

Impact of Public Debt on Economic Growth of Nigeria, 1990-2021

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Abstract

Government borrows when her revenues fall short of her expenditures. Many countries borrow from other nations to address revenue declines and promote economic growth. Borrowing to finance infrastructure and public development is a key to faster economic growth. However, if loans are not used optimally, public debt becomes a burden thereby hindering economic growth. The impact of Nigeria's public debt on economic growth was investigated in this study using data from 1990 through 2021. The specific objectives of the study ascertained impact of external debt on Nigeria's GDP growth rate; examined effect of domestic debt on Nigeria's GDP growth rate; assessed influence of debt service payment on Nigeria's GDP growth rate and determined direction of causality between public debt and economic growth in Nigeria. We adopted Ordinary Least Square (OLS) approach to analyze the public debt-GDP growth rate nexus. Furthermore,

the Auto-regressive Distributed Lag (ARDL) model was used to test for co-integration. Findings showed that while external debt had a negative effect on GDP growth rate on the short-run, it indicated long-run positive effect on GDP growth rate. Domestic debt exerted a negative influence on GDP growth rate both in the short and long run. Debt Service payment had a negative impact on GDP growth rate both in the short-run and the long-run. Results of Granger causality tests indicated a unidirectional causality between external debt and GDPGR, as well as debt service payment and GDP growth rate in Nigeria. The study concluded that borrowing for expansionary fiscal policies is not detrimental if debts are properly utilized. The study therefore recommended that Nigeria's economic growth should be internally determined through enhanced economic activities; the government should endeavor to intensify investment on local resources to boost productivity and to prevent debt trap, the nation's rapidly expanding debt profile must be proficiently managed.

Keywords: Public Debt, GDP Growth Rate, Ordinary Least Square, Autoregressive and Causality Tests

Introduction

Government borrows when her revenues fall short of her expenditures. Many countries have resorted to borrowing from their fellow countries to settle the fall in their revenue. The use of public debt by governments to finance their spending has left several nations with massive outstanding debts. Countries borrow money largely for macroeconomic purposes and to cover short-term balance of payments deficits.¹ This only suggests that government borrowing is done with the intention of promoting development and economic growth. Prudent borrowing to fund public and infrastructure projects is necessary for faster economic growth. An excessive borrowing habit without sufficient financial planning for investments may result in a nation's long-term debt burden, which eventually causes economic problems.²

Public debt is defined as the precise sum of money that the apex government owes to organizations or agencies both inside and outside the country.³ External or domestic debt is referred to as public debt. Domestic debt is that which is owed to lenders within a nation, whereas external debt is that which is owed to institutions, organizations, or nations located outside the country. Nigeria is currently one of the Sub-Saharan Africa's countries with the highest levels of debt due to its slow GDP growth and high debt levels, high levels of poverty, a quick decline in income per capita, and a sluggish rate of export growth.⁴ The country's civil war, which lasted from mid-1967 to January 1970, was the first of three significant factors that contributed to the indebtedness.

Between 1980 and 1990, Nigeria's external debt as noted by Ogunjimi increased from #2.3 billion to #633.1 billion.⁵ The ratio of total debt to GDP, which measures debt burden, increased from 19.9% in 1980 to 108.2% in 1994.

¹Soludo, C. C. (2013). The impact of external debt on economic growth: A comparative study of Nigeria and South Africa. *Journal of Sustainable Development in Africa*. 10, no 3. Pp 55 – 59.

²Ugwuanyi W. N.J. (2013). *The Nigerian Financial System: A Systematic Approach*. 4th Edition, Lagos, Published by Johnkens & Willy Nig. Ltd, Aguda, Lagos. Pp16.

³Nzotta, S. M. (2014). Money, Banking and Finance. Owerri: published in Nigeria by Good-Davis Association.

⁴Yusuf, A., Mohd, M., and [McMillan](#), D. (2021). Impact of Government Debt on Economic Growth in Nigeria. *Cogent Economic & Finance*, 9, no 1.

It decreases between 53.5% and 32.5% in 1995 and 1997, respectively. It again demonstrates rising trend from 1998 to 2006. By agreeing to forgive 60% of Nigeria's USD\$30.85 billion in debt, the Paris Club Debt Relief lessened the burden of debt on the Nigerian economy in 2005. Nigeria spent \$2.45 trillion on debt servicing out of the total income of #4.1 trillion realized in 2019. In the year 2020, 83% of Nigeria's revenue was used to pay down its debt. Nigeria's overall debt increased from N35.46 trillion (US\$86.57 billion) in the second quarter of 2021 to N42.84 trillion (US\$103.31 billion) in the second quarter of 2022, representing both domestic and foreign debt.

Public debt will become a burden for governments if loans are not used effectively.⁶ As a result, income from investments will not be enough to pay off maturing debts, which will impede economic growth. When loans are not used to fund economically sound initiatives, it is challenging to repay the principal and acceded interest. Nigeria is in this situation right now because investments that would normally lead to high-speed growth and a reduction in poverty are fluctuating in both good and negative directions. Consequently, the savings-investments gap has grown and debt accumulated, thereby, necessitating the use of a significant portion of government revenue and a decline in foreign reserves to repay the debt.⁷ Nigeria has resorted to borrowing from wealthier countries and international financial institutions like China, the World Bank, the African Development Bank (ADB) and the International Monetary Fund (IMF) to finance its deficit. Unfortunately, Nigeria's mounting national debt is surpassing its revenue generation capacity and depleting foreign reserves, impeding crucial public capital investments and overall economic growth.

These pressing concerns prompted the initiation of the present study.

⁵Ogunjimi, J.A. (2019). The Impact of Public. Debt on Investment: Evidence from Nigeria. Development Bank of Nigeria Journal of Economic and Sustainable Growth. Pp 1–28.

⁶Erhieyovwe, E. K. & Onovwoakpoma, O. D. (2013). External Debt Burden and its Impact on Growth: An Assessment of Major Macro-Economic Variable in Nigeria. *Academic Journal of Interdisciplinary Studies* 2, no. 4, pp143 – 153.

⁷Onyele, K. O., & Nwokoacha, E. B. (2016). Sources of Public Funds and Economic Prosperity: The Nigerian Case. *Journal of Business and Financial Affairs*. No 5, Pp5.

The major objective of the study is to examine the impact of public debt on economic growth of Nigeria from 1990-2021 while the specific objectives included to:

- i. ascertains impact of external debt on Nigeria's GDP growth rate,
- ii. examine effect of domestic debt on Nigeria's GDP growth rate,
- iii. assess influence of debt servicing on Nigeria's GDP growth rate,
- iv. determine the direction of Causality between public debt and economic growth in Nigeria.

Review of Literature

Conceptual Review

Public Debt

Debt can be defined as money owed by the debtor to the creditor, who may be a bank, a company that offers payday loans, an individual or another person.⁸ A country, business, or person could be the debtor. Debt is the entire amount of money a country owes, whether it was produced by its citizens or external bodies.⁹ Debt is acquired in order to pay for expenses that may adversely increase production and the expansion of the economy.¹⁰

The amount of debt that the government borrows from both internal and external sources to cover its deficit is referred to as public debt. Public debt is the particular amount that the apex government owes to organizations or agencies both inside and outside the nation.³ The desire to build institutional, infrastructural, and human capital capability causes public debt in emerging nations.¹¹ Most often, these efforts result in high government spending, insufficient revenue production, and increased debt burden.

⁸Asogwa, J.O., Okechukwu, E. U., and Onyekwelu, U. C. (2018). Evaluation of the effect of Federal Government External Debts and Reserves on Economic Growth in Nigeria. *Journal of Economics and Sustainable Development*, no 6, Pp 9.

⁹Anidiobu, G.A., Agu, B.O. and Ezinwa, C.E. (2016). Responsiveness of Economic Growth to External Debt in Nigeria. *Journal of Policy and Development Studies*, 10, no, 3. Pp 1-19.

¹⁰Muhammad, D.A.B., Ruhaini, M., Nathan, S.B. & Arshad. (2017). Real effects of Government Debt on Sustainable Economic Growth in Malaysia. *Journal of International Studies*, 10, no 3.

³Nzotta, S. M. (2014). *Money, Banking and Finance*. Owerri: published in Nigeria by Good-Davis Association.

¹¹Kehinde, J. A., Olanike, B., Oni, E., & Achukwu, M. (2015). Public Debt and Private Investment in Nigeria. *America Journal of Economic*, 5, no 5. Pp 501-507.

They pointed out that continuous economic expansion, which would not have been achievable with domestic resources, is achieved through the utilization of foreign debt.¹¹ The goal of public debt is to help recipient nations grow, sustain, and improve the rate of their income sources. They contend that in order for debt to serve its intended purpose, it must be well managed and the money must be directed toward uses that are wise and efficient.

External Debt

External debt consists of debt from foreign financial institutions or other nations. The discrepancy between domestic savings and investment is the cause of external debt.¹² The nation is forced to borrow money at ever-rising rates in order to stay afloat as debt grows as the gap widens. The debt owed by the public and private sectors of the Nigerian economy to nonresidents and citizens, repayable in foreign money, goods, and services, was further defined by him as Nigeria's external debt.

Domestic Debt

Domestic debt is the portion of a country's debt that was borrowed from within its borders.¹³ Domestic debt, also referred to as internal debt, can said to be debt that the government owes to its own people or financial institutions. The government borrows money by issuing financial instruments in the form of securities, such as Treasury Bills for short-term borrowing, which typically have maturities between 30 and 360 days, Development Stock, which typically have maturities between 5 and 25 years, and Bonds with maturities between 10 and above.

¹¹Kehinde, J. A., Olanike, B., Oni, E., & Achukwu, M. (2015). Public Debt and Private Investment in Nigeria. *America Journal of Economic*. 5, no 5. Pp 501-507.

¹²Ogbeifun, L. B. (2007). Effects of Petroleum Products Pipeline Vandalism On Society, Employee and Organizational Productivity: The Dilemma of Downstream Operation of Nigeria. *Journal of Economics and Sustainable Development*.

¹³Ozurumba B. A & Kanu S.I (2014). Domestic Debt and Economic Growth in Nigeria”. *Journal of Economic and Sustainable Development* vol 7, no. 5.

Debt Servicing

Debt servicing was described as the regular repayment of loans taken out by a nation from both local and foreign sources.¹⁴ A portion of the principal and interest on the loan are included in an installment. While according to Adesola, debt servicing refers to the funds needed over a specific length of time to pay back a debt's principal and interest.¹⁵ The weight of debt service has hindered Nigeria's rapid economic growth and made social problems worse.¹⁶

GDP Growth Rate (GDPGR)

The GDP growth rate is a measure of how quickly the economy is expanding. The nation's economic output is compared to the previous quarter's most recent quarter of the country's economic output. GDP measures the size of the economy. The GDP growth rate (GDPGR) gauges the country's GDP growth over time. The percentage (%) value of the change acts as a benchmark for the nation's economic health and potential future expansion.

Theoretical Review

Ricardian Equivalence Theory

This theory was developed by David Ricardo at the beginning of the 19th century, and it was further developed by Harvard professor Robert Barro. The assertion is also known as the Barro-Ricardo equivalence hypothesis. According to the Ricardian equivalence principle, the effects of financing government spending with current taxes or future taxes (as well as current deficits) will be equal to each other, because investors and consumers understand that the loan will eventually need to be repaid through taxes, more government expenditure backed by debt will not be able to stimulate the economy. According to the hypothesis, people can only put money away

if they anticipate having to pay more taxes in the future to pay off their debt, which would reduce the increase in aggregate demand brought on by increase in government spending.

¹⁴Chinaemerem, O. C. & Anayochukwu, O. B. (2013). Impact of Debt Servicing on Economic Development in Nigeria. *Research Journal of Finance and Accounting* 4, No 4.

¹⁵Adesola, W. A. (2009). Debt Servicing and Economic Growth in Nigeria: An Empirical Investigation. *Journal of Social Science*. 8, no. 2, pp 1-11.

¹⁶Audu, Ilemona. (2004). The Impact of External Debt on Economic Growth and Public Investment: The Case of Nigeria. African Institute for Economic Development and Planning (IDEP), Dakar.

Keynesian Theory of Public Debt

The Keynesian theory was proposed by John Maynard Keynes in 1936. The Great Depression of the 1930s in the 19th century contributed to the economic crises that led to the development of the Keynesian theory of public debt.¹⁷ He believed that in an economy, supply and demand are interdependent. According to him, insufficient demand results in unsold items and, thus, the unemployment of factors of production. The author claimed that low demand, which causes downward curl, is the cause of unemployment, poverty, and even depression. Keynes' response to these situations was to use fiscal policy measures to stimulate demand, such as tax cuts and increases in government spending. Since deficit budgeting would result in debt buildup, this will drive consumers to spend more to fill the gap, which will cause depressions. The linkage between public debt and economic growth has occupied a central position in Keynes analysis of fiscal policy instrument. In examining this on Nigeria's data, the study was anchored on Keynesian public debt theory to explain the effect of public debt on the growth in the economy. The concept is an expansionary fiscal policy measure that motivates individuals or the government to spend more, which eventually has an impact on the economy. Keynes, in his wisdom, recommended surplus budgeting as a strategy to reduce or eliminate governmental debt during prosperous times. However, the main issue with high government debt is that it can lead to inflation. Notably, Keynes thought that a budget surplus and/or a restrictive monetary policy could combat inflation. Prices begin to decline as demand (or expenditures) is reduced. Keynes supported budget deficits to increase demand, but he also supported budget surpluses to reduce debt.

¹⁷Keynes J. M, (1936) The General Theory of Employment, Interest and Money. London: Macmillan.

Empirical Studies

The following empirical studies by different authors as they relate to the objectives of the study were reviewed.

Impact of external debt on GDP growth rate of Nigeria

Asafo et al investigated the impact of external debt on economic growth in 46 sub-Saharan African countries from 1990 to 2017 using a two-step General Method of Moments (GMM) technique.¹⁸ The findings indicated that external debt had a negative and significant effect on GDP growth. However, it was observed that the first lag of external debt variables stimulated GDP growth. Interestingly, the detrimental impact of external debt was found to affect both rich and poor sub-Saharan African countries, suggesting that it was not exclusive to any specific group.

Maitra conducted a study on the impact of public debt and foreign aid on key macroeconomic variables, including income, price level, and interest rate in Sri Lanka from 1980 to 2000.¹⁹ The findings revealed that public debt, especially foreign debt, negatively affected income and contributed to an increase in the price level. Domestic debt had an impact on the price level. Surprisingly, foreign aid had a detrimental influence on both income and price levels. Both foreign debt and foreign aid led to an increase in the interest rate in both the short-run and long-run. However, no significant effect of domestic debt on the interest rate was observed in the study.

Effect of domestic debt on GDP growth rate of Nigeria

Mothibi and Mncayi utilized an autoregressive distributive lag (ARDL) model to investigate the impact of government debt on South Africa's economy from 1994 to 2017.²⁰ The study findings revealed the existence of long-run causal effects between government debt and government spending, real GDP, inflation and real interest rates.

¹⁸Asafo, S. S., Matuka, A., & Nyendu, D. (2019). External Debt and Economic Growth: Two-step System GMM Evidence for Sub-Saharan Africa Countries. *International Journal of Business, Economics and Management*. Vol 6, no 1, Pp39-48,

¹⁹Maitra, B. (2019). Macroeconomic Impact of Public Debt and Foreign Aid in Sri Lanka. *Journal of Policy Modeling*. vol 13, no. 2, Pp 100-105,

²⁰Mothibi, L., & Mncayi, P. (2019). Investigating the Key Drivers of Government Debt in South Africa: A Post-apartheid Analysis. *International Journal of eBusiness and eGovernment Studies* vol 11, no. 1.

Government spending, real GDP and interest rates were identified as the primary factors driving public debt in South Africa. The study also found that government debt had a negative influence on economic growth and inflation. However, no significant relationships were observed between inflation, real interest rates, and government debt in the short-run.²⁰

Opara et al examined Nigeria's domestic public debts and economic development with data captured from 1981-2018.²¹ The study employed Ordinary Least Square regression tools for the data analyses. The findings of the study revealed that domestic debt has significant impact on economic development of Nigeria.

Influence of debt service payment on GDP growth rate of Nigeria

Kalu, Okai, Chukwu and Amadi examined the influence of debt servicing and economic growth, the Nigerian experience, with data captured from 1981 to 2013.²² Along with other descriptive statistical tools, the Granger Causality Test and ordinary least squares regression approach were utilized as the principal methods of estimation. The causality tests revealed a bidirectional causal relationship between debt servicing payments (DSP) and gross domestic product (GDP), indicating that DSP is both influenced by and influences economic growth. This highlights the inhibiting effect of

debt on growth, as evidenced by the significant size of government service payments. The study recommends that the government establish a borrowing threshold to mitigate the high costs associated with debt servicing.

²⁰Mothibi, L., & Mncayi, P. (2019). Investigating the Key Drivers of Government Debt in South Africa: A Post-apartheid Analysis. *International Journal of eBusiness and eGovernment Studies* 11, no. 1.

²¹Opara, I. V, Nzotta, S.M. & Kanu, S. I. (2021). Nigeria's Domestic Public Debts and Economic Development. *International Journal of Management Science and Business Administration*. Pp 7-22.

²²Kalu E.U, Okai E.D.J, Chukwu N.O & Amadi I.E. (2016). Debt Servicing and Economic Growth: The Nigerian Experience. *Research Journal of Economics* 4, 2016.

Okolie and Anidiobu examined the effect of deficit financing on economic growth and development in Nigeria from 1986 to 2018.²³ They used stationarity tests, descriptive statistics, and ordinary least square estimation. The findings indicated that external deficit financing had a negative impact on real GDP, while domestic deficit financing had a positive impact. External deficit financing negatively influenced per capita income, while domestic deficit financing had a positive influence. The study recommended allocating deficit financing to productive sectors and adopting fiscal adjustment mechanisms to enhance income generation through improved taxes instead of relying on borrowing for deficits.

Direction of causality between public debt and economic growth of Nigeria

José et al conducted an assessment on the impact of public debt on the stability of economic growth in Latin America.²⁴ The researchers utilized a panel Vector Autoregression (VAR) model and found that external shocks such as; foreign capital flows and trade terms influenced the economic growth associated with public debt. The study revealed that higher levels of public debt increased vulnerability to short-term shocks. However, it also

emphasized the importance of long-term growth for sustainability, as a public debt-to-GDP ratio of 75% led to a slowdown in growth.

Ajayi and Edewusi conducted a study analyzing the influence of public debt on economic growth in Nigeria using secondary data from 1982 to 2018.²⁵ The research findings indicated that Nigeria's domestic debt had a positive effect on economic growth, whereas external debt had a negative impact.

²³Okolie, P. I.P. & Anidiobu, G. A. (2020). Effect of Deficit Financing on Economic Growth and Development in Nigeria. *European Journal of Accounting, Finance and Investment* 6, No. 4; 2020.

²⁴José M.G. L, John W. R. M, & Edgar A. R. H. (2019). Public Debt and Stability in Economic Growth: Evidence for Latin America. *International Journal of Economics and Financial* 9, No. 4 2019.

²⁵Ajayi, I. E, and Edewusi, D. G. (2020). Effect of Public Debt on Economic Growth of Nigeria: An Empirical Investigation". *International Journal of Business and Management Review* 8, No.1, Pp.18-38.

The result of the studies reviewed demonstrated a diverse relationship between public debt and economic growth, which was influenced by geographical factors, analytical techniques and time periods. The inconsistent findings from the empirical review highlighted the necessity for further data on the correlation between Nigeria's public debt and economic growth. This study specifically focused on using the Real Gross Domestic Product Growth Rate (GDPGR) as an indicator of economic growth and employed Autoregressive Distributed Lag (ARDL) model to examine the variables of external debt, domestic debt, and debt servicing which had not been comprehensively explored in previous research.

Methodology

The study employed an *ex-post facto* research design and utilized the Autoregressive Distributed Lag (ARDL) method to analyze the time series data obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin and World Bank data spanning the period from 1990 to 2021.

Model Specification

To examine the impact of public debt on economic growth of Nigeria (proxy by Gross Domestic Product Growth Rate) served as the dependent variable while external debt, internal debt, debt servicing, exchange rate and interest rate served as the independent variables. In this study, we adopted the statistical method of multiple regression approach.

Given the above consideration, the functional relation of the model is generally given as:

$$\text{GDPGR} = f(\text{DDEBT}, \text{EDEBT}, \text{DSP}, \text{INFL}, \text{EXCH}, \text{INT}) \quad (1)$$

The econometrics model is specified as follows:

$$\text{GDPGR}_t = \beta_0 + \beta_1 \text{LDDEBT}_t + \beta_2 \text{LEDEBT}_t + \beta_3 \text{DSP}_t + \beta_4 \text{INFL}_t + \beta_5 \text{EXCH}_t + \beta_6 \text{INT}_t + \mu \quad (2)$$

Where:

GDPGR = GDP growth rate;

LDDEBT = Log of Domestic Debt;

LEDEBT = Log of External Debt;

DSP = Debt Service Payment;

INFL = Inflation;

EXCH = Exchange Rate and

INT = Interest Rate.

$\beta_0, \beta_1, \beta_2, \beta_3$ and β_4 = parameters and μ = Stochastic error term. *A priori* expectations - β_1, β_2 and $\beta_3 > 0$, and $\beta_4 < 0$.

Decision Rule is based on 5% probability value and is stated as follows:

$H_0: 0 = 0_0$ versus $H_1: 0 \neq 0_0$

ARDL Bound co-integration Test Model:

$$\square \text{GDPGR}_t = c + \square \overset{\text{P}}{1i} \square \text{GDPGR}_{t-1} + \square \overset{\text{pp}}{2i} \square \text{LDDEBT}_{t-1} + \square \overset{\text{pp}}{3i} \square \text{LEDEBT}_{t-1} + \square \overset{\text{pp}}{4i} \square \text{DSP}_{t-1} + \square \overset{\text{pp}}{5i} \square \text{INFL}_{t-1} + \square \overset{\text{pp}}{6i} \square \text{EXCH}_{t-1} + \square \overset{\text{pp}}{7i} \square \text{INT}_{t-1} + \mu$$

$$+ \square \overset{\text{P}}{4i} \square \text{DSP}_{t-1} + \square \overset{\text{P}}{5i} \square \text{INFL}_{t-1} + \square \overset{\text{P}}{6i} \square \text{EXCH}_{t-1} + \square \overset{\text{P}}{7i} \square \text{INT}_{t-1} + \mu$$

$$\beta_1 \text{GDPGR}_{t-1} + \beta_2 \text{LDDEBT}_{t-1} + \beta_3 \text{LEDEBT}_{t-1} + \beta_4 \text{DS}_{t-1} + \beta_5 \text{INFL}_{t-1} + \beta_6 \text{EXCH}_{t-1} + \beta_7 \text{INT}_{t-1} \square_t$$

Where:

C= Constant

GDPGR = GDP Growth Rate

LDDEBT = Log of Domestic Debt

LEDEBT = Log of External Debt

DSP = Debt Service Payment

INFL= Inflation

EXCH = Exchange Rate

INT = Interest Rate

P = Optimum lag length

Granger Causality

Granger causality test is a statistical test conducted to test the predictive properties of a variable over the other.

$$\begin{aligned} GRGDP_t &= \beta_0 + \sum_{i=1}^n \beta_1 \text{LDDEBT}_{t-i} + \sum_{i=1}^n \beta_2 \text{LEDEBT}_{t-i} \\ &+ \sum_{i=1}^n \beta_3 \text{DS}_{t-i} + \sum_{i=1}^n \beta_4 \text{Infl}_{t-i} + \sum_{i=1}^n \beta_5 \text{EXCH}_{t-i} \\ &+ \sum_{i=1}^n \beta_6 \text{INT}_{t-i} + \sum_{i=1}^n \beta_7 GRGDP_{t-i} + \mu_{1t} \\ \text{LDDEBT}_t &= \beta_0 + \sum_{i=1}^n \beta_1 \text{LDDEBT}_{t-i} + \sum_{i=1}^n \beta_2 \text{LEDEBT}_{t-i} \\ &+ \sum_{i=1}^n \beta_3 \text{DS}_{t-i} + \sum_{i=1}^n \beta_4 \text{Infl}_{t-i} + \sum_{i=1}^n \beta_5 \text{EXCH}_{t-i} \\ &+ \sum_{i=1}^n \beta_6 \text{INT}_{t-i} + \sum_{i=1}^n \beta_7 GRGDP_{t-i} + \mu_{2t} \end{aligned}$$

$$\begin{aligned}
 LEDEBT_t &= \beta_0 + \sum_{i=1}^n \beta_1 LDDEBT_{t-1} + \sum_{i=1}^n \beta_2 LEDEBT_{t-2} \\
 &\quad + \sum_{i=1}^n \beta_3 DS_{t-3} + \sum_{i=1}^n \beta_4 Infl_{t-4} + \sum_{i=1}^n \beta_5 EXCH_{t-5} \\
 &\quad + \sum_{i=1}^n \beta_6 INT_{t-6} + \sum_{i=1}^n \beta_7 GRGDP_{t-7} + \mu_{3t} \\
 DS_t &= \beta_0 + \sum_{i=1}^n \beta_1 LDDEBT_{t-1} + \sum_{i=1}^n \beta_2 LEDEBT_{t-2} + \sum_{i=1}^n \beta_3 DS_{t-3} \\
 &\quad + \sum_{i=1}^n \beta_4 Infl_{t-4} + \sum_{i=1}^n \beta_5 EXCH_{t-5} + \sum_{i=1}^n \beta_6 INT_{t-6} \\
 &\quad + \sum_{i=1}^n \beta_7 GRGDP_{t-7} + \mu_{4t} \\
 Infl_t &= \beta_0 + \sum_{i=1}^n \beta_1 LDDEBT_{t-1} + \sum_{i=1}^n \beta_2 LEDEBT_{t-2} + \sum_{i=1}^n \beta_3 DS_{t-3} \\
 &\quad + \sum_{i=1}^n \beta_4 Infl_{t-4} + \sum_{i=1}^n \beta_5 EXCH_{t-5} + \sum_{i=1}^n \beta_6 INT_{t-6} \\
 &\quad + \sum_{i=1}^n \beta_7 GRGDP_{t-7} + \mu_{5t} \\
 EXCH_t &= \beta_0 + \sum_{i=1}^n \beta_1 LDDEBT_{t-1} + \sum_{i=1}^n \beta_2 LEDEBT_{t-2} + \sum_{i=1}^n \beta_3 DS_{t-3} \\
 &\quad + \sum_{i=1}^n \beta_4 Infl_{t-4} + \sum_{i=1}^n \beta_5 EXCH_{t-5} + \sum_{i=1}^n \beta_6 INT_{t-6} \\
 &\quad + \sum_{i=1}^n \beta_7 GRGDP_{t-7} + \mu_{6t}
 \end{aligned}$$

$$\begin{aligned} INT_t = & \beta_0 + \sum_{i=1}^n \beta_1 LDDEBT_{t-1} + \sum_{i=1}^n \beta_2 LEDEBT_{t-2} + \sum_{i=1}^n \beta_3 DS_{t-3} \\ & + \sum_{i=1}^n \beta_4 Infl_{t-4} + \sum_{i=1}^n \beta_5 EXCH_{t-5} + \sum_{i=1}^n \beta_6 INT_{t-6} \\ & + \sum_{i=1}^n \beta_7 GRGDP_{t-7} + \mu_{7t} \end{aligned}$$

Decision Rule

If the computed F value exceeds the critical F value at the chosen level of significance, we reject the null hypothesis; otherwise, we do not reject it.

Method of Data Analysis

This paper used regression analysis as the data analysis method. However, it incorporated multivariate co-integration and error correction in order to undertake a thorough examination of the characteristics of time series economic data.

DATA ANALYSIS AND RESULTS

Unit Root Test

A key preliminary test in this study is the Augmented Dickey-Fuller (ADF) unit root test. The Augmented Dickey Fuller Test (ADF) is unit root test for stationarity. Unit roots can cause unpredictable results in time series analysis.

Hypotheses for the test:

- Null hypothesis for this test is that there is a unit root.
- Alternate hypothesis is that the time series is stationary.

Table 4.1: ADF Unit Root Test for the series of GDPGR, LDDEBT, LEDEBT, DSP and INFL

Variable	ADF Test Statistic	Critical Value @5%	Order of Integration	Remark(s)
GDPGR	-4.521299	-2.960411	I(0)	Stationary at level
LDDEBT	-3.503584	-2.963972	I(1)	Stationary at first difference
LEDEBT	-3.835547	-2.963972	I(1)	Stationary at first difference
DSP	-2.112403	-1.952066	I(0)	Stationary at level
INFL	-4.440580	-3.568379	I(1)	Stationary at first difference
EXCH	-4.164228	-3.568379	I(1)	Stationary at first difference
INT	-5.440622	-3.562882	I(0)	Stationary at level

Source: Authors' computations using E-views 9 software.

From Table 4.1, all the variables are stationary at 5 percent level of significance at first level and first difference. Therefore, the variables –GDP Growth Rate (GDPGR), Debt Service Payment (DSP) and Interest Rate (INT) are integrated at I(0), while Domestic Debt outstanding (DDEBT),

External Debt outstanding (EDEBT), Inflation (INFL) and Exchange rate (EXCH) are integrated at first difference, i.e. $I(1)$. Where a unit root problem was found in the model, a co-integration test would be done to determine the existence of a long-run relationship between variables followed by an Error Correction Model (ECM) test in order to adjust the short-run disequilibrium to long-run equilibrium. Hence, Pasaran Bound testing co-integration approach would be used to determine the co-integrating equations. This is because the bound test does not need that all the variables under study to be integrated of the same order. From the results, the variables are a mixture of $I(0)$ and $I(1)$.

Test for Co-integration

Test for co-integrations is consequently conducted in Table 4.2 as shown below:

Table 4.2: Co-integration Test Results

ARDL Bounds Test

Date: 11/19/22 Time: 05:27

Sample: 2 32

Included observations: 31

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	5.906391	6
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

Source: Authors' Computations using E-views 9 software

The Bound Test was used as opposed to the Johansen co-integration on the reason that the data were not integrated at the same order of first difference. The Bound Testing approach takes into account the non-integration of data at the same order and eliminates bias associated with such mixed order of integration. The Bound Test reveals that there is a long run relationship between the dependent and independent variables. The f-statistic (5.906391) is greater than the upper and lower bound test values of 3.61 and 2.45 respectively at 5% level of significance, which is in line with Bound testing rule.

Regression Model

Table 4.3: ARDL Regression Test Results

Dependent Variable: GDPGR

Selected Model: ARDL(1, 0, 1, 1, 0, 0, 0)

Date: 11/19/22 Time: 05:31

Sample: 1 33

Included observations: 31

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LDDEBT)	-8.347697	3.416277	-2.443507	0.0235
D(LEDEBT)	-5.334285	2.923028	-1.824918	0.0823
D(DS)	-4.270101	1.325747	-3.220902	0.0041
D(INFL)	0.160482	0.091794	1.748292	0.0950
D(EXCH)	0.018732	0.038448	0.487212	0.6312
D(INT)	0.041033	0.354690	0.115688	0.9090
CointEq(-1)	-0.846555	0.198527	-4.264178	0.0003
Cointeq = GDPGR - (-9.8608*LDDEBT + 4.1206*LEDEBT - 7.0663*DS + 0.1896*INFL + 0.0221*EXCH + 0.0485*INT + 59.1423)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LDDEBT	-9.860784	4.598117	-2.144527	0.0438

LEDEBT	4.120591	2.266658	1.817915	0.0834
DS	-7.066323	2.480424	-2.848836	0.0096
INFL	0.189571	0.128253	1.478095	0.1542
EXCH	0.022128	0.045985	0.481190	0.6354
INT	0.048471	0.418616	0.115788	0.9089
C	59.142303	36.753076	1.609180	0.1225

Source: Authors' Computations using E-views 9 software.

Discussion of the Results

From the results above, Domestic Debt (LDDEBT) is negatively related to Real Gross Domestic Product Growth Rate (GDPGR) both in the short run and the long run. A unit change in Domestic Debt (LDDEBT) will lead Gross Domestic Product Growth Rate (GDPGR) to decrease by 8.347697 in the short run and by 9.860784 in the long run.

External Debt (LEDEBT) is negatively related to Real Gross Domestic Product Growth Rate (GDPGR) in the short run but positively related to Real Gross Domestic Product Growth Rate (GDPGR) the long run. Therefore, a unit change in External Debt (LEDEBT) will lead Real Gross Domestic Product Growth Rate (GDPGR) to decrease by 5.334285 in the short run but increase by 4.120591 in the long run according to the result output above.

Debt Servicing (DS) is negatively related to Real Gross Domestic Product Growth Rate (GDPGR) both in the short run and the long run. A change in Debt Servicing (DS) will lead Gross Domestic Product Growth Rate (GDPGR) to decrease by 4.270101 in the short run and by 7.066323 in the long run.

Granger Causality Test

The Granger causality test is conducted and results shown in Table 4.4 below

Table 4.4: Granger Causality Test Results

Pairwise Granger Causality Tests			
Date: 11/19/22 Time: 05:52			
Sample: 1 33			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
LDDEBT does not Granger Cause GDPGR	30	0.05481	0.9468
GDPGR does not Granger Cause LDDEBT		0.08271	0.9209

LEDEBT does not Granger Cause

GDPGR	30	0.22390	0.8010
GDPGR does not Granger Cause LEDEBT		9.10353	0.0011

DS does not Granger Cause GDPGR	30	0.17304	0.8421
GDPGR does not Granger Cause DS		4.88814	0.0162

INFL does not Granger Cause GDPGR	30	0.08697	0.9170
GDPGR does not Granger Cause INFL		0.07454	0.9284

EXCH does not Granger Cause GDPGR	30	0.00714	0.9929
GDPGR does not Granger Cause EXCH		0.56412	0.5759

INT does not Granger Cause GDPGR	30	0.77888	0.4697
GDPGR does not Granger Cause INT		0.73396	0.4901

Source: Authors' Computations using E-views 9 software

There is uni-directional Causality relationship between External Debt (LEDEBT) and Gross Domestic Product Growth Rate (GDPGR) in Nigeria; hence Gross Domestic Product Growth Rate (GDPGR) Granger Causes External Debt (LEDEBT).

There is unidirectional Causality relationship between Debt Servicing (DS) and Gross Domestic Product Growth Rate (GDPGR) in Nigeria; Gross Domestic Product Growth Rate (GDPGR) Granger Causes Debt Servicing (DS).

There is no Causality relationship between Domestic Debt (LDDEBT), Inflation (INFL), Exchange rate (EXCH), Interest rate (INT) and Gross Domestic Product Growth Rate (GDPGR).

Conclusion and Recommendations

Based on the above findings, borrowing for expansionary fiscal policies is not detrimental if debts are properly utilized. it can be established that there exist long run relationship between Nigerian Public debt and economic

growth. The international acceptable Debt to GDP ratio should be taken into consideration as the nation debt profile increases.

Galley Proof-IJMGs

The following recommendations were made based on the outcome of the study;

Given the predictive relationship between the Real Gross Domestic Product Growth Rate (GDPGR) and external debt, it is evident that as the nation's economy expands, external debt also tends to increase. However, this scenario should be avoided. The government is advised to focus on enhancing local productivity and utilizing local financial resources more effectively. Furthermore, since the study revealed a negative correlation between domestic debt and economic growth, it is crucial for the nation's rapidly growing debt profile to be carefully managed to prevent future debt burdens. Considering the established Granger causality relationship between public debt and Nigeria's economic growth, the government should prioritize diversification of the economy, reducing reliance on oil as the primary source of income. Economic diversification will help safeguard against external shocks and promote overall stability.

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