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## Article

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International Journal of Management, Economics and Social Sciences (IJMESS)

## Provided in Cooperation with:

International Journal of Management, Economics and Social Sciences (IJMESS)

*Suggested Citation:* Olaniran, Oladotun Richard; Falade, Olanipekun Emmanuel (2024) :  
Macroeconomic effects of public debt in Nigeria, International Journal of Management, Economics  
and Social Sciences (IJMESS), ISSN 2304-1366, IJMESS International Publishers, Jersey City, NJ, Vol.  
13, Iss. 1/2, pp. 25-40,  
<https://doi.org/10.32327/IJMESS/13.1-2.2024.2>

This Version is available at:

<https://hdl.handle.net/10419/300597>

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## Macroeconomic Effects of Public Debt in Nigeria

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The purpose of this study was to investigate the impact of domestic and external debt on macroeconomic variables in Nigeria from 1981 to 2020. Annual secondary data on domestic and external debt, inflation, output, investment and consumption sourced from World Development Indicators (WDI, 2021), and CBN Statistical Bulletin (2020) were used. The study employed two-stage least squares method to evaluate the differential effects of foreign and domestic debt on key macroeconomic variables. The findings showed a positive relationship between domestic debt and private consumption in Nigeria, while a negative relationship exists between external debt and private consumption. Also, an increase in external debt led to increased private investment. The study emphasized the importance of prudent debt management in mitigating inflationary pressures. This implied that domestic debt had a more significant negative impact on output and economic growth, while external debt had less immediate adverse effects. Policymakers should balance debt composition and use borrowed funds for purposes for sustainable economic growth.

*Keywords: Macroeconomics effects, domestic debt, external debt, private consumption, Nigeria*

*JEL: F34, H6, H63*

Nigeria's development agenda faces challenges due to high borrowing costs and rising debt, with 96 percent of the federal government's revenue allocated to debt servicing in 2023 (National Bureau of Statistics [NBS], 2024). Nigeria's public debt, a significant policy issue, has been influenced by fiscal deficits, infrastructure financing needs, and economic shocks (Adeola and Evans, 2018). Exploring its macroeconomic effects is crucial for policymakers, as it directly impacts economic stability, growth prospects, and debt sustainability while excessive accumulation can lead to debt distress and macroeconomic instability (Akinyi *et al.*, 2018). The macroeconomic effects of public debt in Nigeria include debt sustainability, impact on economic growth, fiscal policy implications, and external vulnerabilities. Debt sustainability is determined by factors like debt-to-GDP ratio, debt service-to-revenue ratio, and external debt composition (Ighodaro, 2019). Economic growth can be positively or negatively impacted by debt, and fiscal consolidation measures may be necessary to ensure debt sustainability (Akinyi *et al.*, 2018). External vulnerabilities, such as exchange rate fluctuations and global financial market conditions, can also be assessed through empirical investigation.

Governments, both in advanced and developing economies have crucially depended on fiscal policy as one of the indispensable tools of economic policy in their bid to achieve desired macroeconomic

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Manuscript received March 7, 2024; revised May 31, 2024; accepted June 19, 2024.

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Publisher: UCHPRO & National D.B.A Society, USA

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objectives (Checherita and Rother, 2012). As a result, government makes use of public spending and tax receipts to influence its activities in the economy. Thus, when government expenditure outruns that of revenue, it resorts to borrowing. An accumulated borrowing by government is deficit. To effectively manage deficit, governments employ various methods, such as borrowing, increasing taxes, utilizing seigniorage, depleting foreign reserves, or resorting to the sales of fixed assets. Deficit financing has almost become a permanent occurrence in the Nigerian fiscal policy management resulting in a surge in Nigeria's public debt (as a major source of deficit financing), even after benefiting from the Paris Club debt relief in 2005.

A continuous rise in public debt without a commensurate growth of aggregate demand may cause permanent and irreversible increase in inflation (Essien *et al.*, 2016). Consequently, an increase in inflation will lead to demand for higher wages by government workers and rise in cost of government capital projects. This means both recurrent and capital expenditure will rise and government revenue may not be enough to pay for this additional cost. Government will therefore need to accumulate more debt to pay for this additional cost. This has raised concerns about the country's fiscal sustainability and its broader implications on the macroeconomic performance.

The impact of rising debt on Nigeria's macroeconomic variables is a topic of ongoing research. Public debt can positively influence macroeconomic outcomes by supporting public initiatives like healthcare, education, and infrastructure projects, which can boost the economy, generate jobs, and support long-term growth (Kobayashi, 2015). Additionally, public debt can attract capital inflows and facilitate investment, contributing to capital accumulation and economic development. Empirical studies show that public debt accumulation negatively impacts private consumption, investment, output, and inflation (Kusairi *et al.*, 2019). High debt servicing costs reduce funds for public investments and social welfare programs, potentially slowing down economic growth by squeezing private investment and consumption out (Anyanwu, 2017; Donayre and Taivan, 2017; Essien *et al.*, 2016).

Investigating the macroeconomic effects of Nigeria's public debt is crucial due to rising levels, economic challenges, and the need for informed policymaking. The country's total public debt was N87.91trn or \$114.35bn as at the last quarter of 2023, representing a significant increase from previous years (NBS, 2024). Also, the COVID-19 pandemic has exacerbated economic challenges, leading to increased government spending on healthcare and social protection (World Bank, 2020). Analyzing the macroeconomic effects of public debt can help assess debt sustainability, identify risks, and inform debt management strategies. Research findings can inform policy decisions to promote fiscal sustainability, economic growth, and debt management. Effective debt management is essential for maintaining investor confidence and market stability.

Therefore, study on Nigeria's public debt can reveal its impact on economic growth and financial stability. It can reveal the relationship between debt accumulation, investment, productivity, and growth dynamics, guiding policies for sustainable growth and managing debt levels. It can also identify systemic risks and vulnerabilities. This study aims to provide an insight into the macroeconomic impacts of public debt in Nigeria, focusing on both domestic and external components. It aims to guide policymakers in making prudent decisions about debt management and economic stability, as it is crucial for Nigeria to achieve its development objectives, as these factors significantly influence the country's economic performance. The study therefore intends to proffer answer to the research question "How does the accumulation of public debt in Nigeria impact key macroeconomic variables such as economic output, private sector investment, and private consumption and what are the implications for long-term economic growth and stability?"

The rest of the paper is organized as follows: relevant literature (both theoretical and empirical) was discussed in section two, while section three presents methodology employed in the study. The empirical results of the study and discussion of findings were presented in section four, while policy implications of the findings and concluding remarks were offered in sections five.

## **LITERATURE REVIEW**

### **Theoretical Underpinnings**

The macroeconomic effects of public debt can be studied using various economic theories and models. This study is premised on the debt sustainability framework (DSF) which assesses the long-term sustainability of public debt, considering factors like economic growth, fiscal policy, and external shocks, to inform policymakers. (Anyanwu, 2017; Ghosh, 2013). The theory of debt sustainability is an offshoot of endogenous growth model (EGM) which suggests that public debt impacts investment, productivity, and resource allocation (Barro, 1990).

The Framework can be used to evaluate a country's debt sustainability by considering factors like GDP, private consumption, private investment, inflation, and public debt. GDP growth is crucial for debt sustainability, as it helps generate revenue to service debt obligations. Private consumption and investment are also important, as they drive economic growth and tax revenues. Inflation affects debt sustainability by affecting real interest rates and debt dynamics. Public debt levels are central to assessing debt sustainability, as it can be serviced without compromising fiscal stability or economic growth.

### **Hypotheses Development**

Research on the relationship between government debt and macroeconomic variables has been limited

to advanced economies, focusing mainly on economic growth. For instance, Afonso and Ibraimo (2018) investigated the public debt–per capita GDP growth nexus in 24 advanced countries using panel studies. The findings of the study show no strong evidence that higher public debt levels necessarily lead to lower GDP growth rates. However, developing countries show a significant reduction in economic growth and a higher inflation tendency with external debt levels over 90 percent.

To achieve Sustainable Development Goals (SDGs), developing countries rely on debt to fund growth, but unsustainable levels can jeopardize economic growth. Government borrowing bridges resource gaps and stimulates growth when revenue falls short of expenditure. Also, the COVID–19 pandemic led governments to accumulate public debt to invest in deficit spending and social protection programs. Nigeria borrowed heavily to address budget deficits and return to sustainable growth. Yusuf and Mohd (2023) examined the asymmetric impact of public debt on Nigeria’s economic growth from 1980 to 2020. Results show that external debt positively impacts economic growth, while domestic debt retards growth asymmetrically in the short term and linearly over the long–term. Fiscal reforms are recommended to mitigate the negative effects of unsustainable public debt.

Ekperiware *et al.* (2022) examined the impact of public debt on Nigeria’s economic growth. It disaggregates total debt into domestic, external, and debt servicing costs. The results show that domestic debt is inversely related to growth in the short–run but positively in the long–run if moderated. External debts negatively affect economic growth due to incorrect loan application. The study also highlighted the issue of debt servicing, which leads to continuous debt overhang on yearly budgets. The study recommends that the government should only borrow on items that can repay the loan, as debt servicing negatively impacts the economy. The study examines the impact of public debts, including domestic and external debts, on Nigeria’s economic growth from 1981 to 2020. It found that both debts negatively affect short–term economic growth, but in the long–run, domestic debts can stimulate savings and investment, provided bank deposits are used moderately. In the same vein, Panizza and Presbitero (2014) examined the country–specific factors that affect the effectiveness of public borrowing and its impact on GDP. It is found that government debt negatively affects economic growth in both short and long–term terms, with debt service having a more significant negative effect.

As the debate on public debt and the demand for renewable energy continues to heighten, one could argue that the public debt could serve as a potential source of funding for environmental preservation initiative. As a result, the findings of the work of Hameed *et al.* (2021) revealed that public debt negatively impacts renewable energy use in 20 rising nations. While public debt could potentially fund environmental preservation initiatives, it may also prevent funding for renewable energy industries. The study used econometric approaches and found a causal relationship between public debt and renewable energy

use.

In an attempt to establish the thresholds of public debt indicator that could affect economic growth, Butkus and Alves (2021) used structural threshold regression to determine the indicators affecting public debt's impact on economic growth. They found that high expenditure multipliers increase debt's beneficial effects. Private spending and investment contribute to GDP, while low tax income doesn't hinder growth. The study suggests specific threshold conditions for a relationship between public debt and economic development.

The empirical study of Mendonca and Brito (2021) determined how public debt affects investment and the findings of the study revealed a nonlinear relationship between public debt and private investment, with public debt-to-GDP ratios negatively impacting public sector investment. The implication of the result is that a rise in the public debt-to-GDP ratio is found to have a significant negative effect on private investment.

In Nigeria, several studies have examined the relationship among public debt, inflation, and unemployment. Ajayi and Edewusi (2020) employed an autoregressive distributed lag (ARDL) model to analyze this relationship and the results of the study show no significant connection between inflation and public debt. It also reveals a correlation between total external debt and economic progress, while domestic debt service payments negatively impact growth.

The conventional hypothesis suggests that rising government debt is a liability for future generations, leading to increased interest rates, disposable income, and wages (Barro, 1990). This can decrease corporate profitability, private investment and productivity thereby resulting in low growth. Also, with high debt, governments may perceive themselves as richer, leading to higher spending and low savings which will eventually lead to higher interest rates and stifling growth. The study proposed the following hypotheses:

$H_0$ : Public debt has a negative effect on private investment thereby retarding economic growth in Nigeria.

## **METHODOLOGY**

### **Sample and Procedure**

This study investigated the impact of domestic and external debt on selected macroeconomic variables in Nigeria from 1981 to 2020. The macroeconomic variables used include GDP (to measure the level of output), inflation (to measure the aggregate price level), private consumption (to measure household expenditure) and private investment (to measure firms' expenditure). The study on the macroeconomic effects of public debt in Nigeria involves selecting a sample, collecting data, and implementing an

empirical analysis. The sample selection process involves defining the time period, selecting the sample size, identifying the units of analysis, and considering data availability from reliable sources like Central Bank Statistical Bulletin (2022) and the World Bank Development Indicators (WDI, 2022).

This research also involves gathering data on macroeconomic variables (mentioned earlier) in Nigeria, specifically on public debt levels and debt service payments. The data are then verified for accuracy and consistency. The research model was defined, describing the relationship between public debt and macroeconomic variables. The variables were transformed into natural logarithms to reduce heteroscedasticity. The model was estimated using econometric software, and the results are interpreted.

### Estimation Technique

The estimation technique used to estimate the macroeconomic effects of public debt in Nigeria is two-stage least squares (2SLS). It helps mitigate endogeneity by using instrumental variables to replace potentially endogenous regressors and provides consistent parameter estimates, even when regressors are endogenous, ensuring reliable and unbiased estimates (Wooldridge, 2010). It is more efficient than ordinary least squares (OLS) regression in dealing with endogeneity, and can handle multiple endogenous variables (Gujarati and Porter, 2009). Properly implemented 2SLS estimation produces robust results, even in the presence of misspecification or heteroscedasticity (Wooldridge, 2010). This can enhance confidence in the findings regarding the macroeconomic effects of public debt in Nigeria. The procedure of estimation involves identifying endogenous variables like economic growth, inflation, and interest rate, and selecting instrumental variables that are uncorrelated with the endogenous regressors. The first stage involves regressing each endogenous variable on its instrumental variables using ordinary least squares (OLS) regression (Wooldridge, 2010). The second stage is to regress the dependent variable on the predicted values, accounting for endogeneity (Gujarati and Porter, 2009). The model's fit and validity were evaluated using diagnostic tests. The results were then interpreted to understand the impact of public debt on macroeconomic indicators.

### Model Specification

In line with the theoretical underpinning for this study and following the modification of the work of Ekperiware *et al.* (2022), the relationship between macroeconomic variables and public debt is specified as:

$$MAC = f(PDT) \quad (1)$$

Where, *MAC* implies macroeconomic variables comprising GDP, private consumption, private investment and inflation and *PDT* is the public debt comprising domestic and external debt

Then, equation 1 above becomes:

$$\begin{pmatrix} Y \\ PC \\ PI \\ INF \end{pmatrix} = \begin{pmatrix} \alpha \\ \beta \\ \varphi \\ \pi \end{pmatrix} + \begin{pmatrix} DM \\ ED \\ EX \\ IR \end{pmatrix} + \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \varepsilon_4 \end{pmatrix} \quad (2)$$

Where:

*Y* = GDP (output)

*PC* = Private consumption

*PI* = Private investment

*IF* = Inflation

*DM* = Domestic debt

*ED* = External debt

And a set of control variables that are likely to influence the macroeconomic variables:

*EX* = Exchange rate

*IR* = Interest rate

To examine the differential effects of the two components of public debt on macroeconomic variables notably – output, private consumption, private investment and inflation in Nigeria, the linear functional equations are specified as follows:

$$\begin{aligned} \ln Y_{i,t} = & \vartheta_0 + \sum_{k=1}^n \vartheta_{1k} \ln Y_{Ti,t-k} + \sum_{r=m+1}^{dmax} \vartheta_{2r} \ln Y_{i,t-r} + \sum_{k=1}^n \lambda_{1k} \ln IR_{i,t-k} + \\ & \sum_{r=m+1}^{dmax} \lambda_{2r} \ln IR_{i,t-r} + \sum_{k=1}^n \varphi_{1k} EX_{i,t-k} + \sum_{r=m+1}^{dmax} \varphi_{2r} EX_{i,t-r} + \sum_{k=1}^n \mu_{1k} \ln DM_{Ti,t-k} + \\ & \sum_{r=m+1}^{dmax} \mu_{2r} \ln DM_{i,t-r} + \sum_{k=1}^n \beta_{1k} \ln ED_{Ti,t-k} + \sum_{r=m+1}^{dmax} \beta_{2r} \ln ED_{i,t-r} + \\ & \varepsilon_{1t} \end{aligned} \quad (3a)$$

$$\begin{aligned} \ln PC_{i,t} = & \vartheta_0 + \sum_{k=1}^n \gamma_{1k} \ln PC_{Ti,t-k} + \sum_{r=m+1}^{dmax} \gamma_{2r} \ln PC_{i,t-r} + \sum_{k=1}^n \lambda_{1k} \ln IR_{i,t-k} + \\ & \sum_{r=m+1}^{dmax} \lambda_{2r} \ln IR_{i,t-r} + \sum_{k=1}^n \varphi_{1k} ED_{i,t-k} + \sum_{r=m+1}^{dmax} \varphi_{2r} ED_{i,t-r} + \sum_{k=1}^n \mu_{1k} \ln DM_{Ti,t-k} + \\ & \sum_{r=m+1}^{dmax} \mu_{2r} \ln DM_{i,t-r} + \sum_{k=1}^n \beta_{1k} \ln EX_{Ti,t-k} + \sum_{r=m+1}^{dmax} \beta_{2r} \ln EX_{i,t-r} + \\ & \varepsilon_{2t} \end{aligned} \quad (3b)$$



$$\begin{aligned}
 \ln PI_{i,t} = & \vartheta_0 + \sum_{k=1}^n \vartheta_{1k} \ln PI_{Ti,t-k} + \sum_{r=m+1}^{dmax} \vartheta_{2r} \ln PI_{i,t-r} + \sum_{k=1}^n \lambda_{1k} \ln IR_{i,t-k} + \\
 & \sum_{r=m+1}^{dmax} \lambda_{2r} \ln IR_{i,t-r} + \sum_{k=1}^n \varphi_{1k} EX_{i,t-k} + \sum_{r=m+1}^{dmax} \varphi_{2r} EX_{i,t-r} + \sum_{k=1}^n \mu_{1k} \ln DM_{Ti,t-k} + \\
 & \sum_{r=m+1}^{dmax} \mu_{2r} \ln DM_{i,t-r} + \sum_{k=1}^n \beta_{1k} \ln ED_{Ti,t-k} + \sum_{r=m+1}^{dmax} \beta_{2r} \ln ED_{i,t-r} + \\
 & \varepsilon_{3t}
 \end{aligned} \tag{3c}$$

$$\begin{aligned}
 \ln IF_{i,t} = & \vartheta_0 + \sum_{k=1}^n \gamma_{1k} IF_{Ti,t-k} + \sum_{r=m+1}^{dmax} \gamma_{2r} IF_{i,t-r} + \sum_{k=1}^n \lambda_{1k} IR_{i,t-k} + \sum_{r=m+1}^{dmax} \lambda_{2r} IR_{i,t-r} + \\
 & \sum_{k=1}^n \varphi_{1k} ED_{i,t-k} + \sum_{r=m+1}^{dmax} \varphi_{2r} ED_{i,t-r} + \sum_{k=1}^n \mu_{1k} \ln DM_{Ti,t-k} + \sum_{r=m+1}^{dmax} \mu_{2r} \ln DM_{i,t-r} + \\
 & \sum_{k=1}^n \beta_{1k} \ln EX_{Ti,t-k} + \sum_{r=m+1}^{dmax} \beta_{2r} \ln EX_{i,t-r} + \\
 & \varepsilon_{4t}
 \end{aligned} \tag{3d}$$

Where:

$\ln Y$  = Log of the vectors of output

$\ln PC$  = Log of the vectors of private consumption.

$\ln PI$  = Log of the vectors of private investment.

$\ln DM$  = Log of the vectors of domestic debt.

$\ln ED$  = Log of the vectors of external debt.

$\ln F$  = Inflation.

$EXR$  = Exchange rate

$IR$  = Interest rate

Whereas,  $\varepsilon_{1t}$  to  $\varepsilon_{4t}$  are the disturbance terms for the fitted models, while  $k$  stands for the optimal lag order and  $dmax$  represents the maximum order of integration.

## RESULTS AND DISCUSSION

### Descriptive Statistics

In order to observe the distribution and variability of variables, descriptive statistics is usually employed, prior to analyzing time series data. This establishes information about sample statistics (mean, median, standard deviation, skewness, kurtosis and Jarque–Bera statistics). The result of the descriptive statistics employed in the study is presented in Table 1, with annual time series ranging 1981 to 2020. A significant degree of consistency was found in all of the study's variables, according to the results of the descriptive

statistics. This may be observed in the series' mean and median values, which fall between the maximum and minimum values. Nearly all series' comparatively low standard deviation values indicate that real data variations from their corresponding mean values are likewise rather tiny.

<b>Variables</b>	<b>DM-DEBT</b>	<b>EX-DEBT</b>	<b>PR-INV</b>	<b>INF</b>	<b>RGDP</b>	<b>EXCR</b>	<b>INTR</b>
<b>Mean</b>	3108.746	1752.271	17.91499	19.36482	4.285722	111.2232	17.59510
<b>Median</b>	957.6100	640.9750	17.24625	12.92174	3.698025	111.5000	17.24625
<b>Maximum</b>	13647.66	7352.110	31.65000	76.75887	15.32916	430.0000	31.65000
<b>Minimum</b>	11.19000	2.330000	9.135846	0.220000	-1.616869	2.400000	8.916667
<b>Std. Dev</b>	4330.516	2111.272	4.353769	17.42199	3.461578	104.6938	4.775125
<b>Skewness</b>	1.367226	1.328061	0.588197	1.879206	0.901250	1.088030	0.290614
<b>Kurtosis</b>	3.432646	3.586870	4.342161	5.599051	4.074835	3.897424	3.747550
<b>Jarque-Bera</b>	12.77402	12.33233	5.308827	34.80121	7.340462	9.234352	1.494431
<b>Probability</b>	0.001683	0.002099	0.070340	0.000000	0.025471	0.009881	0.473684
<b>Sum</b>	124349.8	70090.84	716.5995	774.5926	171.4289	4448.930	703.8039
<b>Sum Sq. Dev.</b>	7.31E+08	1.74E+08	739.2569	11837.50	467.3184	427471.0	889.2708
<b>Observation</b>	40	40	40	40	40	40	40

Source: Authors' computation

**Table 1. Descriptive Statistics**

By observing the skewness and kurtosis, one may learn pertinent details about the symmetric nature of probability distributions and the location of the left or right distribution tail peak, respectively. In order to verify if a data series is normal, they also help determine Jarque–Bera statistics. A test for distribution normality called the Jarque Bera is used, with the sample distribution's normality serving as the null hypothesis. In the event that the Jarque–Bera test probability value is significant, the alternative, which states that the sample is not normally distributed, is accepted and the null hypothesis is rejected. The series deviates from normality if every variable has statistical significance.

### Unit Root Test

The study employed the Akaike Information Criterion and Augmented Dickey–Fuller unit root test to determine optimal lag duration and stationarity of variables, ensuring robustness assessment through the Phillips–Perron unit root test. As shown in Table 2, the study found that LNPCI, LNIF, and LNPI are stationary at levels, indicating no shock incidence drift. Other variables become stationary at first difference. The results showed that the variables are integrated either at levels  $I(0)$  or at first difference  $I(1)$  series, and confirmed by Phillips–Perron unit root test.

### Lag Length Selection

Choosing the right lag length is crucial for evaluating models in time series equations. Excessive lag length can generate white noise-like residuals, while less lag length may produce random residuals.

Therefore, the study must determine the optimal lag length to avoid misspecification and degree of freedom loss. Table 3 shows the lag length selection result for public debt.

Variables	ADF			Phillips-Perron		
	Levels	First Difference	Remarks	Levels	First Difference	Remarks
LNDM	-1.9565 (0.3041)	-5.5009 (0.0000) <sup>†</sup>	I(1)	1.9381 (0.3121)	-5.4965 (0.0000) <sup>†</sup>	I(1)
LNEX	-1.8144 (0.3681)	-4.8102 (0.0004) <sup>†</sup>	I(1)	-2.8957 (0.0550) <sup>*</sup>	-4.8102 (0.0004) <sup>†</sup>	I(1)
LNPC	-4.5398 (0.0008) <sup>†</sup>		I(0)	-4.8204 (0.0003) <sup>†</sup>		I(0)
LNPI	-3.0941 (0.0353) <sup>*</sup>		I(0)	-3.1083 (0.0341) <sup>*</sup>		I(0)
LNy	-1.60640 (0.4674)	-4.5589 (0.0009) <sup>†</sup>	I(1)	-5.6740 (0.0000) <sup>†</sup>		I(0)
INF	-4.9425 (0.0002) <sup>†</sup>		I(0)	-4.9461 (0.0002) <sup>†</sup>		I(0)
EXR	-0.8880 (0.7815)	-6.0124 (0.0000) <sup>†</sup>	I(1)	-0.8872 (0.7818)	-6.0102 (0.0000) <sup>†</sup>	I(1)
ITR	-2.3765 (0.1547)	-5.9121 (0.0000) <sup>†</sup>	I(1)	-4.4069 (0.1465)	-5.9270 (0.0000) <sup>†</sup>	I(1)

Source: Authors' computation

Note: <sup>†</sup>  $p < .10$  \*  $p < .05$

**Table 2. Unit Roots Test**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-165.46	NA	1.27e-06	9.129	9.474	9.252
1	56.786	339.21	3.31e-10	0.800702	3.903 <sup>*</sup>	1.904
2	159.34	113.35 <sup>*</sup>	6.97e-11 <sup>*</sup>	-1.228611 <sup>*</sup>	4.632	0.856 <sup>*</sup>

Source: Authors' computation

Note: \*indicates lag order selected by the criterion

Note: Sequential modified LR test statistic (each test at 5% level), FPE: Final Prediction Error,

AIC: Akaike Information Criterion, SC: Schwarz Information criterion, HQ: Hannan-Quinn Information criterion

**Table 3. Lag Length Selection**

Table 3 reveals that there were no conflicting views among the various lag length selection criteria, LR, FPE, AIC, SC, and HQ settle for lag two as the optimal lag length for the models. Log likelihood on the other hand settles for lag zero.

Therefore, based on this mixed order of integration, two-stage least squares (2SLS) technique can be used in econometric modeling for mixed orders of integration, where some variables are stationary and others are non-stationary. This is common in macroeconomic and financial time series analysis. To use 2SLS with mixed orders, data were preprocessed to achieve stationarity, and instrument variables were selected correlated with endogenous regressors but uncorrelated with the error term. The first stage

of the regression involves estimating the endogenous variables to obtain the predicted values which were then used as regressors in the second stage.

### Hypothesis Testing

The results of the differential effects of domestic debt and external debt on macroeconomic variables in Nigeria are presented in Table 4. From the Table 4, there exist a small but unfavorable correlation between Nigeria's output and public debt, with production decreasing by 0.20 percent for every 1 percent rise in external debt and 12 percent for every 1 percent rise in national debt. The results imply that the decrease in production can hinder economic growth, leading to slower GDP growth and a decline in living standards. Rising debt levels also imply increased debt servicing burden, constraining public

Variables	Output (RGDP)	Private Consumption (PC)	Private Investment (PI)	Inflation (IF)
C	0.8216* (0.018)	3.146† (0.0000)	0.5692† (0.0016)	0.4288† (0.0004)
LNDM	-0.12457 (0.7850)	0.0943* (0.0247)	-0.0105 (0.6220)	0.1924 (0.6292)
LNEX	-0.2019 (0.6190)	-0.01762* (0.0425)	0.0240 (0.2101)	0.50128 (0.1624)
EX	0.52967 (0.4516)	0.0575* (0.0345)	-0.01739 (0.5970)	-0.8891 (0.1519)
IR	0.65723 (0.6463)	-0.0362* (0.0480)	0.8022† (0.0000)	0.42650 (0.7325)
R-squared	0.9575	0.7253	0.9397	0.9237
Adj. R <sup>2</sup>	0.9318	0.6920	0.9324	0.9099
Instrumental rank	7	7	7	7
J-stats	0.7849	0.5424	0.0191	0.5874
P-value	0.0075	0.0007	0.0000	0.0015

Source: Authors' computation

Note: †p<.10 \*p<.05

Note: The list of instruments employed for the 2SLS include: EX (-1), EX (-2), INTR (-1), IR (-2), DM(-1) and EX(-1)

**Table 4. Effects of Domestic and External Debts on Macroeconomic Variables**

expenditures like infrastructure development and healthcare. High debt levels can signal fiscal weakness to investors, resulting in capital flight and reduced foreign direct investment. Policymakers may need to reassess fiscal policies to address this issue. Again, mishandled home and overseas debt can impede economic growth, while prudently managed external debt can have a less immediate adverse effect on output. The findings emphasize the importance of a well-balanced approach to debt management for Nigeria's economic growth and output maintenance.

Also, the analysis of domestic and external debt in Nigeria reveals a positive and significant relationship between domestic debt and private consumption. A 1 percent rise in domestic debt leads to a 9 percent increase in private spending, while a 7 percent decline in private consumption occurs for every 1 percent increase in foreign debt. This could be due to increased government borrowing in the domestic market, which stimulates economic activity by injecting more funds into the economy. Conversely, a 7 percent decline in private consumption occurs for every 1 percent increase in foreign debt, suggesting a negative impact of foreign borrowing on private consumption. Factors such as currency depreciation, interest payments, and economic uncertainty can contribute to this. The findings emphasize the importance of maintaining a balance between domestic and foreign borrowing to support private sector activity while minimizing adverse effects on private consumption. The study reveals a non-linear relationship between public debt and private consumption, indicating that long-term increase in public debt do not significantly impact private consumption expenditures. The results are in line with the findings of Yusuf and Mohd (2023) which indicate that domestic debt in Nigeria has a more significant negative impact on private consumption than external debt, particularly in countries with high inflation and rising interest rates, which can crowd out private investment.

Likewise, exchange rate is also found to positively impact private consumption, with a 5 percent change in exchange rate affecting consumption by 3 percent. Domestic debt in Nigeria has a more significant impact on interest rates, as government borrowing drives up interest rates and crowds out private sector borrowing, resulting in higher borrowing costs. The study found a negative correlation between governmental debt and private investment in Nigeria. Domestic debt decreases private investment by 0.10 percent for every 1 percent increase in domestic debt, while foreign debt increases it by around 0.2 percent. The study reveals that Nigeria's government debt, both domestic and foreign, has distinct effects on private investment. Domestic debt increases, leading to a decrease in private investment, reduced capital availability, and a crowding out effect. Conversely, foreign debt increases, mainly due to infrastructure development and investor confidence. These findings suggest that policymakers should balance domestic and foreign borrowing to support public investment while minimizing adverse effects on private sector activity. This finding aligns with previous research, but differs from Afonso and Ibraimo (2018) findings that public debt positively affects private investment.

Based on the findings, our null hypothesis was accepted as it was found that public debt especially domestic component has a negative impact on private investment as it has an incremental effect on interest rate thereby retarding economic growth in Nigeria. The study therefore, emphasizes the need for a balance between domestic and foreign borrowing to support private sector activity and mitigate negative impacts on private consumption. It also emphasizes the importance of Nigeria's debt manage-

ment for macroeconomic stability and long-term economic development, highlighting the need for sustainable fiscal policies. It underscores the significance of balancing domestic and foreign debt in debt management and investment promotion strategies to mitigate government debt's negative impact on private sector growth.

## **CONCLUSION**

The study examines the impact of domestic and external debt on macroeconomic variables in Nigeria from 1981 to 2020, revealing a significant negative relationship between consumption, investment, output, and inflation. The study emphasizes the importance of prudent debt management in mitigating inflationary pressures. Domestic debt has a more significant negative impact on output and economic growth, while external debt can have less immediate adverse effects. The findings underscore the complexity of debt-economic indicators and the need for careful debt management and prudent fiscal policies for sustainable economic growth. The government's heavy reliance on domestic borrowing results in higher interest rates, which discourages private businesses from investing in new projects and expansion thereby hampering private investment in the Nigerian economy.

The study found a negative correlation between Nigeria's output and public debt, suggesting that higher levels may hinder economic growth. The study also found mixed effects on private consumption and investment, with domestic debt decreasing private investment and foreign debt positively impacting private investment. Domestic debt stimulates private spending, while foreign debt may stimulate private investment but negatively impact private consumption. The study emphasizes the importance of distinguishing between domestic and foreign debt types in understanding their effects on macroeconomic variables. The study upholds the proposition of the debt sustainability framework (DSF) which highlights the need for prudent fiscal management to balance public investment with debt accumulation risks. The findings of the study imply that both domestic and external debts increase demand for private consumption and investment, leading to higher interest rates and inflation. This is done with the aim of achieving an increased level of output by employing two-stage least squares (2SLS) which has the potential to address endogeneity issues in regression. According to the study, there is no discernible long-term relationship between public debt and private consumption in accordance with debt sustainability framework (DSF) which assesses the long-term sustainability of public debt. This implies that rise in public debt have no effect on expenditures for private consumption. It can also be inferred that, with careful management, external debt can lower interest rates; however, this effect is contingent upon loan conditions, the stability of foreign exchange rates, and worldwide economic circumstances.

To sustain stable interest rates and foster economic growth, Nigeria needs to strike a balance between

its external and domestic debt. As a result, domestic debt in Nigeria has a greater influence on interest rates since government borrowing raises rates and displaces private sector borrowing. Also, encouraging public–private partnerships and fostering a competitive business environment through regulatory reforms, infrastructure development and investor–friendly policies can stimulate private sector activity despite government debt.

### IMPLICATIONS

The findings of the study imply that both domestic and external debts increase demand for private consumption and investment, leading to higher interest rates and inflation. This is done with the aim of achieving an increased level of output by employing two–stage least squares (2SLS) which has the potential to address endogeneity issues in regression. According to the study, there is no discernible long–term relationship between public debt and private consumption in accordance with debt sustainability framework (DSF) which assesses the long–term sustainability of public debt. This implies that rise in public debt have no effect on expenditures for private consumption. It can also be inferred that, with careful management, external debt can lower interest rates; however, this effect is contingent upon loan conditions, the stability of foreign exchange rates, and worldwide economic circumstances. To sustain stable interest rates and foster economic growth, Nigeria needs to strike a balance between its external and domestic debt. As a result, domestic debt in Nigeria has a greater influence on interest rates since government borrowing raises rates and displaces private sector borrowing, raising the cost of borrowing.

To improve the investment climate, regulatory reforms, infrastructure development, and investor–friendly policies can stimulate private sector activity despite government debt. Encouraging public–private partnerships and fostering a competitive business environment can also attract investment and drive economic growth. The study highlights the need for Nigerian policymakers to balance public debt, improve debt management practices, and implement structural reforms to mitigate its adverse effects and promote sustainable economic growth.

### LIMITATIONS AND FUTURE DIRECTIONS

The study is limited to the impact of public debt on macroeconomic variables in Nigeria using two–stage least square (2SLS) technique. Future research could use scenario analysis or stress testing to evaluate public debt management strategies’ resilience to external shocks, thereby improving policymakers’ preparedness for adverse events. While, this thesis provides important insights into the impact of public

debt on macroeconomic variables in Nigeria, several limitations present opportunities for future research. The research concentrates specifically on Nigeria, which may limit the generalizability of the findings to other countries with distinct economic structures, institutional frameworks, and debt dynamics. Macroeconomic environment and policies are not static they change over time. The findings of this research may be more applicable to the specific time studied and may not fully represent long-term trends or future developments. Continuous changes in fiscal and monetary policies can have serious effects on macroeconomic variables, making it tough to separate the effect of public debt alone. Differences in institutional quality, such as governance, corruption, and bureaucratic efficiency, can influence how public debt impact the economy, increasing complexity to the analysis. Addressing these limitations can improve the robustness and comprehensiveness of the findings.

Also, research on Nigeria's public debt can help understand its macroeconomic effects and inform policy decisions. Future studies could include key areas such as debt sustainability and fiscal policy, debt composition and economic growth, debt servicing and budgetary constraints, debt, inflation, and monetary policy, and debt, exchange rates, and external vulnerabilities. These areas can help assess how fiscal policies can be adjusted to ensure debt sustainability and macroeconomic stability, and how high levels of public debt influence monetary policy decisions and central bank independence. Additionally, understanding the role of exchange rate policies in mitigating external debt risks and maintaining external sector stability is crucial.

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