Does public debt disrupt economic growth in Nigeria? A two-stage least squares approach

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Abstract

The impact of Nigeria's public debt on economic growth was investigated in this study. Additionally, it confirmed the validity of Nigeria's debt burden and crowding-out hypotheses. The time series data used ranged from 1981 to 2021. For analysis, the Two-Stage Least Squares and Toda Yamamoto Causality tests were employed. The findings contradicted the debt overhang effect hypothesis by showing that public debt had a positive and significant influence on economic growth. This proves that Nigeria's public debt has no adverse effects on the economic growth of the nation. Additionally, debt service has a detrimental effect on economic growth. This demonstrated that the crowding-out effect, often known as the crowding-out hypothesis, existed in Nigeria. Thus, servicing the national debt has a negative impact on Nigeria's economic expansion. The results of the public debt model, however, showed that trade openness and real gross domestic product had a favourable effect on public debt. A bidirectional relationship between public debt and economic growth was revealed by the findings of the causality test. The results also showed a one-way relationship between debt service and economic growth. As a result, the study implies that the government can simultaneously pursue its two policy goals of economic growth and public debt. Furthermore, decisions about debt repayment in Nigeria should be made in a way that promotes the growth of the economy. Nigeria should also improve institutional performance and boost its macroeconomic policy in the areas of inflation, foreign direct investment, trade, and exchange rates.

Contents

Contribution of this paper to the literature

In contrast to previous studies, this study deployed the 2SLS technique to untangle the nexus between total public debt and economic growth in Nigeria from 1981 to 2021. The study also utilized the 2SLS to address endogeneity, regarded as a methodological improvement, a majo divergence from several past studies.

1. Introduction

The debate on the relationship between public debt and economic growth among academics, policymakers and economics in the economic literature has lasted for ages. Evidence from the existing literature on the public debt-growth nexus indicates that the laggard economies particularly have been at the receiving end because of its impact on their Gross Domestic Product (GDP) growth rates through interest rates, saving, investment and total factor productivity. However, Checherita-Westphal and Rother (2011) maintained that longstanding interest rates are the main conduit through which the negative consequences of public debt accumulation on growth are experienced. Public debt is regarded by economists as a critical problem that inhibits economic performance. No wonder Chongo (2013) stressed that it was a two-edged sword after an investigation of its consequences on the economy of Zambia.

Owing to its unfavourable consequences on the performance of the economy, the widespread accumulation of public debt over time all over the world economy has become amazing. The issue of the buildup of public debt predominantly in low- and middle-income economies over time and its unfavourable consequences on the performance of these economies has further aroused the collective interests of some economists and policymakers. Public debt is a possible catalyst for financing budget deficits in less developed countries (Geleta, 2021). A surge has been recorded in internal and foreign debts owing to the need of the government to finance the deficit budget. On the other hand, the interest in the public debt-growth nexus in advanced economies among economists, policymakers, and scholars was strengthened by the Great Recession of 2008–09 and the substantial fiscal stimulus measures applied by governments (Sabina, 2018). For instance, in the view of the European Commission (2017), throughout the 2008–2009 global financial and economic crisis, the fiscal sustainability of innumerable European economies was severely dampened.

This reinforced Canbek (2014) contention that the level of public debt at the time was a subject of political discussion for both established and developing nations. Moreover, Canbek (2014) stressed that after the 2008 global financial crisis, the connection between public debt and growth was at the vanguard of macroeconomics literature. Atoullo (2019) claimed that before the Great Recession of 2008, the body of research was merely focused on a particular cluster of rising economic powers and undeveloped countries that had meaningful external indebtedness. In the contention of Leon, Murillo, and Hernandez (2019), public debt surfaced as one of the major dynamics influencing economic growth after the financial crisis of 2008. The debt-growth nexus in established countries was unearthed by Reinhart and Rogoff (2010a); Reinhart and Rogoff (2010b); Reinhart and Rogoff (2011) and Reinhart, Reinhart, and Rogoff (2012). These narratives engendered a new series of discussions concerning the connection between debt and the fundamental health of the economy. Reinhart and Rogoff (2010a) investigated whether public debt began to cause contraction below a specific threshold.

Owing to the finding of Reinhart and Rogoff (2010a) that economic growth is significantly dampened if the public debt-to-GDP ratio approaches 90%, the research that has been executed to investigate the public debt-growth nexus in advanced countries and developing markets has increased. The political officeholders and decision-makers in Nigeria could borrow a leaf from the outcome of this investigation in the formulation of strategies for handling the debt crisis in Nigeria. Also, it would underpin the creation of an enabling environment for inclusive sustainable economic growth by getting rid of the challenges Nigeria has due to its debt problem. Moreover, the outcome of this investigation could be critical to decision-makers in the design of a new Nigerian public debt management strategy.

While a considerable body of past investigation on the subject proposes a negative connection between public debt and economic growth (Abbas & Christensen, 2010; Ahlborn & Schweickert, 2016; Akram, 2015, 2016; Al Kharusi & Ada, 2018; Clements, Bhattacharya, & Nguyen, 2003; Egert, 2015; Gomez-Puig & Sosvilla-Rivero, 2018; Hansen, 2002; Huang, Panizza, & Varghese, 2018; Kumar & Woo, 2010; Mhlaba & Phiri, 2019; Panizza & Presbitero, 2014; Reinhart & Rogoff, 2010a; Reinhart & Rogoff, 2010b; Sachs, 1989; Schclarek, 2004; Serieux & Yiagadeesen, 2001; Szabo, 2013; Weeks, 2000; Woo & Kumar, 2015), two conflicting viewpoints still subsist.

Based on the first contention (Abbas & Christensen, 2010; Adams & Bevan, 2005; Bua, Pradelli, & Presbitero, 2014; Gomez-Puig & Sosvilla-Rivero, 2018; Greiner, 2011; Owusu-Nantwi & Erickson, 2016; Sanchez-Juarez & Garcia-Almada, 2016; Spilioti & Vamvoukas, 2015), public debt has a positive effect on economic growth. The second contention is that public debt has no effects on economic growth (Adams & Bevan, 2005; Akram, 2015, 2016; Hansen, 2001; Jalles, 2011; Kourtellos, Stengos, & Tan, 2013; Panizza & Presbitero, 2012; Pattillo, Poirson, & Ricci, 2002; Schclarek, 2004; Tchereni, Sekhamptu, & Ndovi, 2013). Finally, a nonlinear connection between public debt and economic growth is reinforced by certain studies (Baum, Checherita-Westphal, & Rother, 2013; Checherita-Westphal & Rother, 2010, 2011; Eberhardt & Presbitero, 2015; Minea & Parent, 2012; Mupunga & Le Roux, 2015; Pattillo et al., 2002; Pescatori, Sandri, & Simon, 2014; Reinhart & Rogoff, 2010a).

The empirical research on the causal relationship between public debt and economic growth is still in its early years, and the findings are conflicting. Evidence from the existing empirical data points to changes that originated from time and cross-country divergence. In certain investigation, the connection between public debt and economic

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growth was unidirectional (Afxentiou, 1993; Donayre & Taivan, 2017; Gomez-Puig & Sosvilla-Rivero, 2015; Kobayashi, 2015; Woo & Kumar, 2015), whereas, in other studies, the connection was found to be bidirectional (Abbas & Christensen, 2010; Amoateng & Amoako-Adu, 1996; Donayre & Taivan, 2017; Eberhardt & Presbitero, 2015; Ferreira, 2009; Owusu-Nantwi & Erickson, 2016). However, certain investigations discerned no connection between public debt and economic growth (Donayre & Taivan, 2017; Gomez-Puig & Sosvilla-Rivero, 2015; Jalles, 2011; Panizza & Presbitero, 2014; Reinhart & Rogoff, 2010a).

Despite efforts to lower its debt in 2005, which led to the Paris Club of Creditors granting her debt relief, Nigeria has continued to have trouble managing the servicing of its comparatively huge inventories of public debt. Nigeria's thirst for increasingly expensive and unaffordable international loans has led to an increase in debt. It is extremely important to look into how Nigeria's government debt and economic growth are related. The study seeks to provide answers to the following questions: Is Nigeria's government debt a barrier to the country's economy? What is the relationship between Nigeria's economic growth and its governmental debt? Do the debt overhang and crowding-out hypotheses apply to Nigeria? In light of the foregoing, this study will empirically examine the effect of public debt on economic growth in Nigeria and will also ascertain the existence of public debt overhang and crowding out effect on economic growth in Nigeria.

The remainder of the study is organized as follows: In Section 2, the relevant theoretical and empirical literature are reviewed. In light of the literature review, Section 3 explains the data source, methodology, and model development. Section four of the study discusses the empirical findings. The findings are used to draw the conclusions and policy recommendations in Section 5.

2. Literature Review and Theoretical Framework

2.1. Empirical Literature

In-depth research has been done in the literature on the relationship between governmental debt and economic growth. Both developed and developing countries have examined the connections between these two variables. Depending on the country, different scholarly works using various types of data and models produce different outcomes. The same technique alone does not guarantee the same results (Geleta, 2021). For instance, in Zimbabwe, Mavhinga (2015) used the Vector Error Correction Model (VECM) to examine the impact of external debt on economic growth from 1980 to 2013. Also, the viability of the debt overhang and crowding out theories in Zimbabwe was investigated. The results showed that external debt exerted a negative effect on economic growth. In addition, the findings validated the debt overhang idea. However, the results refuted the crowding out theory in Zimbabwe.

Wangmo (2018) investigated the association between government debt and economic growth in Bhutan from 1990 to 2016 using the VECM methodology. The results showed the long-term positive impact of government debt and tourism revenue on economic growth. However, unemployment, tax income, foreign aid, and population expansion had a detrimental impact on economic growth. The study examined how each component was impacted by the rupee currency problem as well as how it affected economic expansion. The results showed that Bhutan's economic growth was significantly impacted by the financial crisis of 2012.

Iitula (2018) examined the impact of public debt on Namibia's economic growth from 2003 to 2016 using information from a quarterly time series. The Toda-Yamamoto Granger causality methodology was employed for the analysis. The results of cointegration showed that there are no long-term correlations between the variables. The results also revealed no connection between public debt and GDP growth. The results of the variance decomposition test showed that the burden of domestic debt on GDP growth was greater. The results of the impulse response function show that there was instability in GDP growth's response to public debt.

For 17 Organization for Economic Cooperation and Development (OECD) nations, Sabina (2018) looked into the potential nonlinearity in the relationship between public debt as a share of GDP and economic growth for each country independently from 1970 to 2014. Employing the technique of Hansen (1996) and Hansen (1999), the consequent debt-value threshold is endogenously determined while simultaneously adjusting for additional growth drivers. The results show that the debt-value thresholds, cointegration, and nonlinearity between these two variables, as well as the effect of the public debt ratio on economic growth, are all country-specific.

Using the Error Correction Model (ECM) methodology, Elikana (2019) examined the impact of Tanzania's public debt on economic growth from 1990 to 2017. The findings showed that external debt positively impacted economic growth. However, the repayment of external debt had a positive and insignificant impact on economic growth. The findings also showed that domestic debt has a negative impact on economic growth. The outcome of cointegration also demonstrated a long-term link between the variables.

Sanusi, Hassan, and Meyer (2019) used a Non-linear Autoregressive Distributed Lag (NARDL) model within a panel framework to investigate the non-linear impacts of public debt on economic growth in the Southern African Development Community (SADC). The findings supported the long-term non-linearity between public debt and economic growth, which suggests that public debt drives growth before counteracting it upon reaching the threshold level. Additionally, the findings indicate that over the long term, the SADC's public debt ceiling is set at 57% of GDP.

In Latin America, Leon et al. (2019) applied the Vector Autoregression technique to investigate the relationship between public debt and economic growth. The main results indicated that when the ratio of public debt to GDP is 75%, economic growth decelerates. Conversely, the volatility of economic growth is enhanced when the ratio is 35%. The results further established that external shocks such as foreign capital flows and changes in the situations of trade affect the link between public debt and economic growth. Rising levels of public debt undeniably increases the short-run vulnerability of the economy. However, growth becomes a catalyst for fiscal sustainability in the long term.

The Autoregressive Distributed Lag (ARDL) model was utilized by Atoullo (2019) to examine the impact of public debt on Tajikistan's economy. The short-run and long-run results showed that external debt has a detrimental effect on economic growth. The proposition that public debt is favourable in the short term and unfavourable in the long term was countered by this finding. However, it supported the suggestion that the link between public debt and economic growth in the short and long runs was negative. Furthermore, the impact of debt service on economic growth in the short and long runs was inverse.

Njoroge (2020) used the methodologies of ARDL and VECM to investigate the impact of public debt on economic growth in Kenya. The findings indicated that public debt, investment and population growth had a positive

effect on economic growth. On the other hand, the openness of the economy and government consumption spending exerted a negative impact on economic growth. The findings further indicated that the primary budget balance had a positive effect on the public debt of Kenya. This result implies that the public debt of Kenya is manageable.

Utilizing data from 1970-2017, Saungweme (2020) deployed the ARDL bounds tests to cointegration to analyse the link among public debt, public debt service and economic growth in South Africa, Zambia and Zimbabwe. The findings demonstrated that public debt had a favourable impact on the economic growth of Zambia. Nonetheless, it exerted a negative effect on the economic growths of South Africa and Zimbabwe respectively. Furthermore, domestic public debt exerted a negative effect on the economic growths of Zambia and Zimbabwe. It, however, exerted a positive impact on the economic growth of South Africa. Moreover, foreign public debt affected Zambia's economic growth positively. Nevertheless, it exerted a negative effect on the economic growth of South Africa and Zimbabwe. The results of the causality test indicated that causality runs from economic growth to public debt in all the economies investigated. In all the countries studied, there was no proof of a positive relationship between public debt service and economic growth.

In another study, Nwanedo (2021) adopted the multiple regression technique and the Granger causality test to examine the impact of public debt on economic growth in Nigeria from 1981 to 2019. The results indicated that external debt had a negative effect on economic growth. However, domestic debt had a positive and insignificant impact on economic growth. The result of cointegration indicated the presence of a long-run equilibrium relationship among the variables. The test of the Granger causality indicated a unidirectional relationship from external debt and domestic debt to economic growth.

In a study of 18 sub-Saharan African (SSA) countries, Geleta (2021) employed panel data from 2005 to 2018 and the Two-step System Generalized Method of Moment (2SSYS-GMM) and Two-stage Least Squares approach.to examine the impact of public debt on economic growth. The findings indicated that public debt had a negative effect on the economic growth of the investigated sub-Saharan African (SSA) countries. Nevertheless, the non-linear link suggested by the Laffer curve between public debt and economic growth was refuted by the outcome of this investigation. Moreover, the results indicated that national savings, gross exports and broad money had a positive effect on economic growth. Furthermore, the results indicated that there is no nexus between public debt and economic growth in the SSA economies investigated.

Mosikari and Eita (2021) deployed the NARDL approach in a diverse study to explore the asymmetric link between government debt and GDP growth in Namibia. To begin with, the results indicated that government debt exerted a positive and insignificant effect on economic growth. However, government debt started to exert a negative influence on economic growth after a particular stage. Owing to this, GDP growth has diverse responses to rising debt levels and falling debt levels. The response of the growth rate of GDP to declining values of debt is more favourable than to rising values of debt.

In 14 European countries of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Luxembourg, Norway, Portugal, Spain, Sweden, and Turkey, Yildirim and Erdogan (2021) used the panel ARDL approach to examine the nexus between public debt and economic growth from 1980 to 2017. The results indicated that except Denmark and Norway where public debt exerted a positive effect on economic growth, that it had a negative effect on the economic growth of the remaining countries. However, public debt exerted a positive and insignificant effect on the economic growth of Sweden. Adopting the ARDL methodology and time series data from 1980 to 2022, Uzoma, Duru, Uruakpa, and Nzeribe (2023) investigated the connection between public debt and economic growth in Nigeria. The results revealed that domestic debt had a negative effect on economic growth. However, external debt exerted a negative and insignificant effect on economic growth.

Facts from the reviewed literature indicate that most of the studies were executed in industrialized economies. Also, it revealed that diverse methodologies have been deployed for the investigation of public debt-growth nexus. However, the VECM was the most common one in terms of frequency of use. There is a consensus among scholars that the Keynesian theory, Ricardian equivalence theory, and neoclassical theory have been utilized as the main theoretical framework for the investigation of the public debt-growth nexus (Aero & Ogundipe, 2016; Eze & Ogiji, 2016; Lwanga & Mawejje, 2014; Njoroge, 2020; Renjith & Shanmugam, 2018). To the best of our knowledge, further evidence from the reviewed literature showed that Egbetunde (2012); Akomolafe, Bosede, Emmanuel, and Mark (2015); Nwanedo (2021) and Uzoma et al. (2023) were the investigation executed in Nigeria.

The studies executed in Nigeria on public debt and public debt-growth nexus were sparse. Nevertheless, this issue had resulted in extensive studies in other developing and developed economies as evidenced by these researches (Alves, 2014; Atoullo, 2019; Canbek, 2014; Chongo, 2013; Geleta, 2021; Leon et al., 2019; Mosikari & Eita, 2021; Njoroge, 2020; Saungweme, 2020; Soares, 2022; Yildirim & Erdogan, 2021). Akomolafe et al. (2015) dwelt on public debt and private investment in Nigeria. To the best of our knowledge, the only researchers their focal point was public debt-growth. nexus were Egbetunde (2012); Nwanedo (2021) and Uzoma et al. (2023).

Deploying a Vector Autoregressive (VAR) technique, Egbetunde (2012) utilized time series data from 1970 to 2010 to analyse the impact of public debt on economic growth in Nigeria. The real gross domestic product (GDP) was the dependent variable. Conversely, domestic debt and external debt were the independent variables. This study established a bidirectional relationship between public debt and economic growth. Uzoma et al. (2023) deployed time series data from 1980 to 2022 to examine the link between public debt and economic growth in Nigeria. The ARDL approach was used for analysis. The real GDP was the dependent variable. However, domestic debt, external debt, inflation rate, and interest rate were the independent variables. The results indicated that domestic debt had a negative and significant impact on economic growth. On the other hand, external debt had a negative and insignificant effect on economic growth in Nigeria.

Nwanedo (2021) on the other hand, used time series data from 1981 to 2019 and a multiple regression methodology to examine the connection between public debt and economic growth in Nigeria. The real GDP was the dependent variable. Conversely, the exchange rate, the consumer price index, the total stock of domestic debt, and the total stock of external debt were the independent variables. The findings indicated that external debt exerted a negative impact on economic growth. However, domestic debt exerted a positive and insignificant impact on economic growth. The results of the reviewed empirical studies on public debt-growth nexus were conflicting owing

to diverse datasets and methodologies. The results of studies executed in Nigeria (Egbetunde, 2012; Nwanedo, 2021; Uzoma et al., 2023) on the public debt-growth nexus were no exceptions.

Owing to this, the public debt-growth nexus is still open for discussion in Nigeria. Methodological problems are among the drawbacks of previous studies. The Ordinary Least Squares (OLS) approach was utilized by Nwanedo (2021) for analysis. This could probably result in a problem of endogeneity due to the bidirectional link between public debt and economic growth. The resulting outcome would be biased and inconsistent in this regard owing to the OLS application. This study deployed the Two Stage Least Square (2SLS) approach which is at variance with the approaches adopted by Egbetunde (2012); Nwanedo (2021) and Uzoma et al. (2023) to analyse the public debt-growth nexus. In contrast to the OLS method, the 2SLS has an added advantage since it removes the endogeneity amid the explanatory variables.

Moreover, the investigations by Egbetunde (2012); Nwanedo (2021) and Uzoma et al. (2023) decomposed public debt into domestic and external public debt. The joint effect of total public debt (involving both domestic and external debt) on economic growth regarded as a critical gap in the public debt-growth literature was ignored by these studies as well. Owing to this, the effect of total public debt on economic growth in Nigeria was not investigated by any of these studies. No wonder Elikana (2019) maintained that evaluations of public debt in developing economies have traditionally dwelt on external debt only. Based on this, we joined domestic and external debt to spawn total public debt rather than separating it to examine the impact of total public debt (either domestic debt or external debt) on Nigeria's economic growth. In contrast to previous studies, our study expanded the sphere of investigation. This study included extra macroeconomic variables into the current empirical models to address one of the critical gaps in past research.

2.2. Theoretical Framework

According to the theoretical analysis of the connection between public debt and economic growth, there is not just one explanation for it. The theoretical framework of this study will therefore be based on the Neoclassical theory, the Keynesian theory and the Ricardian Equivalence theory. This is because, according to the literature, these are the main ideas that scholars employ to explain how public debt and economic growth are related. In addition to these three fundamental theories, others can be used to analyze the connection between debt and economic growth, including the functional finance theory, dual gap theory, and tax smoothening theory (Chongo, 2013; Karazijiene, 2015). The Classical strategy, which is based on the core idea that there is no basis for government interference in the economy outside of a few crucial sectors like military, health, and education, is elaborated upon by the Neo-Classical approach.

When it comes to public debt, these two perspective-sharing approaches underline the detrimental effect of government expenditure on economic growth. According to the traditional view, society or future generations are ultimately responsible for repaying public debt, which includes both principal and interest (Buchanan, 1958). This is because the neoclassical model suggests that public debt may be a constraint on economic growth because it crowds out private investment, according to Diamond (1965) and Panizza and Presbitero (2013). Also, this is because the neoclassical model gave a stronger role to crowding-out effects brought on by rising interest rates due to increased competition for funds in the financial markets. According to classical theory, public debt has a detrimental effect on economic expansion. This supports the claims made by early classical scholars like Adam Smith, Jean Baptiste Say, and David Ricardo, who opposed government debt because it distorts private capital and has a detrimental effect on capital accumulation and growth because government spending is unproductive (Tsoulfidis, 2007).

The neoclassical supports the idea that debt held by the government impedes economic growth. Investors may view governmental debt as a pretext for future tax increases, interest rate rises, or debt-driven crises, all of which could discourage private investment and economic growth. The crowding-out effect of high debt levels is the term used to describe this phenomenon (Akram, 2015). When foreign exchange resources are mostly used for debt service and only a small percentage is allocated to investment and growth finance, this phenomenon is known as crowding out (Krugman, 1988). The crowding-out hypothesis is part of a broader body of neoclassical theory, which maintains that investment is driven away by deficit financing, leading to a decrease in capital formation and economic growth. Elmendorf and Mankiw (1999) assert that the signing of government debt to finance the budget deficit is one of the primary factors impeding private investment.

Therefore, the enormous servicing of public debt may lead to the misallocation of limited resources that could be used for public investment. Therefore, the majority of the detrimental impact of public debt servicing on economic growth is explained by the crowding out hypothesis. Another widely acknowledged theory is the debt overhang effect. The debt overhang effect is a theory that explains how public debt influences investment and economic expansion. Borensztein (1989) and Sachs (1989) define a debt overhang as a situation in which a country's ability to repay its public debt is less than the burden of public debt. The ratio of public debt to GDP is used to determine financial capacity. A high percentage suggests that a country's ability to generate enough income to pay off its national debt would be challenging. The accumulated debt stock deters investors from making investments in the private sector because they fear having to pay high taxes to the government (Wangmo, 2018).

At that moment, the debt overhang effect starts to work. A country's public debt is considered to be overhanging when it is beyond its repayment capacity. Debt overhang can send organizations and nations into a vicious downward spiral since more cash flows and revenues are utilized to service current debt, which only helps to raise the total amount of debt (Mensah, 2017). The negative impact of public debt on economic growth can be largely explained by the debt overhang hypothesis. The idea contends that governmental debt and economic growth are inversely correlated. Myers proposed the debt overhang theory in Myers (1977). However, the debt crisis in the mid-1980s prompted several important studies by Sachs (1989); Krugman (1988) and Krugman (1989), which brought it into the realm of international finance literature. Debt drives away the private sector, depletes resources due to debt and interest payments to borrowers, and throws doubt on the future health of the economy, according to this prognosis.

The Keynesian theory of public debt contends that rising debt levels encourage government expenditure, which in turn boosts economic growth. The Keynesian hypothesis holds that boosting government spending by taking on additional debt from the public sector will increase economic activity at home and attract private investment (Saungweme & Odhiambo, 2018). The Keynesian hypothesis therefore contends that debt boosts demand, which

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ultimately encourages a rise in investment and production. According to Keynesians, debt does not cost either the present or future generations because of the investments it generates. Therefore, according to them Buchanan (1958), the underlying burden of the national debt is not being passed on to future generations. According to this theory, production increases as a result of the accelerator effect, which happens when debt boosts investment more proportionately than demand (Diallo, 2009).

Their rationale is that, according to Oleksandr (2003) one of the sources for funding capital creation is external debt, and since capital formation financing encourages investment, it fosters economic growth. Ewaida (2017) contended that this mechanism is dependent on the effectiveness of expansionary fiscal policy in increasing output and aggregate demand. Additionally, this advantageous effect happens when public debt is utilized to fund either productive public capital or public amenities (Attard, 2019; Checherita-Westphal & Rother, 2012). The classical view, however, contends that debt prevents consumption and capital creation because it acts as a future tax (Diallo, 2009; Oleksandr, 2003; Pattillo, Poirson, & Ricci, 2004; Sheikh, Abbasi, Iqbal, & Masood, 2014). Therefore, due to its negative impact, the classical, debt overhang theorists, and crowding-out theorists do not advocate public debt for growth.

Finally, Barro (1979) Ricardian equivalence theory rejected both the Keynesian and the Neoclassical perspectives on public debt. However, according to this theory, there is either no relationship or a neutral one between public debt and economic growth (Barro, 1989). To put it another way, as long as solvency is not a concern, government debt merely explains the distribution of financial resources among economic agents, with no changes to actual macroeconomic variables (Barro, 1989). Since rational people are aware that the government utilizes the power of levy to pay off its debt, they also understand that today's tax cut is equivalent to tomorrow's tax increase. The Ricardian equivalence theory states that borrowing and taxation have equal effects when financing government debt (Bernheim, 1989). Consequently, in Barro (1974) opinion, according to the Ricardian Equivalence Hypothesis, public debt cannot be a tool for stimulating the economy.

The so-called conventional view of debt, which mixes Keynesian and Neoclassical viewpoints and maintains that the economy exhibits Keynesian behaviour in the short term and classical behaviour in the long term, is also mentioned in the literature (Elmendorf & Mankiw, 1999). In conclusion, there is disagreement over how public debt affects economic growth according to these ideas. The public debt, according to the Neoclassicals, has a detrimental impact on economic expansion. The Keynesians, on the other hand, believed that public debt had a beneficial effect on economic expansion. The Ricardian equivalence theory also predicted that public debt would have no negative or positive effects on economic growth. Bernheim (1987) analysed the Keynesian, Neoclassical, and Ricardian schools of thought about deficit financing, arguing that the Ricardian paradigm should be rejected on theoretical grounds because it is based on questionable premises.

3. Methodology and Model Specification

In this investigation, time series data from 1981 to 2021 was used. Considering the accessibility of the data, this time frame was chosen. Additionally, the debt crisis at the start of the 1980s had an impact on the majority of the Least Developed Countries (LDCs). Furthermore, the Structural Adjustment Programme (SAP) era, the debt relief phase of 2005, the global financial crisis of 2008, and the period of elevated public borrowing were included in our focus. Data from the World Bank (WB), World Development Indicators (WDI) and the Central Bank of Nigeria (CBN) were used for the study. The data on the national debt was provided by the CBN. However, data for the remaining variables was gathered from the WB WDI. Tables 1 and 2 present the variable definition, measurement, data source, and expected signals for economic growth and public debt models, respectively.

Table 1. Variable definitions, measures and sources of data for the growth model.

Variable	Description	Expected sign	Source of data
Dependent variable			
GDP per capita growth rate	GDP per capita (Constant 2015 US$)	Dependent variable	WB, WDI
Independent variables			
Public debt stock	Public debt stock as a share of GDP	+/-	CBN
Inflation	Inflation rate measured by the consumer price index	-	WB, WDI
Openness to trade	Trade as a share of GDP	+	WB, WDI
Debt service	Total debt service as a percentage of exports of goods and services (% of exports)	-	WB, WDI
Real effective exchange rate	Real effective exchange rate	-	WB, WDI
Foreign direct investment	Foreign direct investment, net inflows as a share of GDP	+	WB, WDI

Table 2. Variable definitions, measures and sources of data for the public debt model.

Variable	Description	Expected sign	Source of data
Dependent variable			
Public debt stock	Public debt stock as a share of GDP	Dependent variable	CBN
Independent variables			
GDP per capita growth rate	GDP per capita (Constant 2015 US$)	-	WB, WDI
Inflation	Inflation rate measured by the consumer price index	-	WB, WDI
Openness to trade	Trade as a share of GDP	+	WB, WDI
Debt service	Total debt service as a percentage of exports of goods and services (% of exports)	+	WB, WDI
Real effective exchange rate	Real effective exchange rate	-	WB, WDI
Foreign direct investment	Foreign direct investment, net inflows as a share of GDP	-	WB, WDI

To prevent problems with spurious regression, a time series stability test was conducted. Using the Augmented Dickey-Fuller (ADF) and Phillips-Perrons unit root tests, we looked for stationarity in the series. Economic growth and public debt have a two-way relationship. Findings from a single equation method like Ordinary Least Squares (OLS) will be biased and conflicting (Greene, 2003; Gujarati, 2003). The Two-Stage Least Squares (2SLS) methodology will be used in this study to address the endogeneity between economic growth and public debt and investigate their relationship.

In terms of model specification, the study will specify two equations. The two equations are therefore those that relate to public debt and economic growth. The first equation will illustrate how public debt and economic growth are related, and the second equation will make clear what produces public debt. All of the variables were logged. The logarithm sign was represented by the symbol ln. The first model was adapted from those made by Geleta (2021); Forgha, Mbella, and Ngangnchi (2014), as well as Chukwuagoziem (2012). However, the second model was modified using models from Chongo (2013); Forgha et al. (2014) as well as Geleta (2021). The following is how these equations are shown:

$$LNRGDP_t = \beta_0 + \beta_1 LNPUBD_t + \beta_2 LNINF_t + \beta_3 LNOPEN + \beta_4 LNDEBTS_t + \beta_5 LNREER_t + \beta_6 LNFDI_t + \varepsilon_t \quad (1)$$

$$LNPUBD_t = \beta_0 + \beta_1 LNRGDP_t + \beta_2 LNINF_t + \beta_3 LNOPEN_t + \beta_4 LNDEBTS_t + \beta_5 LNREER_t + \beta_6 LNFDI_t + \mu_t \quad (2)$$

Where:
$LNRGDP$ = *Real GDP per capita in logarithm form.*
$LNPUBD$ = *Public debt stock in logarithm form.*
$LNINF$ = *Inflation in logarithm form.*
$LNOPEN$ = *Openness to trade in logarithm form.*
$LNDEBTS$ = *Debt service in logarithm form.*
$LNREER$ = *Real effective exchange rate in logarithm form.*
$LNFDI$ = *Foreign direct investment in logarithm form.*

Table 3. ADF unit root test results.

Variable	Augmented Dickey-Fuller (ADF)		
	Level	**First difference**	**I(d)**
LNRGDP	-1.1727	-4.0447***	I (1)
LNPUBD	-3.1025**	-	I (0)
LNINF	-3.4972***	-	I (0)
LNOPEN	-2.0659	-7.7559***	I (1)
LNDEBTS	-1.2803	-6.3650***	1(1)
LNREER	-2.9636**	-	1(0)
LNFDI	-3.1537**	-	1(0)

Note: *** and ** indicate statistical significance at the 1% and 5% levels.

4. Data Presentation, Analysis and Discussion of Results

The variables were either I(0) or I(1), according to the findings of the ADF unit root test in Table 3. All other variables were stationary at the first difference, except for public debt, the inflation rate, the real effective exchange rate, and foreign direct investment.

Table 4. Estimates of two-stage least-squares for the growth model.

Dependent variable: LNRGDP				
Variable	**Coefficient**	**Std. error**	**t-statistic**	**Prob.**
LNPUBD	0.0376	0.0149	2.5287**	0.0163
LNINF	0.0059	0.0255	0.2302	0.8193
LNOPEN	-0.1275	0.0481	-2.6491***	0.0122
LNDEBTS	-0.1260	0.0129	-9.7446***	0.0000
LNREER	-0.0741	0.0443	-1.6732*	0.1035
LNFDI	-0.0510	0.0294	-1.7328*	0.0922
C	7.8230	0.4298	18.2010***	0.0000
Model parameters				
R²	0.8543			
Adjusted R²	0.8286			
F-statistic (Prob.)	33.2350 (0.0000)			
Durbin-Watson statistic	0.9589			

Note: ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels.

The findings of the equation of economic growth are depicted in Table 4. The results indicate that public debt has a positive effect on economic growth. Thus, if public debt increases by one per cent, economic growth would increase by 0.04 per cent. This result agrees with the Keynesian suggestions. Consequently, the debt overhang hypothesis does not hold in Nigeria. This is an indication that public debt does not dampen economic growth in Nigeria. The results of Mensah (2017); Wangmo (2018); Saungweme (2020) and Njoroge (2020) support this result. The findings of Chongo (2013); Anning, Ofori, and Affum (2016); Saungweme (2020) and Geleta (2021) contravene this outcome. inflation has a positive and insignificant impact on economic growth against expectation. This suggests that Nigeria's macroeconomic policy promotes economic growth slightly. The findings of Oteng (2022) agree with this outcome. However, the deductions of Njoroge (2020) violate it.

Unlike what was anticipated, trade openness had a negative effect on economic expansion. Thus, it does not promote economic growth in Nigeria. This suggests that a 0.13 per cent rise in trade openness would diminish economic growth. In Nigeria, where primary commodities make up the majority of export earnings, this result

emphasizes the importance of varying export and import prices on economic growth, which is a substantial source of economic volatility. This observation is not consistent with those of Duru et al. (2021). The real effective exchange rate has a negative effect on economic growth as forecasted. This implies that a 0.07 per cent per rise in real effective exchange rate would stifle economic growth. This result contradicts Nsonwu (2016) submissions. Contrary to expectations, foreign direct investment had a negative impact on economic growth. Hence, it does not contribute to economic growth in Nigeria. This implies that a 0.05 per cent rise in foreign direct investment would reduce economic growth. The findings of some earlier investigations (Chongo, 2013; Mavhinga, 2015; Njoroge, 2020) do not support this. In addition, as was expected, debt service had a negative impact on economic growth.

This implies that a 0.13 per cent rise in debt service would dampen economic growth. This result aligns with the findings of Nsonwu (2016); Elikana (2019); Atoullo (2019); Saungweme (2020) and Oteng (2022). However, it contradicts Mavhinga (2015) submissions. The crowding-out effect phenomenon or crowding-out hypothesis is consistent with this. This suggests that national debt servicing has a detrimental effect on Nigeria's economic growth. The crowding-out effect hypothesis therefore applies to Nigeria. As a result, there is a greater reliance on foreign loans due to the debt servicing load. Furthermore, paying off debt uses up resources that could be used to support development initiatives, which has a direct detrimental effect on economic growth. This result contradicts Mavhinga (2015) and Elikana (2019) submissions. The explanatory factors were able to account for 85% of the total variation in the dependent variable, which suggests that the model fits the data well. The Durbin-Watson value of 0.9589 indicates the presence of positive autocorrelation. The p-value of the F-statistic indicates that the model as a whole is statistically significant.

Table 5. Estimates of two-stage least-squares for the public debt model.

Dependent variable: LNPUBD				
Variable	Coefficient	Std. error	t-statistic	Prob.
LOGRGDP	4.2093	1.6646	2.5287***	0.0163
LOGINF	-0.0113	0.2698	-0.0419	0.9668
LOGOPEN	1.5112	0.4958	3.0482***	0.0044
LOGDEBTS	0.2109	0.2640	0.7988	0.4299
LOGREER	-0.8391	0.4657	-1.8018	0.0805
LOGFDI	-0.2193	0.3227	-0.6795	0.5014
C	-15.2952	14.6720	-1.0425	0.3045
Model parameters				
R^2	0.6691			
Adjusted R^2	0.6107			
F-statistic (Prob.)	11.4577 (0.0000)			
Durbin-Watson statistic	0.4308			

Note: *** indicates statistical significance at the 1% level.

The 2SLS results as shown in Table 5 indicates that real GDP per capita has a positive impact on the public debt. This means that a one per cent increase in real GDP per capita would increase economic growth by 4.21 per cent. However, foreign direct investment and the real effective exchange rate exerted a negative and insignificant effect on the public debt. The negative and insignificant link between the real effective exchange rate and the public debt violates the submissions of Chongo (2013). As was expected, trade openness had a negative effect on public debt. This entails that a one per cent rise in trade openness would increase the public debt by 1.51 per cent. Furthermore, the results indicated that 67% of the total variation in the dependent variable was accounted for by the explanatory variables. Thus, the model has a good fit. The positive autocorrelation is present in our model due to the Durbin-Watson value of 0.4308. The model is statistically significant owing to the p-value and the F-statistic.

Table 6. Toda and Yamamoto multivariate causality test results.

Dependent variable	Sources of causation	
	LNRGDP χ^2	LNPUBD χ^2
LNRGDP	-	540.8503***
LNPUBD	173.2946***	-

Note: *** Indicates significance at the 1 per cent level.

Table 7. Toda and Yamamoto multivariate causality test results.

Dependent variable	Sources of causation	
	LNRGDP χ^2	LNDEBTS χ^2
LNRGDP	-	2.7967
LNDEBTS	26.2617***	-

Note: *** Indicates significance at the 1 per cent level.

Tables 6 and 7 show the outcomes of the Toda and Yamamoto multivariate causality tests. The result in Table 6 showed a bidirectional correlation between economic growth and governmental debt in Nigeria. Additionally, this result raises the possibility that Nigeria could simultaneously work toward reducing its public debt and growing its economy. The findings of Reinhart and Rogoff (2010a); Egbetunde (2012); Panizza and Presbitero (2014); Gomez-Puig and Sosvilla-Rivero (2015); Woo and Kumar (2015); Kobayashi (2015); Donayre and Taivan (2017) and Iitula (2018) are at odds with those of this study.

It does, however, concur with the arguments made by Geleta (2021); Donayre and Taivan (2017); Egbetunde (2012); Owusu-Nantwi and Erickson (2016); Abbas and Christensen (2010) and Ferreira (2009). On the other hand, Table 7's findings showed that debt servicing in Nigeria and real GDP per capita have a one-way causal relationship. The fact that debt servicing in Nigeria results from economic growth rather than the other way around suggests that decisions about debt payment are not made in a way that would disproportionately encourage economic

expansion. The results of this study contradict those of Afxentiou (1993); Amoateng and Amoako-Adu (1996); Jalles (2011) and Chukwuagoziem (2012).

5. Conclusion and Recommendations

The findings of the economic growth model disproved the debt overhang effect theory by demonstrating that the effect of public debt on economic growth was both positive and significant. The debt overhang hypothesis, then, does not hold in Nigeria. This proves that Nigeria's public debt has no adverse effects on the economic growth of the nation. Furthermore, it supports the Keynesian proposition. Additionally, debt service has a detrimental effect on economic expansion. This demonstrates that the crowding-out effect, often known as the crowding-out hypothesis, exists in Nigeria. This shows that Nigeria's economic growth is negatively impacted by servicing the country's debt. Due to the burden of debt servicing, there is a higher reliance on foreign loans. Furthermore, paying off debt uses up resources that could be used to finance development initiatives, which has a detrimental effect on economic progress.

The results of the public debt model demonstrated that real GDP and openness to trade have a positive effect on public debt. Furthermore, it was demonstrated that there is a bidirectional relationship between economic growth and governmental debt in Nigeria. It suggests that Nigeria can pursue both economic growth and goals for public debt management simultaneously. It was also proven that there is a one-way causal relationship between Nigeria's real GDP per capita and debt servicing. In Nigeria, debt servicing arises from economic growth rather than the other way around, indicating that debt payment decisions are not handled in a way that would unduly favour economic growth. Based on the study's findings, the following recommendations are made: The Nigerian government can simultaneously pursue its goals for policy regarding public debt and economic growth. Additionally, decisions about debt servicing in Nigeria should be made in a way that supports economic expansion.

It will be impossible for Nigeria to pay off its public debt in the future without accruing extra debt and threatening its ability to develop; therefore, it must either adopt other measures to handle the issue or enhance its macroeconomic institutions and policies. Nigeria should strengthen its macroeconomic policies in the areas of inflation, foreign direct investment, trade, and exchange rate, as well as the effectiveness of its institutions. Effective debt management strategies are also required to ensure that borrowed money is used for desirable projects that produce foreign currency, rather than pointless undertakings, to promote growth. In addition, the government must ensure that loans are applied to capital projects that boost private sector participation. According to the findings, doing so would mitigate the negative effects of crowding out private sector expansion. To ensure that Nigeria's public debt continues to promote economic growth, the strategies and policies for controlling debt should also be sustained.

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