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DOMESTIC DEBT OUTSTANDING AND ECONOMIC GROWTH: A LINEAR OR NONLINEAR EVIDENCE IN NIGERIA

Gobna, Obida Wafure[1] Usman, Gana[1] Mohammed, Salam Shuaib[2] Ibrahim, Murtala[3]

[1]*Department of Economics, Faculty of Social Science, University of Abuja, P.M.B. 117, Abuja.*
[2]*Department of Economics, Faculty of Social Science, Prince Abubakar Audu Kogi State University, Anyigba, P.M.B 1008, Anyigba.*
[3]*School of Preliminary Studies, Department of Art and Social Sciences, Kogi State Polytechnic, Lokoja.*

ABSTRACT

This paper explores the linear or nonlinear (asymmetric) impact of domestic debt outstanding on economic growth in Nigeria over the period of 1981 to 2021 using linear and nonlinear Autoregressive Distributed-Lag (ARDL) models. This study's data is mainly collected from secondary sources including World Development Indicators (WDI) and Central Bank of Nigeria (CBN). The findings of this study reveal a negative and insignificant linear relationship between domestic bank holding debt (DOBH) and economic growth in the long run and short run while domestic non-bank holding debt (DNBH) has positive impact on economic growth in the short run and a nonlinear (asymmetric) impact in the long run. Therefore, the study recommends that to increase growth, government should initiate policy that will stop commercial banks from holding excessive government bonds so that more loanable fund is available for private sector to invest in real sector and also encourage itself (as a larger spender) to hold more non-bank debt and invest in infrastructures that will encourage investment expansion and economic growth.

KEYWORDS: *Domestic Bank Debt; Domestic Non-Bank Debt; Economic Growth, Linear; Nonlinear*

JEL Classifications: F40; F43; H63

I. INTRODUCTION

The issue about public debt as a policy to promote economic growth is still debatable among economists, policy makers and researchers, because debt-growth relationship is country and time-specific, conditional on the business cycle and institutional quality (Dombi & Dedák, 2019). Governments use debt instruments to borrow in order to close the resource gap between savings and investment. Other reasons for government borrowing are budget deficit financing, monetary policy implementation, and development of the financial instruments to deepen the financial market (Alison, 2003).

The issue of indebtedness is not peculiar to some countries or regions but rather a global phenomenon. Since the global economic crisis of 1930s and World War II (1939-1945), borrowing has increased tremendously, particularly to rehabilitate countries affected by the war and to meet the financing needs of developing countries (Aybarc, 2019). The trend of borrowing did not just rise but has led to global financial crises in phases. For example, the debt crisis in the 1980s in which highly indebted Latin America and other developing regions were trapped in debt overhang syndrome (UN, 2017; Stambuli, 1998); the 1990s crisis which is attributed to over-borrowing by domestic banks and nonbanks corporations as well as over-lending by foreign banks and private investors (Helleiner, 1989 cited in Saleh 2015); and the debt crisis of 2008 which is caused by the low interest rate policies adopted by Central Banks of most countries. This led to fall in economic activities and rising unemployment (UNCTAD, 2018; Allen & Carletti, 2009). The high

level of Africa countries debt profiles over the period of 1960 to date shows that government spending in responds to meeting their developmental needs `has led them to crisis such that in 2005, under the Heavily Indebted Poor Countries (HIPC), thirty African countries were relieved of their debt burden. Even at the succor given to these countries, their expenditure from 2008, has increased to cover for the infrastructural deficiency as a result of the huge gap in infrastructure development (Onyekwena & Ekeruche, 2019; Pegkas, 2018).

Nigeria's domestic debt is introduced through the introduction of financial reform by the colonial government in 1958 and the creation of the Central Bank of Nigeria (CBN). The Central Bank which is saddled with responsibility of debt management, exercises its role of both the primary and secondary markets for government securities (Asogwa & Ezema, 2005). Since then, the Nigerian domestic debt had risen tremendously in total of ₦11.19 billion in 1981 when the nation started feeling the heat of fall in oil price in the mist of higher debt and in 1986 it rose to ₦28.44 billion, about 154 percent. Instead of Nigerian domestic debt to fall because of the structural adjustment programme that was meat to redress the crisis, it continued to go up. In 1990, the domestic debt had increase to ₦84.09 billion and stood at ₦794.31 billion in 1999 when democracy returned. It was expected to be managed properly under civilian rule but instead it skyrocketed to ₦1,016.97 billion in 2001. In 2005, 60 percent of external debt was forgiven and the government opted for 60:40 ratio plan for domestic-foreign debt. that translated to a sharp increase in the domestic debt at ₦3,228.03 billion in 2009. This increase was also linked to the financial crisis of 2008. The profile continued rising and stood at ₦12,774.40 billion in 2018 and currently, it is ₦16,023.39 billion in 2020 (see CBN, 2020). However, as domestic debt was gradually building up, the rate of economic growth was fluctuating. For instance, in 1981, 1990, 1995 and 2000, growth rates were -13.13 percent, 11.78 percent, -0.07 percent, and 5.02 percent respectively (WDI, 2020). It rose to 6.44 percent in 2005 and 8.01 percent in 2010. However, in 2016 it fell to -1.62 percent, rose to 1.94 percent in 2018 and stood at 2.21 percent in 2019 (WDI, 2020; PWC, 2019). This proved that domestic debt has not sustained the increase in Nigerian economic growth.

Therefore, we contribute to literature by disaggregating the domestic debt into bank and non-bank holdings where we regressed to observe the individual impact of these components on economic growth in Nigeria. The closest paper done in line with this was the study by Bouis (2019) whose work was on the relationship between banks' holdings of domestic sovereign securities and credit growth to the private sector in emerging market and developing economies. His work relates these debt components to credit growth and not economic growth. Though, he arrived at a negative relationship between bank holdings and credit growth in private sector. We also, introduce linear and nonlinear model analysis to ascertain whether there is asymmetric effect or not in the individual components on economic growth. Other similar works done had found mixed results. For instance, Ibrahim and Shazida (2019) examined the long-run relationship between domestic debt and economic growth in Nigeria and found an insignificant positive relationship in the short run but negative impact in the long-run. In the work of Eyide and Nzewi (2018) entitled "the effect of external debt, domestic debt, exchange rate and interest rate on economic development in Nigeria" they found that domestic debt is positively and negatively related in the short run and long-run respectively. Van et al. (2018) analyzed the relationship between government expenditure, tax on returns to assets, public debt, and growth. they found that domestic debt has a linear relationship with tax on returns to assets. Matthew and Mordecai (2016) also worked on the impact of public debt on economic development in Nigeria and their results revealed the domestic debt stock had a direct and significant relationship with gross domestic product (GDP) per capita in the short-run. Babu et al. (2015) explored the effect of domestic debt as a share of Gross Domestic Product (GDP) on economic growth in the East Africa Community (EAC) and found that domestic debt has a positive significant effect on per capita GDP growth rate. However, Charles (2012) conducted research on the relationship between domestic debt and economic growth in Nigeria and reported that domestic debt holding of government has negative and significant effect on economic growth.

2. LITERATURE REVIEW

Domestic debt involves liability or debt incurred by a nation within the country. Eyide and Nzewi (2018) defined domestic debt as debt instrument issued by the federal government and dominated in local currency. In Nigeria, domestic debts are contracted by the Federal Government as well as states and local governments. In principle, states

and local governments can issue debt instruments and are limited in their capacity to do so. Domestic debt instruments in Nigeria usually consist of treasury bills (TBs), treasury certificates (TCs), Federal Government development stocks (DS), bonds and means advances. The TBs, TCs and DS are marketable and negotiable while bonds and means advances are not, but are rather held solely by the Central Bank of Nigeria (Adofu & Abula, 2010). In recent time, the government of Nigeria has committed to developing key infrastructure projects in transportation through specific domestic fund known as Sukuk (Ijarah or lease) with a tenor of seven (7) years and a rental income that would be paid every six months at a rate of 16.47 percent per annum *to investors (Ayadi & Ayadi, 2008).* Islamic financial certificate (Sukuk Ijarah) was first introduced in Osun State of Nigeria in 2013 for building of ten schools (Salaudeen, 2021). The federal government of Nigeria adopted the Osun Sukuk in 2017 and has raised over ₦362 billion domestic borrowing through the Issuance of 3 rounds of Ijarah Sukuk to finance road infrastructure across the 6 geo-political zones of the country (Debt Management Office, 2019).

On the other hand, economic growth is a process involving a set of stages of traditional society, preconditions for take-off, take-off, the drive to maturity, and the age of high mass consumption (Rostow, 1959). According to Kuznets (1973), a country's economic growth may be defined as a long-term rise in capacity to supply goods to a population of an increasingly diverse economy. He further state that, the growing capacity is based on advancing technology, institutional and ideological adjustments that it demands. Lipsey (1986) defined economic growth as the positive trend in the nation's total output over a long period of time, while Adofu and Abula (2010) described economic growth as an increase in real output and expansion in product possibility curve. In the words of Todaro and Smith (2009), economic growth is the steady process by which the productive capacity of the economy is increased over time to bring about rising levels of national output and income. To put in another way, economic growth refers to a process of sustained increase in real national income of a country. Haller (2012) defined economic growth as the process of increasing the sizes of national economies, especially the GDP per capita with positive effects on the sectors and the living standard. A number of theories have tried to study the process of economic growth with respect to productive capacity, especially within the free market context and the watching factor for growth has been viewed over the years to be influenced exogenously and/or endogenously. For instance, Harrod (1939) and Domar (1947) cited in Erauskin (2015), espoused that productive capacity is a factor of increased saving to increase investment, hence capital-output increase. Solow (1957) however viewed it from technological progress which is expected to be generated outside the economy steady state of growth (Erauskin, 2015).

In another words, DFID (2012) defined economic growth as the continuous improvement in the capacity to satisfy the demand for goods and services, resulting from increased production scale, and improved productivity. That is, economic growth reduces poverty and improves the standard of living. Murungi and Okiro (2018) defined growth in the economy as the rise in the value of goods and services in the market adjusted for inflation over time by the economy. Agunbiade and mohammed (2018) believed economic growth is a process that requires harnessing real resources for the production of capital goods not meant for immediate consumption, but rather for increasing the production potential in future. Therefore, in this study, economic growth is the increase in an economic output resulting from prudent debt management strategy. That is, a sustained increase, over a significant period, in the quantity of material goods and services produced in an economy as made possible by the public debt management. Economic growth rate is the percentage increase in Gross Domestic Product (GDP)-the market value of goods and services produced within a country over a year.

The relationship of these debt sustainability measures and economic growth is linked with many theories. Some of these theories are pessimistic and optimistic in the contribution to economic growth. for instance, the Classical debt theory of Smith (1776), Ricardian equivalent theory of Barro in the 1970s, debt overhang theory of Myers (1977), and Debt-Laffer curve theory considered by Sachs (1989) are of the view that government borrowing does not necessarily impact positively on economic growth in the long run. However, the Keynesians theory championed by Keynes (1883–1946), Fiscal Insurance theory of Lucas and Stokey (1983), dual-gap theory of Chenery and Strout (1966) and Functional Finance theory of Lerner (1943) are positively incline in their doctrine as to public debt contribute to economic growth of a country.

Given this theoretical backdrop, this study is based on the pessimistic theory of Ricardian equivalent. This theory was coined by the American economist Robert Barro in the 1970s after it was first conceived by the English economist, David Ricardo (1772–1823) in the 18th – 19th Century and subsequently became a standard topic in public finance and macroeconomic theory. For this reason, Ricardian equivalence is also known as the Barro-Ricardo equivalence proposition. The tenet of the Ricardian equivalence theory is that if government debt is expected at some future time to be redeemed through increase in future taxation, individuals increase their savings to buy the government bonds issued such that the savings equals the size of the public deficit and hence the interest-rate remains unchanged. This means private investment is not crowded-out by government spending and the overall demand remains the same together with the other real variables of the economy. In a nut shell, the Ricardian equivalence maintains that government spending to stimulate the economy is not effective in the long run. That is, individuals who get extra money from tax cut today will save it in order to pay for the future tax increases they know must follow. Government is the larger spender in Nigeria and a higher government debt, resulting from budget deficit, to reduce savings-investment gaps will not be fully compensated for by an increase in private savings. As a result, national savings decreases, resulting in lower total investment at home and will have a negative effect on gross domestic product (GDP) (Karagöl, 2002; Apere, 2014; Elmendorf & Mankiw, 1999).

As for studies that found evidence of domestic public debt effect on economic growth, Bouis (2019) studied the relationship between banks' holdings of domestic sovereign securities and credit growth to the private sector in emerging market and developing economies. He employed unbalanced panel data of 80 economies obtained from IMF IFS database for the period of 2001 to 2016. He found an inverse relationship between banks' holdings of government debt and credit growth to the private sector while a direct relationship was arrived at between government bank's holdings and return on assets of the banking sector. He recommended the discouragement of banks from holding excessive sovereign bonds to improve financial stability.

Meanwhile, Ibrahim and Shazida (2019) examined the long-run relationship between domestic debt and economic growth in Nigeria over the period from 1981 to 2013. They used the autoregressive distributed lag (ARDL) approach. Their results revealed that domestic debt has an insignificant positive effect on economic growth in the short-run and a significant negative effect on growth in the long-run. They recommended that government should adopt public private partnerships as a financing option for economic infrastructure to reduce pressure on it and provide private sectors to participate in economic activities.

Eyide and Nzewi (2018) specifically addressed the effect of external debt, domestic debt, exchange rate and interest rate on economic development over the period of thirty-six years (1981 to 2016). They adopted ex-post-facto research design and extracted data from Nigeria federal bureau database. They adopted Ordinary Least Square (OLS) methodology with Error Correction Model (ECM) model. After analysis, they found among others that domestic debt was seen to have significant positive effect in the short run and significant negative effect in the long-run with economic development. Lastly, exchange and interest rates were insignificant and negatively affect economic development in the short run. In the long run, exchange rate was significant and positively affects interest rate while interest rate was negatively related to Real Gross Domestic Product. They recommended that Nigeria should direct internal debt for short-term projects and external debt for long-term projects.

Van et al. (2018) analyzed the relationship between government expenditure, tax on returns to assets, public debt, and growth in an endogenous growth model. Public debt is composed of two components, domestic debt and external debt. They showed in particular, the relation between public spending and the tax rate has a bell shape and that domestic debt increased with tax whereas external debt depicted an inverted U-shaped curve. A high tax rate leads to a reallocation of public debt in favor of domestic debt to the detriment of external debt. They revealed positive debt-growth relationship.

On the concept of debt payment, Ugwu (2017) assessed the effect of domestic debt payments on economic growth in Nigeria within the period of 2000 to 2016. He deployed ordinary least- square (OLS) method of multiple regression

to analyze secondary data obtained from Central Bank of Nigeria annual report, national bureau of statistic and debt management office. His finding indicated that domestic debt outstanding has significant relationship between Gross Domestic Product in Nigeria. Likewise, there is significant relationship between interest rate and debt servicing on Gross Domestic Product in Nigeria. He recommended that government should maintain a bank deposit ratio below 40% and resort to increase use of tax revenue to finance its project. The regulatory authorities should provide enabling environment and policies for private sector investors with improved infrastructure.

Matthew and Mordecai (2016) who examined the impact of public debt on economic development of Nigeria using annual data that covered the period of 1986 to 2014. Their study employed Johansen co-integration test, Error Correction Method (ECM) and the Granger Causality test method of analysis. Their results revealed the presence of a long-run relationship among the variables. The ECM results revealed among others that domestic debt stock had a direct and significant relationship with gross domestic product (GDP) per capita while domestic debt service payment was significant but inversely related to gross domestic product (GDP) per capita in Nigeria. In conclusion, they recommended that the government should reduce the level of external debt it accumulates overtime, but domestic debt accumulation would contribute significantly to the development of the economy.

In another study, Igbodika et al. (2016) empirically examined the relationship between domestic debt and the performance of Nigerian economy using data spanning from 1987 to 2014. They used secondary data collected from Nigeria apex bank database and applied Ordinary Least Square (OLS) regression for data analysis. Their findings indicated a positive significant relationship between domestic debt and Gross Domestic Product in Nigeria. They recommended that government should maintain a debt-bank deposit ratio below 35 percent and should excuse itself from production activities but provide enabling environment for private sector investors to strive.

Charles (2012) also arrived at similar results in a study conducted on quarterly data that spanned between 1994 and 2008 to investigate the relationship between domestic debt and economic growth in Nigeria. He employed error correction model for analyze and revealed that the domestic debt holding of government has negative and significant effect on economic growth. Also, Essien et al. (2016) utilized a Vector Autoregressive model to study the impact of public sector borrowings on prices, interest rates, and output in Nigeria and found that domestic debt over the period of this study had no significant impact on the general price level and output.

Babu et al. (2015) explored the effect of domestic debt as a share of Gross Domestic Product (GDP) on economic growth in the East Africa Community (EAC) over the period 1990 to 2010. Their study was based on the Solow growth model and employed panel data analysis. Their results showed that domestic debt has a direct impact on per capita GDP growth rate in the EAC and that led them to recommend the use of domestic debt for growth enhancement. Ojo and Awodele (2013) further confirmed the relationship between domestic debt, macroeconomic indices and the viability of the construction sector of Nigeria economy. Data on monetary and fiscal macroeconomic indices such as unemployment rate, exchange rate, inflation rate, interest rate, domestic debt and the contribution of the construction sector to GDP between years 2001-2011 were analyzed using multiple regression analysis. Their results revealed long-run behaviour of the economy. They recommended that appropriate guidance and understanding of macroeconomic policy is required by investors and policy makers for decision making and attracting investment to the building and construction subsector of the economy.

Matiti (2013) established the relationship between public debt and economic growth in Kenya. He used data extracted from Kenya National database over 2002 to 2012 periods. He then applied ordinary least square regression to analyse the relationship between GDP and debt variables like Treasury Bonds, Treasury Bills, Government Stock, Overdraft at the Central Bank of Kenya, Advances from Commercial banks and External Debt as the explanatory variables. He found that there was a direct relationship between economic growth and treasury bonds as well as treasury bills while there was an inverse relationship between economic growth and Overdraft at the Central Bank of Kenya, government stocks, advances from commercial banks and external debts. He concluded that government should implement wider

reforms that promote investment in Treasury bonds, and encourage institutional investors such as pension funds and insurance companies to invest in Treasury bonds.

3. DATA AND METHODOLOGY

This study mainly collects time-series data from secondary sources covering the period of 1981 to 2021. The choice of data is based purely on availability and to cover the period of Structural Adjustment Programme (SAP) when policies meant for national development were indirectly geared towards creation of debt crisis. 1981 is chosen because it was shortly after the period of international oil price crisis in Nigeria in which the nation found it difficult to repay its debts, hence large increased debt liabilities in both interest and capital (Ikudayisi et al., 2015). It is noteworthy that the positive oil shock in the 1970s led the nation to embark on ambitious socio-economic development schemes, but with mismanagement and military rule, it became all economic disaster. In addition, the oil glut of early 1980s forces supply above demand for energy and the consumer shift from hydrocarbons contributed to fall in oil price and revenue dropped significantly which made a former rich nation became a debtor nation (Udoka & Nkamare, 2016).

A comprehensive dataset on public debt and economic growth is accessible and generated from National Bureau of Statistics (NBS), Central Bank of Nigeria (CBN) Bulletin and World Bank's World Development Indicators (WDI) statistical bulletin. The internet, books, journals and other relevant publications, and library are also consulted for materials. The data on exchange rate, and domestic bank and non-bank holding debts are extracted from CBN statistical bulletin, 2021, while data on gross domestic product growth rate (measure of economic growth) and real interest rate, are sourced from WDI, 2021. All data are put in same footing by converting those that are not in rates into percentage before supplying them into e-views for analysis except exchange but logged during estimation.

This study deploys linear and nonlinear dynamic models to investigate the impact of debt sustainability measures on economic growth in Nigeria. The nonlinearity analysis is necessitated by the results of structural break unit root and trend analysis which suggest a possible positive and negative effects. Also, because of the fact that debt dynamics or changes may have distinct impact on economic activity based on the Keynesian standpoint. Preliminary unit root tests (without and with structural break) of the data indicate mixed order of integration which is suitable for the application of bound cointegration test. The aim of these analyses is to ascertain the asymmetric effects and rate of adjustment to equilibrium in the short run should any shock exist in the economy.

After nonlinear autoregressive distributed-lag (NARDL) estimation, the representations of the variables are aided by the application of Stepwise Least Squares regression to automatically arrange the variables systematically for the application of Wald test on both long-run and short-run nonlinear estimates. Wald test is used to determine the asymmetric effect and if there is no asymmetric effect, then the linear estimate or result is interpreted. A significant Wald test's F-statistic suggests an asymmetric (nonlinear) effect of the independent variable on the dependent variable and vise-versa for an insignificant F-statistic. NARDL dynamic multiplier graph is derived to reaffirm the findings. The decision rule here is that if a shock graph (or multiplier line) in the dynamic multiplier graph lies above the zero line, there is positive response, but if it lies below the zero line, then a negative response of economic growth rate on the sustainability measures is observed. It is also used to reaffirms the result of Wald test of asymmetry by observing the zero line whether it passes through or outside the upper and lower bounds of 95 percent level of significance. Passing through means no asymmetry while lying outside indicates asymmetry.

Model Specification

The following equation of Sanusi *et al.* (2019) is adapted.

$$Y = f(PD, PD^2, X) \quad (1)$$

Where Y is economic growth proxy by per capita GDP, PD is public debt-to-GDP ratio, PD^2 is the nonlinear public debt-to-GDP ratio, and X is the set of control variables consisting investment, government expenditure, inflation rate and trade openness. This paper thus modify equation (1) to incorporate domestic bank holdings and domestic non-bank holdings as policy variables while using exchange rate and real interest rate as its control variables. Therefore, the conditional ECM form of the linear and nonlinear Autoregressive Distributed-lag (ARDL) models are:

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$$\Delta Log(GDPG_t) = \alpha_0 + \alpha_1 T + \beta_1 Log(GDPG_{t-1}) + \beta_2 Log(EXRT_t) + \beta_3 Log(RINT_t) + \beta_4 Log(DOBH_t) + \sum_{i=1}^{n} \theta_i \Delta Log(GDPG_{t-i}) + \sum_{i=0}^{n} \gamma_i \Delta Log(EXRT_{t-i}) + \sum_{i=0}^{n} \delta_i \Delta Log(RINT_{t-i}) + \sum_{i=0}^{n} \varphi_i \Delta Log(DOBH_{t-i}) + \rho Ect_{t-1} + \varepsilon_t \quad (1)$$

This model (1) considers linear impact of DOBH on GDPG.

$$\Delta Log(GDPG_t) = \alpha_0 + \alpha_1 T + \beta_1 Log(GDPG_{t-1}) + \beta_2 Log(EXRT_t) + \beta_3 Log(RINT_t) + \beta_5 Log(DOBH\_POS_t) + \beta_6 Log(DOBH\_NEG_t) + \sum_{i=1}^{n} \theta_i \Delta Log(GDPG_{t-i}) + \sum_{i=0}^{n} \gamma_i \Delta Log(EXRT_{t-i}) + \sum_{i=0}^{n} \delta_i \Delta Log(RINT_{t-i}) + \sum_{i=0}^{n} \psi_i \Delta Log(DOBH\_POS_{t-i}) + \sum_{i=0}^{n} \xi_i \Delta Log(DOBH\_NEG_{t-i}) + \varepsilon_t \quad (2)$$

This model (2) considers nonlinear impact of DOBH on GDPG.

$$\Delta Log(GDPG_t) = \alpha_0 + \alpha_1 T + \beta_1 Log(GDPG_{t-1}) + \beta_2 Log(EXRT_t) + \beta_3 Log(RINT_t) + \beta_7 Log(DNBH_t) + \sum_{i=1}^{n} \theta_i \Delta Log(GDPG_{t-i}) + \sum_{i=0}^{n} \gamma_i \Delta Log(EXRT_{t-i}) + \sum_{i=0}^{n} \delta_i \Delta Log(RINT_{t-i}) + \sum_{i=0}^{n} \lambda_i \Delta Log(DNBH_{t-i}) + \varepsilon_t \quad (3)$$

This model (3) considers linear impact of DNBH on GDPG.

$$\Delta Log(GDPG_t) = \alpha_0 + \alpha_1 T + \beta_1 Log(GDPG_{t-1}) + \beta_2 Log(EXRT_t) + \beta_3 Log(RINT_t) + \beta_8 Log(DNBH\_POS_t) + \beta_9 Log(DNBH\_NEG_t) + \sum_{i=1}^{n} \theta_i \Delta Log(GDPG_{t-i}) + \sum_{i=0}^{n} \gamma_i \Delta Log(EXRT_{t-i}) + \sum_{i=0}^{n} \delta_i \Delta Log(RINT_{t-i}) + \sum_{i=0}^{n} \psi_i \Delta Log(DNBH\_POS_{t-i}) + \sum_{i=0}^{n} \xi_i \Delta Log(DNBH\_NEG_{t-i}) + \varepsilon_t \quad (4)$$

This model 4 considers nonlinear impact of DNBH on GDPG.

GDPG represents the growth rate of gross domestic product, EXRT is exchange rate, RINT is real interest rate, DOBH is domestic bank holding outstanding debt, DNBH is domestic non-bank holding outstanding debt, α_0 is the intercept while α_1 is the coefficient of trend, T, βs are the long run coefficients to be estimated, θ, γ, δ, ψ, ξ and ρ are short

run parameters to be estimated, n represents the lag length which differ for each variable, ε represents error term and Δ is change.

DBOH is a disaggregated component of domestic public debt comprises of CBN holdings and deposit money bank holdings. It is measured by domestic bank holdings debt outstanding as a percentage of GDP. DNBH on the other hand, is also a disaggregated component of domestic public debt and it is captured by combining sinking fund holdings and non-bank holdings as a percentage of GDP.

4. DATA ANALYSIS, RESULTS AND DISCUSSION

Informal Diagnostic Test

Table 1: Summary of Statistics

	GDPG	EXRT	RINT	DOBH	DNBH
Mean	3.15	94.26	0.31	8.61	3.31
Median	4.20	102.11	4.31	7.29	3.46
Maximum	15.33	306.92	18.18	20.18	9.54
Minimum	-13.13	0.61	-65.86	3.61	0.75
Std. Dev.	5.47	92.87	14.61	4.25	1.97
Skewness	-0.87	0.81	-2.63	0.96	1.02
Kurtosis	4.64	2.85	12.25	3.31	4.18
Jarque-Bera	9.23	4.27	184.16	6.12	9.05
Probability	0.01	0.12	0.00	0.05	0.01
Sum	122.85	3676.09	12.00	335.74	129.25
Sum Sq. Dev.	1135.91	327709.70	8107.35	687.05	147.28
Observations	41	41	41	41	41

Source: Extract from E-views 11 Output, 2022

The Table 1 describes the properties of the data for the estimation period, 1981 to 2021. It is observed that Exchange Rate (EXRT) ranges between 0.61 and 306.92 with mean value of 94.26 Naira per Dollar and has a standard deviation value of 92.87. The mean is farther away from the maximum, hence, positively skewed. The mean growth rate of Gross Domestic Product (GDPG) is 3.15 percent with maximum and minimum values of 15.33 and -13.13 percent respectively. The mean value of domestic bank holding debt (DOBH) is 8.61 percent while its value ranges between 3.61 and 20.18 with a deviation from the mean value of 4.25. It has a positive skewed distribution which is because the mean is closer to the minimum value than the maximum value. The average mean values of domestic non-bank holding debt (DNBH) is 3.31 percent, and Real Interest Rate (RINT) is 0.31 percent.

The highest maximum (and lowest minimum) values of the variables are DNBH, 9.54(0.75) and RINT, 18.18(-65.86). The maximum and minimum values for each measure indicate that the performance varies substantially. The Jarque-Bera statistics test of normality indicates that variables GDPG, RINT, DOBH and DNBH are not normally distributed at 5 per cent level. Finally, the kurtosis statistic shows that EXRT is platykurtic in nature while GDPG, RINT, DOBH and DNBH are leptokurtic.

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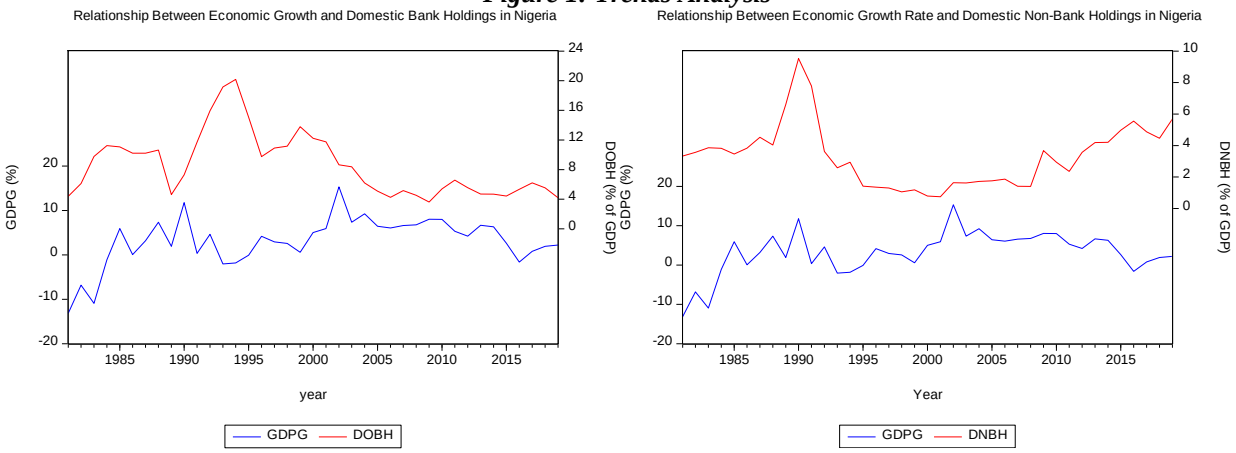
Table 2: Correlation Matrix

	GDPG	EXRT	RINT	DOBH	DNBH
GDPG	1.00				
EXRT	0.25	1.00			
RINT	0.58	0.38	1.00		
DOBH	-0.19	-0.54	-0.22	1.00	
DNBH	-0.10	0.04	0.11	-0.23	1.00

Source: Output from E-views 11, 2022

The Table 2 presents the correlation matrix and it shows that the data for the variables used have optimum linearity and relevant for this paper. According to Dormann *et al.* (2013), the established threshold for weak collinearity is when the value is less than 0.7 and the summary above shows that all of the variables are weakly correlated with each other.

Figure 1: Trends Analysis



Source: Output from E-views 11, 2022

The Figure 1 shows the graphical representation of the dependent variable (GDP growth rate) and the individual exogenous variables (domestic bank holding debt and domestic non-bank holding debt) in percentage form. GDP growth rate (GDPG) is unstable as it undulates but somewhat upward trend is observed with break points in 1985 and 2002. Domestic bank holdings debt (DOBH) has a breakpoint in 1994 for a downward trend after initial upward trend, domestic non-bank holdings debt (DNBH)'s breakpoint is in 1999. All these breakpoints are indications of financial crises during these periods and are not far from the effects of the 1986 Structural Adjustment Programme (SAP) instituted by the then military administration. It also shows the possibility of nonlinear variables (Ekperiware & Oladeji, 2012).

Formal Diagnostic Test

The stationarity tests adopted are unit root test without and with structural break. That is, Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) are carried out for unit root without break point. Perron (2006) test of unit root is also carried out to account for structural break point since the conventional unit root test suffers from low power distortion in the presence of structural break (that is, it can report presence of unit root when there is none and vice-versa).

Table 3: Unit Root without Structural Break Test (Conventional)

Augmented Dickey-Fuller (ADF)							
	LEVEL			FIRST DIFFERENCE			
Variables	Constant	Trend and Constant	None	Constant	Trend and Constant	None	I(d)
GDPG	-4.1580	-3.9822**	-1.9192	-10.0771	-10.3136	-10.1476	I(0)
	(0.0024)	(0.0179)	(0.0534)	(0.0000)	(0.0000)	(0.0000)	
EXRT	1.3936	-2.0776	3.0129	-4.2635	-4.5095***	-3.7419	I(1)
	(0.9986)	(0.5408)	(0.9990)	(0.0018)	(0.0049)	(0.0004)	
RINT	-7.2683	-7.4756***	-7.1782	-9.8216	-9.5889	-9.9892	I(0)
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
DOBH	-2.3198	-3.3862	-0.8624	-4.6069	-4.5888***	-4.6567	I(1)
	(0.1713)	(0.0687)	(0.3352)	(0.0007)	(0.0042)	(0.0000)	
DNBH	-1.9174	-1.0790	-0.2831	-5.8274	-5.8633***	-5.8960	I(1)
	(0.3208)	(0.9188)	(0.5769)	(0.0000)	(0.0001)	(0.0000)	
Philip Perron (PP)							
	LEVEL			FIRST DIFFERENCE			
Variables	Constant	Trend and Constant	None	Constant	Trend and Constant	None	I(d)
GDPG	-4.1721	-3.9822**	-3.0057	-10.4068	-12.1131	-10.2430	I(0)
	(0.0023)	(0.0179)	(0.0036)	(0.0000)	(0.0000)	(0.0000)	
EXRT	1.3364	-1.5171	2.9457	-4.1653	-4.2581***	-3.7360	I(1)
	(0.9984)	(0.8060)	(0.9988)	(0.0024)	(0.0092)	(0.0005)	
RINT	-7.0445	-7.1658***	-6.7871	-28.0615	-29.8299	-21.1819	I(0)
	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	
DOBH	-1.9846	-2.6267	-0.6825	-4.2090	-4.2731***	-4.2923	I(1)
	(0.2921)	(0.2714)	(0.4147)	(0.0021)	(0.0089)	(0.0001)	
DNBH	-1.9123	-1.8394	-0.5475	-4.5904	-4.5893***	-4.6656	I(1)
	(0.3234)	(0.6656)	(0.4732)	(0.0007)	(0.0040)	(0.0000)	

Source: Extract from E-views 11 Output, 2020

NB: *, ** and *** imply significance at 10%, 5% and 1% respectively. ADF is Augmented Dickey Fuller Unit Root Test, PP is Philip Peron Unit Root Test. Values in parenthesis (…) indicate MacKinnon (1996) one-sided p-values

Table 4: Unit Root with Structural Break Test

	LEVEL			**FIRST DIFFERENCE**			
Variables	**Break Date**	**T-statistic**	**P-value**	**Break Date**	**T-Statistic**	**P-value**	**I(d)**
GDPG	2000	-4.8343*	0.0539	1985	-11.7581***	< 0.01	I(1)
EXRT	2014	-3.8352	0.4780	1999	-5.43146***	< 0.01	I(1)
RINT	1995	-9.6366***	< 0.01	1997	-10.0861***	< 0.01	I(0)
DOBH	2003	-6.7419***	< 0.01	1999	-5.6574***	< 0.01	I(0)
DNBH	1990	-4.3923	0.1699	1990	-6.9064***	< 0.01	I(1)

Source: Extract from E-views 11 Output, 2022

NB: *, ** and *** signify significance at 10%, 5% and 1% respectively

The Table 3 presents the unit root stationarity test of the variables deployed in this study. It shows the standard or conventional ADF and PP unit root results at level, I(0) and first difference, I(1) for all the variables in three categories of equations (that is, equations that include intercept or intercept & trend or none). The results are mixed order of integration. That is, variables GDPG and RINT under ADF unit root test are stationary at level I(0) while variables EXRT, DOBH and DNBH are stationary at first difference I(1). The results are not different for ADF and PP.

In Table 4, the unit root test with structural break using Perron (2006) methodology indicates mixed order of integration also, but on series different from the standard unit root test results. Accordingly, variables GDPG, EXRT and DNBH are stationary at first difference, but exhibit structural breaks at different years. Also, variables RINT and DOBH are stationary at level and at different break points as well.

Regression Analysis

Impact of Domestic Bank Holding Debt (DOBH) on Economic Growth

Table 5: Summary of Linear ARDL (LARDL) and Nonlinear ARDL (NARDL) Estimates for Model 1 and 2

Panel A	**LARDL (Model 1)**			**NARDL (Model 2)**		
Variable	**Coefficient**	**t-Statistic**	**Prob.**	**Coefficient**	**t-Statistic**	**Prob.**
Long-Run						
C	11.1559***	3.0728	0.0063	13.2024***	4.8434	0.0001
@TREND	-0.7253***	-3.8613	0.0011	-1.1373***	-5.3434	0.0000
GDPG(-1)	-1.0170***	-5.4289	0.0000	-1.2470***	-7.8062	0.0000
LOG(EXRT(-1))	3.0799***	3.2327	0.0044	0.4848	0.2012	0.8425
RINT(-1)	0.3336***	3.1938	0.0048	0.2240*	1.7533	0.0941
DOBH	-0.2769	-1.4852	0.1539	-	-	-
DOBH_POS	-	-	-	-0.3500*	-2.0667	0.0513
DOBH_NEG	-	-	-	-1.0306**	-2.6699	0.0143
Short-Run						
C	10.4306***	6.2278	0.0000	13.202***	6.9702	0.0000
@TREND	-0.7253***	-3.8613	0.0011	-1.1373***	-9.4959	0.0000
DLOG(EXRT)	-5.4722***	-4.8175	0.0001	-5.1696***	-4.0030	0.0006
DLOG(EXRT(-1))	-1.1112	-0.7614	0.4558	0.0207	0.0156	0.9877
D(RINT)	0.0899*	1.9349	0.0680	0.0521	1.5051	0.1472
D(RINT(-1))	-0.1899***	-5.0898	0.0001	-0.1551***	-4.0723	0.0005
D(DOBH)	-0.0645	-0.3548	0.7266	-	-	-
D(DOBH(-1))	-0.6787***	-3.1573	0.0052	-	-	-
D(DOBH_NEG)	-	-	-	-0.1999	-0.7396	0.4677
ECT(-1)	-1.0170***	-6.5870	0.0000	-1.2470***	-10.1251	0.0000
Panel B: Bound Cointegration Test						
F-Statistic	**I(0)**	**I(1)**	**Significance**	**F-Statistic**	**I(0)**	**I(1)**
7.1684***	2.97	3.74	10%	17.2230***	3.03	4.06
	3.38	4.23	5%		3.47	4.57
	4.3	5.23	1%		4.4	5.72
Panel C: Post Estimation Test (Robustness Check)						
Diagnostic Test	**F-statistic**	**Df**	**Prob.**	**F-statistic**	**Df**	**Prob.**
Linearity (RESET)	0.1443	1, 18	0.7085	0.0066	1, 20	0.9360
Serial Correlation	0.4812	2,17	0.6262	0.4408	2,19	0.6499
Heteroscedasticity	0.2467	14,19	0.9948	0.4646	13,21	0.9215
JB-Normality	3.3044	-	0.1916	0.8027	-	0.6694
$Wald_{LR}$ Test	-	-	-	0.4554	1, 17	0.5089
R^2	0.8825	-	-	0.8674	-	-
Adj. R^2	0.8314	-	-	0.8197	-	-
F-stat.	17.2768***	-	0.0000	18.1706***	-	0.0000

Source: Extract from E-views 11 Outputs, 2022

NB: *, ** and *** imply significance at 10%, 5% and 1% respectively

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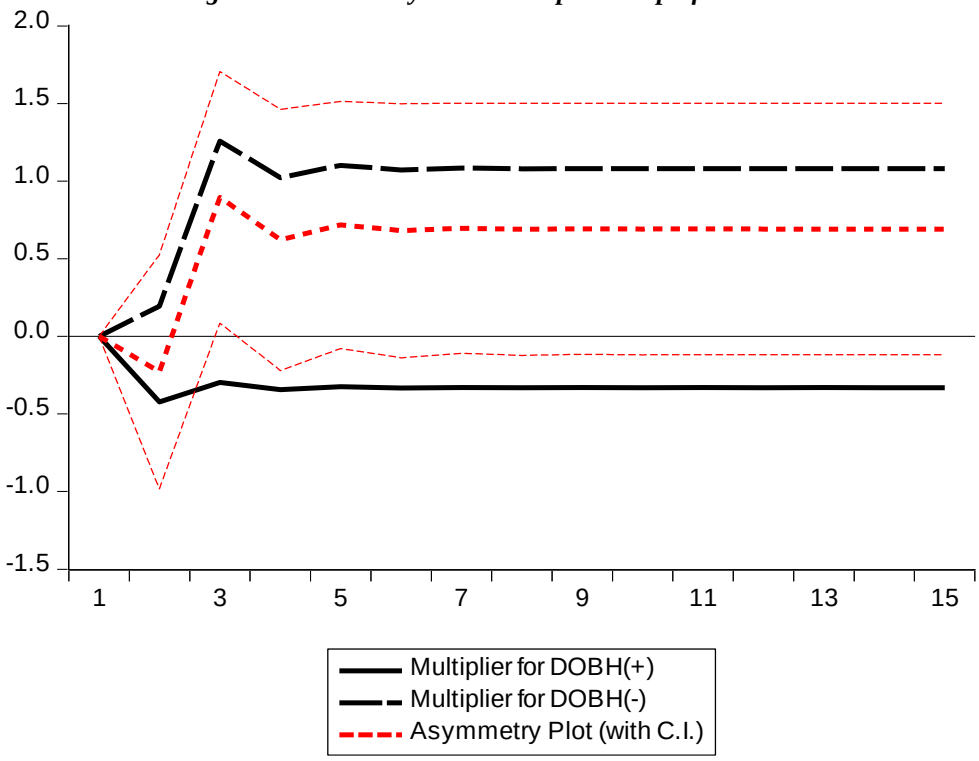
Figure 2: NARDL Dynamic Multiplier Graph for PDOR



Source: Output from E-views 11, 2022

The results in Table 5 are generated through Schwarz Criterion (SIC) model selection and automatically select lag length LARDL (1, 5, 2, 2) model and NARDL (1, 4, 2, 0, 1) model. Further estimation tests the models' reliability as there is absence of specification error, serial correlation, and heteroscedasticity, with normally distributed residuals. The bound cointegration tests of the two models suggest long-run equilibrium relationship amongst the variables (F-test > I(1) @ 0.05). The existence of cointegration necessitates the interest in the error correction component of the models.

The result in Model 2 (NARDL) indicates that economic growth rate (GDPG) responds negatively to a positive shock and negatively to a negative shock in DOBH in the long-run. The nonlinear estimate omitted the short-run positive result and present for negative shock. Thus, it shows that GDPG response negatively to a negative shock. This result shows no asymmetric effect which is also confirmed by the Wald test results (in Panel C) where the F-statistic is insignificant at 5 percent level of significance. The multiplier graph in figure 2 also verifies the result as the zero line in the graph lies within the upper and lower bounds of 95 percent level of significance. since there is no asymmetric effect, Model 1 is now of interest to interpret. Therefore, from Model 1 (LARDL), there is an insignificant negative relationship between DOBH and GDPG in the short-run but significant in lag 1. That is, for every one percentage increase (or decrease) in DOBH, GDPG falls (or rises) by about 0.07 percent in the short-run. In the long-run, there is an insignificant and negative relationship between DOBH and GDPG. For every one percentage change (increase) in DOBH, GDPG changes (falls) by about 0.28 percent in the long-run.

The error correction coefficient (ECT) represents the speed of adjustment and the coefficient of ECT, -1.0170, implies that about 102 percent errors generated in one period is corrected in the next period. This highly significant and negative ECT coefficient also supports evidence that there is a stable long-run relationship between the dependent

variable and the independent variables. The Adjusted R^2 indicates that 83 percent of the explanatory variables accounts for the variation in economic growth.

Impact of Domestic Non-Bank Holding Debt on Economic Growth

Table 6: Summary of Linear ARDL (LARDL) and Nonlinear ARDL (NARDL) Estimates for Model 3 and 4

Panel A	LARDL (Model 3)			NARDL (Model 4)		
Variable	**Coefficient**	**t-Statistic**	**Prob.**	**Coefficient**	**t-Statistic**	**Prob.**
Long-Run						
C				1.2818	0.8636	0.3951
GDPG(-1)	-0.4667***	-3.4123	0.0028	-0.9183***	-5.9561	0.0000
LOG(EXRT(-1))	0.4579**	2.1826	0.0412	4.1698***	2.9861	0.0058
RINT(-1)	-0.0049	-0.0589	0.9536	0.1790**	2.5083	0.0182
DNBH(-1)	-0.4781**	-2.2995	0.0324	-	-	-
DNBH_POS	-	-	-	-1.7436***	-3.6536	0.0011
DNBH_NEG	-	-	-	0.1594	0.2880	0.7755
Short-Run						
D(GDPG(-1))	-0.4113***	-3.996551	0.0007	-	-	-
DLOG(EXRT)	-4.1405**	-2.496481	0.0214	-1.8486	-1.1064	0.2780
D(RINT)	0.2012***	4.265358	0.0004	-	-	-
D(DNBH(-1))	1.1752**	2.830697	0.0103	-	-	-
D(DNBH_POS)	-	-	-	0.7032	1.1147	0.2745
D(DNBH_NEG)	-	-	-	-2.0107***	-3.0213	0.0053
ECT(-1)	-0.4667***	-5.143103	0.0000	-0.9183***	-7.0940	0.0000
Panel B: Bound Cointegration Test						
F-Statistic	**I(0)**	**I(1)**	**Significance**	**F-Statistic**	**I(0)**	**I(1)**
5.7503***	2.01	3.1	10%	7.1167***	2.2	3.09
	2.45	3.63	5%		2.56	3.49
	3.42	4.84	1%		3.29	4.37
Panel C: Post Estimation Test (Robustness Check)						
Diagnostic Test	**F-statistic**	**Df**	**Prob.**	**F-statistic**	**Df**	**Prob.**
Linearity (RESET)	0.1658	1, 19	0.6885	2.8847	1, 27	0.1009
Serial Correlation	2.1461	2,18	0.1459	1.2297	2,26	0.3088
Heteroscedasticity	0.8104	15,19	0.6564	1.0349	8,28	0.4342
JB-Normality	0.5386	-	0.7639	0.7922	-	0.67293
$Wald_{LR}$ Test	-	-	-	9.4682***	1, 28	0.0046
$Wald_{SR}$ Test	-	-	-	2.7344	1, 28	0.1094
R^2	0.841588	-	-	0.626037	-	-
Adj. R^2	0.765826	-	-	0.592040	-	-

Source: Extract from E-views 11 Output, 2022

NB: *, ** and *** imply significance at 10%, 5% and 1% respectively

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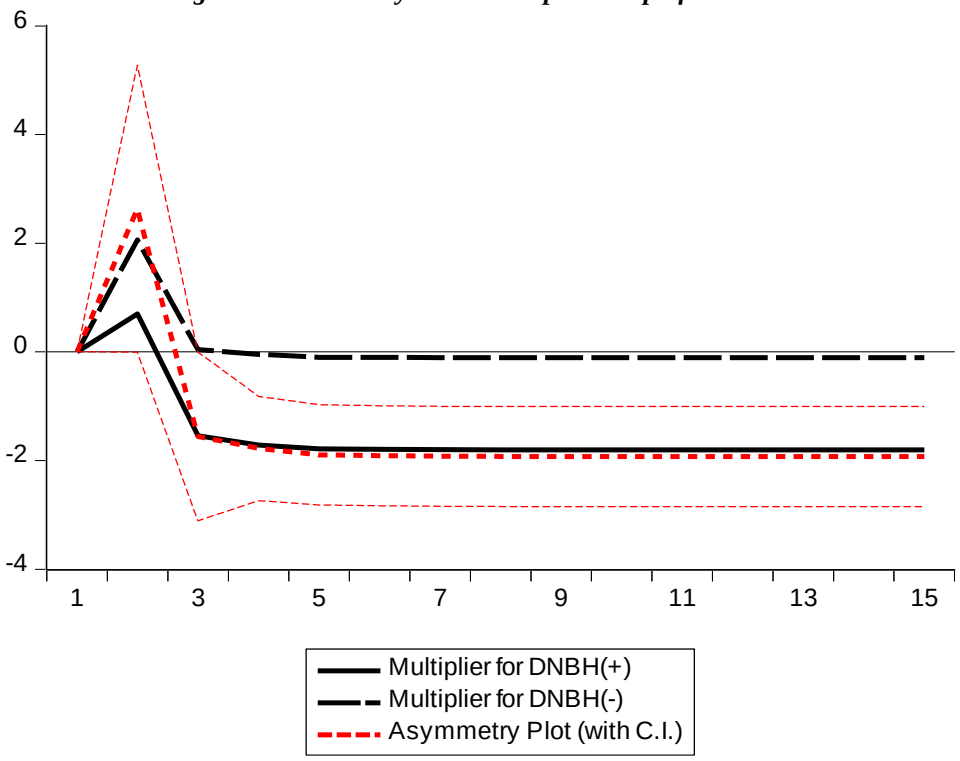
Figure 3: NARDL Dynamic Multiplier Graph for DNBH



Source: Output from E-views 11, 2022.

The results in Table 6 are generated through Schwarz Criterion (SIC) model selection and automatically select lag length LARDL (2, 4, 4, 2) model and NARDL (1, 1, 0, 1, 1) model. Further estimation tests the models' reliability as there is absent of specification error, serial correlation, and heteroscedasticity, with normally distributed residuals for both models. The bound cointegration tests of the two models suggest long-run equilibrium relationship amongst the variables (F-test > I(1) @ 0.05). The existence of cointegration necessitates the interest in the error correction component of the models.

The results in model 4 (NARDL) indicate that economic growth rate (GDPG) responds negatively to positive shock and positively to negative shock in DNBH in the long-run. This result clearly shows an asymmetric effect which is confirmed by the significant F-statistic (@0.05 level of significance) of long-run Wald test (in Panel C) and reaffirmed by the multiplier graph in Figure 3 where the zero line lies outside the 95 percent bounds graphs. The results show that for every one percentage increase in DNBH, GDPG decreases by 1.74 percent and when DNBH decreases by one percentage, GDPG decreases also by 0.16 percent.

On the other hand, in the short run, the response of GDPG on DNBH shock is insignificantly positive to a positive shock and significantly negative to a negative shock. This suggests an asymmetric effect in the short run, but the short-run Wald test indicates otherwise and the result is reaffirmed by the multiplier graph in Figure 3 as the zero line in the graph at the beginning lies within the upper and lower bounds of 95 percent level of significance. Therefore, we conclude that the result is not nonlinear but linear in short-run, hence, Model 3 (LARDL) which depicts a significant positive relationship between DNBH and GDPG in the short-run. That is, for every one percentage increase (or decrease) in DNBH, GDPG increases (or decreases) by 1.18 percent in the short-run.

The error correction coefficient (ECT) represents the speed of adjustment where the coefficient, -0.4667, implies that about 47 percent errors generated in one period is corrected in the next period. This highly significant and negative ECT coefficient also supports evidence that there is a stable long-run relationship between the dependent variable and the independent variables. The Adjusted R^2 indicates that about 77 percent of the explanatory variables accounts for the variation in economic growth.

Discussion of Results

The study examines the linear and nonlinear impacts of bank holding of domestic debt outstanding on economic growth in Nigeria. The result of the analysis shows that domestic bank holding debt (DOBH) has no asymmetric effect on economic growth rate (GDPG) in the short- and long-run, but an insignificant negative relationship. The result is an indication of crowding out effect of private investment because government domestic borrowing reduces funds in private sector for real investment and eventually reduces economic growth. This finding corroborates the findings of Charles (2012) and Bouis (2019) where Charles specifically opines that domestic debt holding of government has negative effect on economic growth in Nigeria while Bouis found that higher banks' holdings of government debt are related with a lower credit growth to the private sector and hence economic growth.

Another objective this study investigates is the linear or nonlinear impacts of non-bank holding of domestic debt outstanding on economic growth in Nigeria. The study finds that domestic non-bank holdings outstanding debt has linear positive impact in the short run and nonlinear impact in the long-run on economic growth. That is, economic growth rises when DNBH increases or decreases in the long-run and by implication, a large holding of government securities (bonds) outside the banking industry tends to, with government as a larger spender, boost aggregate demand which stimulate investment and economic growth both in the short- and long-run. This finding is linked to the work of Eyide and Nzewi (2018) where they found that domestic debt was positively related to economic growth in the short run. Specifically, in the short run, Babu et al. (2015) showed that domestic debt has a positive significant effect on per capita GDP growth rate in the East Africa Community. This result in the long-run goes in line with the study of Essien et al. (2016), Medina et al. (2020) and Ehikioya et al. (2020). Where Essien et al. concluded that the values of the real GDP in Nigeria were not explained by the level of domestic debt. That is, a negative relationship exists. Still in consonant is the findings of Adoufu and Abula (2010) that domestic debt has negative and significant effect on economic growth in Nigeria. Medina et al. result followed a non-linear analysis and they found that debt-to-GDP ratio is nonlinear related to economic growth in Mexico. Ehikioya et al. also showed evidence of double impacts of public debt on economic growth in Africa.

5. CONCLUSION AND RECOMMENDATIONS

The issue about public debt as a policy to promote economic growth is still debatable among economists, policy makers and researchers, because debt-growth relationship is country and time-specific, conditional on the business cycle and institutional quality (Dombi & Dedák, 2019). Governments use the debt instruments to borrow in order to close the resource gap between savings and investment. Alison (2003) explained three theoretical reasons for government domestic debt. They are budget deficit financing, monetary policy implementation (i.e., buying and selling of treasury bills in the open market), and development of the financial instruments to deepen the financial market. Domestic debt has been on the increase after 2006 debt forgiveness was granted by Paris Club creditors. This is evident in 2018 where domestic debt accounted for 62 percent of the nation's total debt. This backdrop necessitated the investigation of this study in which Linear and nonlinear autoregressive models were deployed to analyse the impact of domestic debt outstanding on economic growth in Nigeria.

The results of this study showed an insignificant negative and absence of nonlinear (asymmetric) relationship between domestic bank holding debt outstanding and economic growth both in the short- and long-run. another finding is that domestic non-bank holdings outstanding debt has linear positive impact in the short run and nonlinear impact in the long-run on economic growth.

Therefore, from the findings, the study recommends the following:

i. Rooted from the finding that bank holding of domestic debt outstanding showed no asymmetric evidence with economic growth and a weak linear negative relationship existed in the short and long run, this study suggests that for government to raise economic growth, it should initiate policy that will stop banks from holding excessive government bonds so that more loanable fund is available for private individuals or group of individuals in real sector investments.

ii. It is evident from the result that non-bank holding impacted directly on economic growth in the short-run and after accounted for nonlinearity, a long-run asymmetric evidence was revealed. To this end, the study recommends government (as a larger spender) to hold more non-bank debt and invest in infrastructures that will aid the ease of doing business, hence, investment expansion and economic growth increase.

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