	0.0603	3.4060	0.0028**
TOPN	0.0369	0.0098	3.7467	0.0013**
C	-3.9347	2.2952	-1.7144	0.1019

Source: Researchers Computation

As can be observed from Table 14, both capital and labour have positive but insignificant long-run impact on economic growth. Meanwhile, the effect of total debt on growth is noted to be negative and significant in the long-run hence, a 1% increase in the total debt will cause economic growth to decline by 0.1134% on average. This further upheld the inverse relationship between total debt and economic growth as enshrined in the debt crowding out effect theory. It is also observed that while the effect of proportion of government expenditure in the economy is positive but insignificant, the effect of inflation is negative and insignificant in the long-run. Further, both financial depth and trade openness put forth a positive and significant influence on long-run economic growth in Nigeria. This points to the important role of a developed financial system in fostering growth, along with the importance of international competitiveness in driving long-run economic growth. From the estimates, a 1% increase in financial depth will cause a 0.20525% upsurge in economic growth; while such a 1% increase in trade openness will make economic growth to surge by 0.0369% on the average.

5.7 Post Estimation Diagnostic Test

It is pertinent to conduct post estimation diagnostic tests on the parameter estimates of the three models to validate their reliability. The test follows the stability test, heteroscedasticity test, normality test, and serial correlation test to detect whether the estimates are stable for inferences.

5.7.1 Stability Test

The stability test is conducted using the cumulative sum (CUSUM) test for stability. For stability to exist in a model, the CUSUM line must lie within the 5% upper and lower bounds of the test. Figure 4 captures the test result for Model I while Figure 5 and Figure 6 captures that of Model II and Model III respectively.

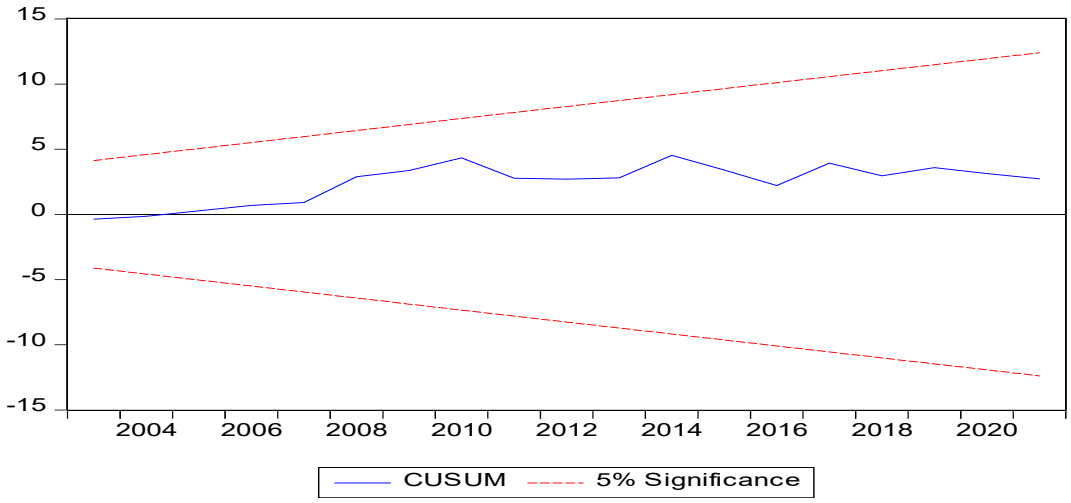

Figure 4: Cumulative Sum (CUSUM) Test for Stability for Model I

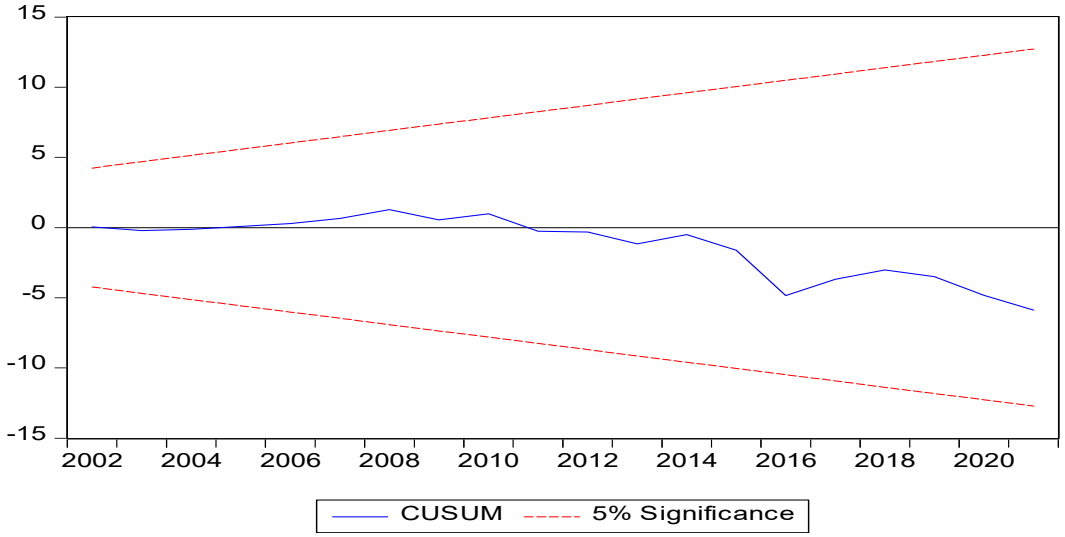

Figure 5: Cumulative Sum (CUSUM) Test for Stability for Model II

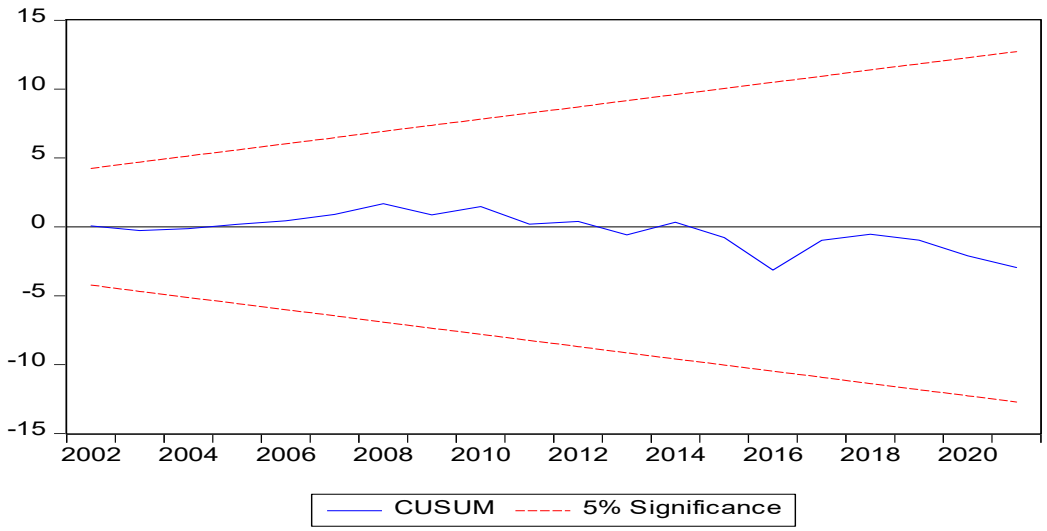

Figure 6: Cumulative Sum (CUSUM) Test for Stability for Model III

In all the three models, it is observed that the CUSUM line lies within the 5% upper and lower bounds. This validates the stability of our parameter estimates which are viable in making inferences for policy making.

5.7.2 Heteroscedasticity Test

The heteroscedasticity test is conducted to ascertain whether the residuals have constant variance as expected. The results are presented in Tables15, 16, and 17. The test is conducted based on the autoregressive conditional heteroscedasticity (ARCH) test.

Table 15: Heteroscedasticity test result for Model I

Heteroskedasticity Test: ARCH			
F-statistic	0.0229	Prob. F(1,35)	0.8807
Obs*R-squared	0.0242	Prob. Chi-Square(1)	0.8765

Table 16: Heteroscedasticity test result for Model II

Heteroskedasticity Test: ARCH			
F-statistic	0.2636	Prob. F(1,35)	0.6109
Obs*R-squared	0.2766	Prob. Chi-Square(1)	0.5989

Table 17: Heteroscedasticity test result for Model III

Heteroskedasticity Test: ARCH			
F-statistic	0.4102	Prob. F(1,35)	0.5260
Obs*R-squared	0.4286	Prob. Chi-Square(1)	0.5127

Source: Researchers Computation

Given that the F-statistics reported for each of the model are statistically insignificant, the conclude that there is no heteroscedasticity in the model. Thus, the error terms are homoscedastic as expected.

5.7.3 Normality Test

The normally test is conducted to ascertain if the error terms are normally distributed as expected. The test is conducted using the histogram normality test which generates the Jarque-Bera statistics. The significance of the Jarque-Bera statistic implies that the error terms are not normally distributed. The result of the test is presented in Figure 7, Figure 8, and Figure 9 for model I, model II and model III respectively.

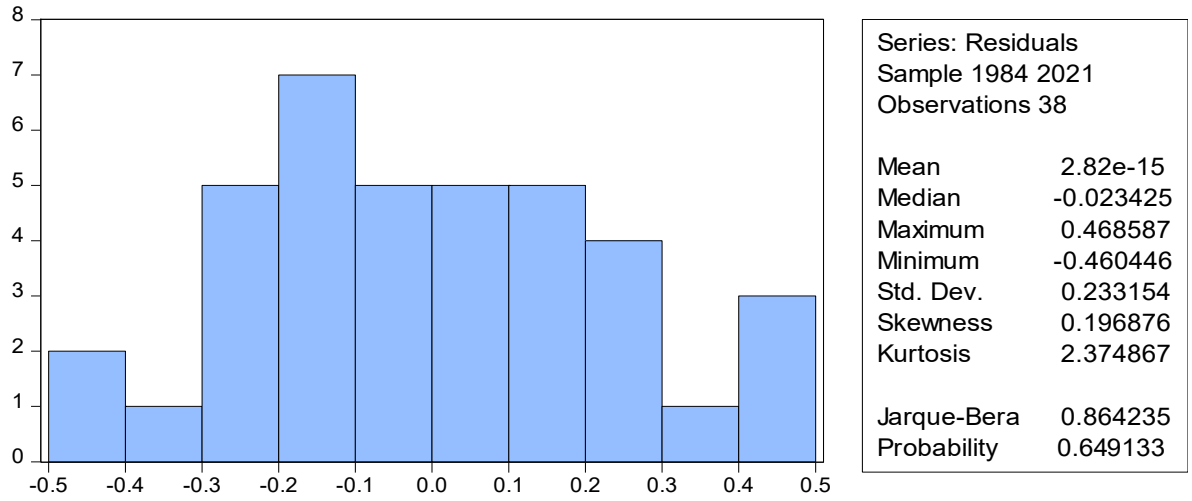

Figure 7: Normality test result for model I

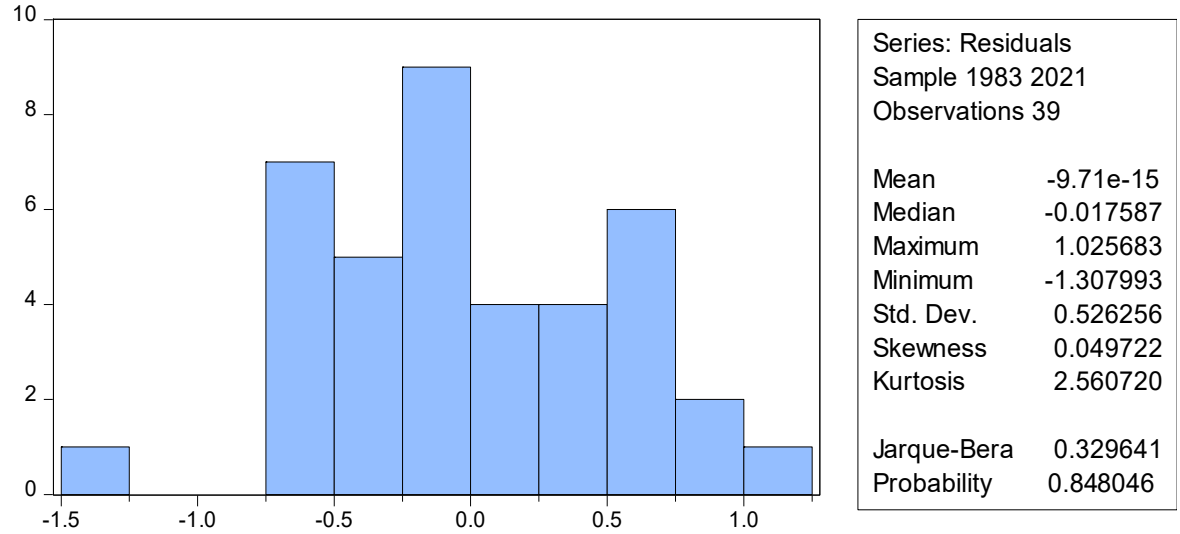

Figure 8: Normality test result for model II

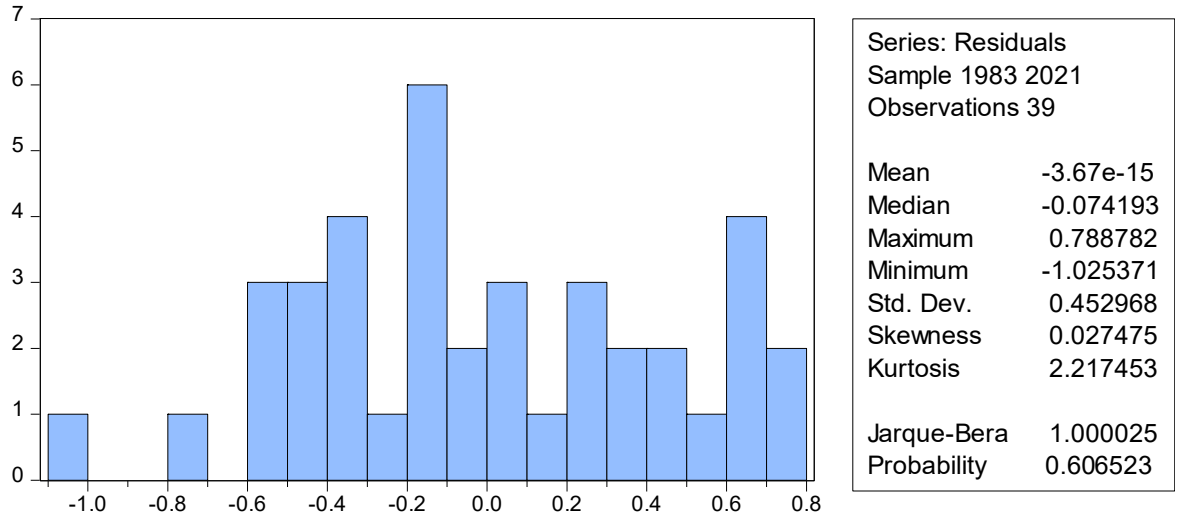

Figure 9: Normality test result for model III

The Jarque-Bera statistic generated for model I is 0.8642 with a p-value of 0.6491 while the Jarque-Bera statistic for model II is 0.3296 with a p-value of 0.8480. For model III, the Jarque-Bera statistic is obtained to be 1.0000 with a p-value of 0.6065. In all these cases, the Jarque-Bera statistics are insignificant thereby leading to the conclusion that the error terms are normally distributed.

5.7.4 Serial Correlation Test

The serial correlation test which is conducted to check that the error term in one period is not correlated with that of another period is conducted using the Breusch-Godfrey serial correlation Lagrange Multiplier (LM) test. The result for the three models is presented in Table 18, Table 19, and Table 20.

Table 18: Serial correlation test result for model I

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	2.1390	Prob. F(2,18)	0.1332
Obs*R-squared	1.3706	Prob. Chi-Square(2)	0.2225

Table 19: Serial correlation test result for model II

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.4114	Prob. F(2,18)	0.2695
Obs*R-squared	5.1513	Prob. Chi-Square(2)	0.0761

Table 20: Serial correlation test result for model III

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.1390	Prob. F(2,18)	0.3332
Obs*R-squared	1.9706	Prob. Chi-Square(2)	0.5225

Source: Researchers Computation

In Tables 18,19 and 20, the F-statistic of 2.1390, 1.4114 and 1.1390 respectively, are observed not to be statistically significant at the 5% level of significance given their p-values. Thus, we conclude that the models are free from serial correlation.

5.8 Discussion of Major Findings

This study has categorically shown that whether in short-run or long-run, the effect of public debt on the growth of the Nigerian economy is negative. The implication of this findings is simply that the increasing trend of borrowing in Nigeria has been casing economic growth to decline over the years. This negative effect of debt on economic growth has earlier been established by previous findings like (Ekong, Effiong, & Inyang, 2021; Eze, Nweke, & Atuma, 2019; Ndubuisi, 2017; Forgha, Mbella, & Ngangnchi, 2014; Chinaemerem & Anayochukwu, 2013). The argument for this negative effect of debt on economic growth hinges on the debt crowding out effect which asserts that "debt servicing could be such a burden that the government revenue may no longer be adequate for provision of public services which complements private investment and boost private sector involvement in the economy" (Omodero, 2019).

Similarly, Panizza, Sturzenegger & Zettelmeyer (2010) asserted that the consequence of extreme domestic borrowing is linked to financial instability and crowding out of the private sector investments. Also noted by Ekong, Effiong & Inyang (2021), an excessive amount of borrowing increases the economy's susceptibility to macroeconomic shocks. The debt overhang argument contends that, even in the near term, a public debt overhang may exacerbate instability, impede economic recovery, or cause economic disruption. This notion is supported by the statement that "high debt profiles have spillover consequences on the private sector and lockup the room for counter-cyclical fiscal policy" (Ekong, Effiong, & Inyang, 2021).

Meanwhile, Checherita & Rother (2012) and Woo & Kumar (2015) have earlier propounded that rising public debt can retard economic growth. This can be linked to the usage of the debt – whether productively or unproductively (Checherita-Westphal, *et al*., (2014); as well as the institutional framework of the country (Masuch, Moshammer, & Pierluigi, 2016). Consequently, debt incurred to finance consumption will likely have a deleterious effect on growth compared to debt that are incurred to finance infrastructure. On the second case, countries with weak institutions which is fraught with corruption will likely experience high debt with low economic growth.

6.0 Conclusion and Recommendations

Debt has been categorized as being "the necessary evil in some situations" (Inyang & Effiong, 2020) while others have viewed it as being detrimental to economic growth (Checherita & Rother, 2012; Checherita-Westphal, Hughes-Hallett, & Rother, 2014; Woo & Kumar, 2015). This points to the fact that though debt can be desirable in some situations, concerns over its deleterious effect on the growth of an economy need not to be snubbed. This paper examined such effect of public debt on the growth of the Nigerian economy from 1982 through 2021. The motivation behind the study is centred on the rising debt profile of the country in recent times, which calls for an attention towards ascertaining its short-run and long-run impact on the economy. In this regard, we formulated three models to trace the effect of domestic debt, external debt, and total debt on economic growth.

The study utilized the ADF unit root test to detect the order or integration of the variables; the ARDL bounds test for cointegration to detect whether a long-run relationship exist between debt and economic growth; and

the error correction model to examine both the short-run and long-run effect of public debt of the growth of the Nigerian economy. The study also employs the stability test, heteroscedasticity test, normality test, and serial correlation test as post estimation diagnostic tests to check the reliability of the estimates.

The result of the ADF unit root test reported that some variables were stationary at levels, while others were stationary at first difference in all the three models. This calls for a test for cointegration test. From the ARDL bounds test, it was confirmed that cointegration exists, pointing that there is a long-run relationship between the various debt components and economic growth. The result from the ARDL error correction model revealed that domestic debt, external debt, and total debt all have a negative and significant effect on economic growth in Nigeria in both the short-run and the long-run. The implication of these findings is that rising public debt will retard economic growth through its crowding out effect on private sector investments in the economy. Other key findings that are worthy of being mentioned is the fact that government expenditure, trade openness and financial deepening all put forth a positive and significant long-run effect on economic growth in Nigeria while labour force put forth a negative and significant short-run effect on economic growth.

In line with the above findings, the study recommends that Nigeria's debt profile should be reduced substantially to avert the more impending adverse consequences that it can pose to the growth of the Nigerian economy. There is need for the government to diversify the revenue base away from oil, and rationalization of expenditure to the productive sector of the economy should be encouraged. As a matter of sustainability in debt, there is need to borrow within an appropriate threshold that will not pose serious dangers to the country's growth potentials. Such debt threshold has been estimated by Ekong, Effiong & Inyang (2021) to be 15.021% of GDP. This threshold should be maintained given that it will generate the positive outcome required to stimulate growth. Also, there is need for a more robust financial system particularly through financial liberalization rather than repression to facilitate the efficient functioning of the financial system desirable for growth. This should be done along with a more liberalized economy to ensure competition and transfers of technologies which could aid greater productivity and growth. There is need for a greater labour utilization to reduce the rate of unemployment in the economy which is a drawback on the country's economic prosperity.

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APPENDICES

Table 1: Public Debt Stock - External and Domestic Debt of the FGN, States and FCT

Year	External Debt Stock (FGN + States) (US$'M)	Domestic Debt Stock (FGN Only) (US$'M)	Domestic Debt of States & FCT (US$'M)	Total Debt Outstanding (US$'M)
2015Q1	9,464.11	43,185.51	10,856.52	63,506.14
2015Q2	10,316.82	42,633.11	10,856.52	63,806.45
2015Q3	10,617.35	43,727.99	9,852.25	64,197.60
2015Q4	10,718.43	44,857.85	9,852.25	65,428.53
2016Q1	11,194.65	50,609.41	9,852.25	71,656.31
2016Q2	11,261.89	37,478.21	12,706.91	61,447.01
2016Q3	11,582.59	35,528.97	12,706.91	59,818.47
2016Q4	11,406.28	36,256.41	9,728.84	57,391.53
2017Q1	13,807.59	39,077.32	9,985.16	62,870.07
2017Q2	15,047.00	39,337.86	9,809.27	64,194.13
2017Q3	15,352.13	40,869.29	10,412.86	66,634.27
2017Q4	18,913.44	41,142.11	10,943.71	70,999.26
2018Q1	22,071.91	41,147.58	11,059.37	74,278.86
2018Q2	22,083.44	39,749.55	11,374.95	73,207.94
2018Q3	21,591.68	40,107.11	11,514.21	73,213.00
2018Q4	25,274.36	41,610.44	12,551.91	79,436.72
2019Q1	25,609.63	42,721.68	12,942.77	81,274.09
2019Q2	27,162.63	43,775.44	12,944.58	83,882.66
2019Q3	26,941.50	45,281.91	13,167.41	85,390.82
2019Q4	27,676.14	43,781.12	12,596.06	84,053.32
2020Q1	27,665.66	40,262.46	11,375.19	79,303.31
2020Q2	31,477.13	42,813.57	11,605.81	85,896.52
2020Q3	31,985.17	41,591.16	10,997.86	84,574.18
2020Q4	33,348.08	42,057.55	10,986.91	86,392.54
2021Q1	32,859.99	43,514.96	10,864.17	87,239.12
2021Q2	33,468.92	43,040.09	10,062.79	86,571.80
2021Q3	37,955.09	44,437.88	10,233.44	92,626.41
2021Q4	38,391.32	46,593.28	10,795.04	95,779.64
2022Q1	39,969.19	48,452.26	11,648.44	100,069.89

Source: Debt Management Office (2022a)

Table 2: Actual External Debt Service Payments (in Thousands of USD)

Year	Multilateral	Bilateral	Commercial	Others	Total Debt Service
2015Q1	36,889.67	26,795.88	45,630.00	0.00	109,315.54
2015Q2	26,505.08	2,630.14	0.00	20,859.63	49,994.85
2015Q3	36,334.61	28,297.77	45,630.00	0.00	110,262.38
2015Q4	138,650.80	59,416.16	91,260.00	41,732.89	331,059.85
2016Q1	43,189.46	28,841.31	45,630.00	0.00	117,660.77
2016Q2	33,824.73	1,910.80	0.00	12,262.90	47,998.43
2016Q3	51,680.66	30,312.18	45,630.00	0.00	127,622.84
2016Q4	36,632.25	2,319.63	0.00	20,859.63	59,811.51
2017Q1	50,788.86	31,482.59	45,630.00	16.90	127,918.35
2017Q2	34,849.31	2,534.79	0.00	2,534.79	58,243.73
2017Q3	59,065.93	33,528.17	104,692.50	0.00	197,286.60
2017Q4	47,018.77	4,282.91	8,439.50	20,859.63	80,600.82
2018Q1	60,038.15	60,507.24	104,692.50	15.27	225,253.15
2018Q2	51,115.06	16,023.94	114,375.00	20,859.63	202,373.63
2018Q3	89,454.37	63,082.02	697,436.25	0.00	849,972.64
2018Q4	48,447.78	10,742.46	114,375.00	20,874.90	194,440.13
2019Q1	79,397.93	67,099.39	210,759.58	0.00	357,256.90
2019Q2	65,849.96	8,578.17	157,012.17	20,859.63	252,299.93
2019Q3	34,383.69	76,519.86	263,036.25	0.00	473,939.80
2019Q4	49,566.69	22,661.35	157,012.17	20,859.63	250,099.84
2020Q1	114,522.43	94,991.71	263,036.25	15.27	472,565.66
2020Q2	94,911.07	14,260.19	157,012.17	20,859.63	287,043.07
2020Q3	129,519.76	114,596.67	114,596.67	0.00	507,152.68
2020Q4	98,078.01	34,344.81	157,012.17	15.27	289,450.25
2021Q1	134,044.34	106,329.35	763,036.25	0.00	1,003,409.94
2021Q2	103,732.70	38,220.88	157,012.17	0.00	298,965.75
2021Q3	165,369.54	109,252.61	246,161.25	0.00	520,783.40
2021Q4	92,978.06	36,362.63	157,012.17	0.00	286,352.86
2022Q1	173,401,723.38	129,290,093.99	391,317,500.05	0.00	694,009,317.42

Source: Debt Management Office (2022b)