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Empirical Analysis of The Impact of Public Debt on Macroeconomic

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Abstract:

This study investigates the impact of public debt on Nigeria's macroeconomic indicators, including real gross domestic product (RGDP), unemployment (UNEM), interest rate (INTR), and inflation rate (INFR), from 1980 to 2020. The study utilises the autoregressive distributed lag (ARDL) bounds testing approach for cointegration, and the nonlinear autoregressive distributed lag (NARDL) bounds testing approach. The cointegration analysis reveals a notable symmetric and asymmetric cointegrating relationship, both in the long run, between public expenditure (both external and domestic) and the chosen macroeconomic variables. In addition, the ARDL model demonstrates that Domestic Debt (DD) raises national output but reduces UNEM and INFRs significantly in the long term. However, the results suggest that External Debt (ED) raises UNEM and INTR in the country in the long term. The NARDL model indicates that the positive component of DD raises national output. The study reveals that both domestic and ED have long-term effects on national output, with negative debt reducing UNEM and INTR, and positive ED reducing inflation. Given these results, the federal government should decrease excessive borrowings due to their detrimental impact on macroeconomic indicators in the short and long run. Generate more revenue through tax increment rather than borrowing, diversify the economy into areas like agriculture and mining rather than depending on oil and borrowing, and reduce the leakages (corruption) in the system through effective and efficient use of the anti-graft agencies in Nigeria.

Keywords: *Public Debt; External Debt; Domestic Debt; Real Gross Domestic Product; Unemployment Rate; Interest Rate; Inflation Rate*

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1. Introduction

The issue of public debt is a persistent and global economic challenge that transcends regional boundaries. Historically, the accumulation of sovereign debt can be traced back to the first wave of financial globalization between 1880 and 1913—a period characterized by the gold standard and robust international capital flows that promoted economic growth and moderated debt ratios (Abbas et al., 2010; Aybarç, 2019). However, global shocks such as the World Wars and the Great Depression reversed this trend, compelling many nations to increase borrowing significantly to finance wartime expenditures and post-war reconstruction.

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Since 1946, public debt levels have escalated worldwide, driven by development ambitions, reconstruction needs, and frequent global financial crises (Chen et al., 2018). The implications of excessive debt on macroeconomic performance have led to the development of various theoretical frameworks, including Keynesian views on counter-cyclical fiscal policy (Keynes, 1936), and more contemporary performance assessments like the Economic Performance Index (EPI) by the IMF (Khramov & Lee, 2013).

In Africa, the post-independence era of the 1960s was marked by developmental optimism. Newly sovereign countries such as Nigeria undertook massive borrowing to expand infrastructure and public services, which initially spurred economic growth (Omotoye et al., 2006; Magaji, 2000). However, growth was short-lived. Many African nations, including Nigeria, faced economic stagnation by the late 1970s, driven by external shocks and poor fiscal management (Ebi & Imoke, 2017). Nigeria's debt burden became particularly concerning, even after initiatives such as the Heavily Indebted Poor Countries (HIPC) program and the 2006 Paris Club debt relief. Between 2006 and 2020, the country's debt stock rose from ₦2.2 trillion to ₦32.9 trillion, fueled by revenue volatility, exchange rate depreciation, and structural budget deficits (Debt Management Office, 2016; 2019; 2020).

The persistent increase in public debt—despite relief efforts—raises pressing concerns about fiscal sustainability and long-term economic performance. While public borrowing is often seen as a tool for development, the outcomes remain debatable in resource-dependent economies such as Nigeria. High unemployment, inflation, and poor infrastructure continue to plague the economy despite rising debt (Chukwuka & Mma, 2019; Jude, 2020; Dikeogu, 2018). Furthermore, debt servicing costs have soared, with Nigeria's debt-service-to-revenue ratios far exceeding IMF-recommended benchmarks (Ogbonna et al., 2019).

Empirical evidence on the debt-growth relationship in Nigeria presents mixed results. While some studies find a negative or insignificant impact of rising debt on growth (Adam et al., 2016; Didia & Ayokunle, 2020), others argue for a nuanced, threshold-based or nonlinear relationship (Sanus et al., 2019; Veiga et al., 2014). Many of these works, such as those by Adam and Bankole (2000), Akinkunmi (2017), and Benjamin et al. (2020), focus primarily on the aggregate effect of total debt on GDP, often neglecting the distinct effects of external versus domestic debt. In addition, few studies have addressed the transmission channels of debt through inflation, unemployment, or interest rate volatility (Idenyi et al., 2016; Iwedi, 2020).

Some researchers highlight the role of institutional weaknesses, such as corruption, in exacerbating debt mismanagement and undermining public finance outcomes (Matthew & I.O.A., 2016). Moreover, studies like Rafindadi (2012) and Sanusi (2002) have drawn attention to Nigeria's inability to translate growth into employment—a phenomenon known as "jobless growth." These structural problems are compounded by macroeconomic vulnerabilities and poor public expenditure efficiency (Essien et al., 2016).

From a methodological standpoint, many existing studies rely on linear models, which may be inadequate for capturing the asymmetric or nonlinear effects of debt under

volatile fiscal conditions. Recent advances recommend using nonlinear ARDL frameworks and asymmetric cointegration models to better capture these complexities (Shin et al., 2014; Perron, 1997).

This study seeks to bridge these gaps by offering a comprehensive and differentiated analysis of public debt's impact on macroeconomic performance in Nigeria. Specifically, it distinguishes between external debt (ED) and domestic debt (DD) and evaluates their separate and combined effects on key macroeconomic indicators, including Real GDP (RGDP), Inflation Rate (INFR), Interest Rate (INTR), and Unemployment Rate (UNEM). By adopting a multidimensional and nonlinear approach, this study not only provides empirical clarity but also enhances understanding of debt sustainability and economic planning in a resource-dependent context.

In contrast to earlier works that often isolate GDP growth as the only dependent variable, this study adopts a holistic lens—one that incorporates inflation, employment, and interest rates—to understand the full macroeconomic burden of rising public debt. Through this approach, the study contributes to the growing literature on public debt and economic performance, while offering practical, evidence-based recommendations for policymakers tasked with managing Nigeria's fiscal future.

2. Theoretical Background

The Concept of Public Debt

Public debt, as defined by Aybarç (2019), is the legal responsibility of a government to repay borrowed funds—both principal and interest—within a stipulated period to individuals or entities with specific rights. It represents the total financial obligations a government accumulates by borrowing from domestic or international sources. Similarly, Chen et al. (2018) describe debt as the act of obtaining funds from external entities to facilitate expenditures that exceed current resources.

Idenyi et al. (2016) explain that public or national debt includes all amounts borrowed by federal, state, and municipal governments. It encompasses liabilities owed to private institutions, other governmental bodies, and foreign entities. According to Idenyi et al. (2016), public debt may also cover future obligations such as pensions or credit-based acquisitions of goods and services.

Veiga et al. (2014) further clarify that public debt refers to a government's financial obligations to external parties. It is considered internal when transactions are conducted within the domestic market, and external when involving international creditors, regardless of the currency or nationality involved.

Macroeconomic Performance

Macroeconomic performance refers to how well a country achieves key economic policy goals such as stable prices, sustainable growth, and employment. According to Rafindadi (2012), it reflects the capacity of policymakers to provide services that

support quality of life through stable real GDP per capita, low inflation, low unemployment, and a healthy balance of trade.

Khramov and Lee (2013) note that economic development involves more than GDP growth. They observed that while many developing countries achieved strong economic growth in the 1950s and 1960s, this did not translate to improved living conditions. Issues like poverty, illiteracy, and weak healthcare persisted. For example, Nigeria's 2010 GDP rebasing made it the largest economy in Africa, yet issues like poverty, unemployment, and inadequate infrastructure remained widespread.

Keynesian Theory of Public Debt

The Keynesian theory, originating from John Maynard Keynes (1936), emphasizes the positive role public debt can play in stimulating economic growth, especially during downturns. Contrary to classical views that regard public debt as harmful, Keynes argued that government borrowing can fill gaps in private sector demand, increasing employment and output.

According to Hoogduin and Wierts (2012), Keynesian theory suggests that the economy can return to full employment through increased effective demand—even in a state of equilibrium with unemployment. Keynes maintained that when the private sector fails to utilize resources, government borrowing—through deficit spending—can mobilize them.

Filip (2010) supports the view that public debt can increase private consumption and positively affect macroeconomic indicators such as output and unemployment. Government borrowing thus acts as a fiscal tool to stimulate aggregate demand.

Matthew and Mordecai (2016) argue that public borrowing, when well-utilized, significantly boosts economic performance by supporting infrastructure development and investment, both of which contribute to long-term growth. According to Keynesian principles, such borrowing is not only necessary but beneficial for national development, especially in times of recession.

Precious (2015) asserts that public debt should be viewed as a national asset rather than a burden, particularly in developing economies where infrastructure gaps and underemployment persist. Persistent deficit spending is seen as essential for achieving full employment and long-term economic growth.

Empirical Review

Benjamin et al. (2020) investigated the relationship between external debt and economic growth across 43 African countries from 2001 to 2018 using the Johansen Cointegration Test and System GMM. They found a long-term equilibrium relationship between external debt and growth, emphasizing the need for strategic debt allocation and monitoring mechanisms to ensure effective utilization.

Iwedi (2020) analyzed the impact of public debt on inflation in Nigeria from 1960 to 2016 using Granger Causality tests. The study found that domestic debt significantly drives inflation, confirming its direct effect on the general price level.

Akingbade and Nicholas (2020) examined state debt and inflation in Ghana from 1983 to 2018 using inflation as the dependent variable. Their study showed that increases in public debt are linked to inflationary pressures, particularly when debt is used inefficiently.

Jude (2020) assessed whether public debt can reduce unemployment in Nigeria from 1981 to 2019 using the VECM method. The study concluded that public debt has not effectively reduced unemployment due to issues like corruption and inefficient use of borrowed funds.

Essien et al. (2016) studied the relationship between public sector borrowing, interest rates, prices, and output in Nigeria from 1970 to 2014. Using VAR and impulse response analysis, they found that foreign debt tends to raise interest rates in the short term, but public debt overall had limited long-term effects on price levels and output. Dikeogu (2018) employed the ARDL method to assess the impact of government expenditure on inflation in Nigeria between 1980 and 2017. His findings suggested that both capital and recurrent expenditures had a minimal and statistically insignificant effect on inflation, despite large borrowing levels.

James et al. (2016) explored how domestic debt influenced economic performance in Nigeria from 1970 to 2013 using the OLS method. Their results indicated that while domestic debt had a negative but insignificant effect on growth, it did contribute to inflation and unemployment. They recommended more efficient debt management strategies to channel funds toward productive investments.

3. Methodology

Research Design
This study employed an analytical and descriptive research design to investigate the correlations between public debt and macroeconomic performance factors. The study utilised the Linear ARDL model and the Nonlinear NARDL model. The ARDL model is a dependable technique for detecting cointegrating correlations in limited datasets, irrespective of the integration order of the regressors. The NARDL model, an extension of ARDL, is employed to investigate an asymmetrical association between the dependent and explanatory variables. The NARDL model utilises partial sum decompositions to establish long-term and short-term links.

Model Specification
The Keynesian theory of public debt is based on effective demand. That is demand back-up by the ability to pay. Aggregate demand equates to aggregate supply (public debt assumed full employment). According to Keynes, government expenditure is essential to raise aggregate demand, leading to economic performance, especially in UNE and under-employment. The Keynesian model of aggregate demand (Y) is

determined by consumption (C), Investment (I), and government expenditure (G) (Keynes, 1935). When a closed economy is assumed, the equilibrium equation for Y is:

$Y = C + I + G$

The G in the above equation represents autonomous government expenditure and can be financed by borrowing domestically from the public at the nominal INTR.

The equation can be expanded when the government transacts business outside its economy. That is when the external sector is introduced. The positive or negative net exports are the difference between exports and imports (X – M). Where X is the export while M is the import and can be added to equation 3.1 as follows:

$Y = C + I + G + (X – M)$

To achieve the objectives of this study, a modified version of Didia and Ayokunle's (2020) model that examined the relationship between Nigeria's public debt and GDP was used. Their model is as follows:

$GDP = f(DD, ED, V')$

Where:

GDP = Gross Domestic Product.
DD = Total Domestic Debt as a percentage of GDP
ED = Total External Debt as a percentage of GDP
V' = additional factors that affect GDP, like foreign aid, foreign direct Investment, government spending, export revenue, and debt services.

However, four functional forms of the models were created from equation (3.3) to the goals of this study:

Model one:

$$RGDP = \lambda_0 ED^{\lambda 1} DD^{\lambda 2} \quad \text{.....(3.4)}$$

Model one examines the impact of public debts on the economic growth in Nigeria.

Model Two:

$$UNEM = \alpha_0 ED^{\alpha 1} DD^{\alpha 2} \quad \text{.....(3.5)}$$

Model two examines the impact of public debts on the UNEM rate in Nigeria.

Model Three:

$$INTR = \beta_0 ED^{\beta 1} DD^{\beta 2} \quad \text{.....(3.6)}$$

Model Three examines the impact of public debts on INTR in Nigeria.

Model Four:

$$INFR = \phi_0 ED^{\phi 1} DD^{\phi 2} \quad \text{.....(3.7)}$$

Model four examines the impact of public debts on inflation in Nigeria.

Where:

RGDP = Real Gross Domestic Product
ED = External Debt
DD = Domestic Debt
UNEM = Unemployment Rate
INTR = Rate of Interest
INFR = INFR
U_t = Stochastic or Error Term

The apriori expectation is that: $\lambda_1 <$ or > 0, $\lambda_2 > 0$; $\alpha 1 <$ or > 0, $\alpha_2 > 0$; $\beta_1 > 0$, $\beta_2 > 0$

While $\phi_1 <$ or > 0, $\phi_2 > 0$

Techniques of Data Analysis
This study used the techniques of estimation, stationarity test, a test of heteroskedasticity, serial correlation, normal distribution, and cointegration to analyze the data.

Nature and Sources of Data
The study uses yearly time series data sets from 1980 to 2020, comprising 41 observations. The data set was obtained from reliable secondary sources, such as the Central Bank of Nigeria's (CBN) annual statistical bulletin, the Debt Management Office's (DMO) annual reports, the National Bureau of Statistics (NBS), the WB, the IMF, and the WDI (WDI). More precisely, the information on RGDP and INTR was obtained from the CBN bulletin. Moreover, the UNEM and INFR data were obtained from the NBS and the IMF publications. Finally, the Debt Management Office and World Bank were responsible for collecting both internal and EDs

4. Empirical Findings/Result

Data Presentation
The ARDLbounds testing method is used to evaluate the presence of cointegration through nonlinear analysis. The study employed the NARDLbounds testing approach to analyse the impact of public debt on various macroeconomic indicators (RGDP, unemployment, INTR, and INFR) in Nigeria. Following that, the hypotheses stated in the previous part are analysed, taking into account the projected result.

Statistical Analysis (Descriptive Statistics)
Descriptive statistics examines the variables' statistical properties, such as mean, maximum, minimum, and standard deviation. It also looks at the variables' distribution pattern to identify whether they are typically distributed.

Table 1. Descriptive Statistics

Variables	Mean	Std. Dev.	Skewness	Kurtosis	Jaque Bera	Max.	Min.
LRGDP	14.851	2.646	-0.294	1.651	3.702	18.190	10.700
UNEM	17.640	6.276	-0.345	4.098	2.873	33.300	0.000
INTR	21.936	6.440	-0.168	2.602	0.464	36.090	9.000
INFO	18.659	16.004	1.825	5.568	34.039	72.800	5.400
LDD	13.360	2.352	-0.244	1.889	2.519	16.820	9.020
LED	13.141	2.208	-0.961	3.298	6.457	16.360	7.530

Source: Author's computation extracted from E-views output (2023)

The descriptive statistics for the variables log of DD (LDD), log of foreign debt (LED), log of RGDP, UNEM rate, INTR, and INFR are presented in Table 1. The results suggest that the average logarithmic value of RGDP is 14.85. In contrast, the average unemployment, interest, and INFRs are 17.64%, 21.94%, and 18.66%, respectively. Furthermore, the findings suggest that the deviation of the variables from their average value is relatively minimal. The standard deviation of the RGDP log is

2.65. The standard deviations of the unemployment, interest, and INFRs are 6.28, 6.44, and 16.004, respectively. The analysis shows that the standard deviation of the logarithm of DD is 2.35, whereas the standard deviation of the logarithm of overseas debt is 2.21.

In addition, the skewness properties indicate the degree of distortion or asymmetry in the series distribution relative to its mean. It also reveals how much the distribution stretches towards the right or left tail. In this case, the INFR is right-skewed, as indicated by the positive value of the skewness properties. On the other hand, the other variables have a left-skewed distribution, indicating that their series has a longer right tail. Furthermore, this suggests that the variables' distribution is asymmetrical. In addition, the kurtosis characteristics of the series, which measure the degree of peakedness or flatness in the distribution of the series, indicate that all the variables deviated from a normal distribution due to dispersion away from their mean value. Specifically, the kurtosis qualities suggest that the logarithm of GDP, INTR, and the logarithm of DD exhibit a flat distribution rather than a bell-shaped distribution, typically associated with a normal distribution. On the other hand, the distribution of unemployment, INFR, and the logarithm of ED implies a peaked shape in the series. More so, based on the Jarque-Bera property, the results suggest that all the series, aside from the log of ED and INFR, are insignificant, thus indicating that the variables are not normally distributed.

Trend Analysis of the Variables

Having explored the summary statistics of the variables considered, the graphical representation of the movement of the variables, especially the relationship between the variables and domestic and EDs.

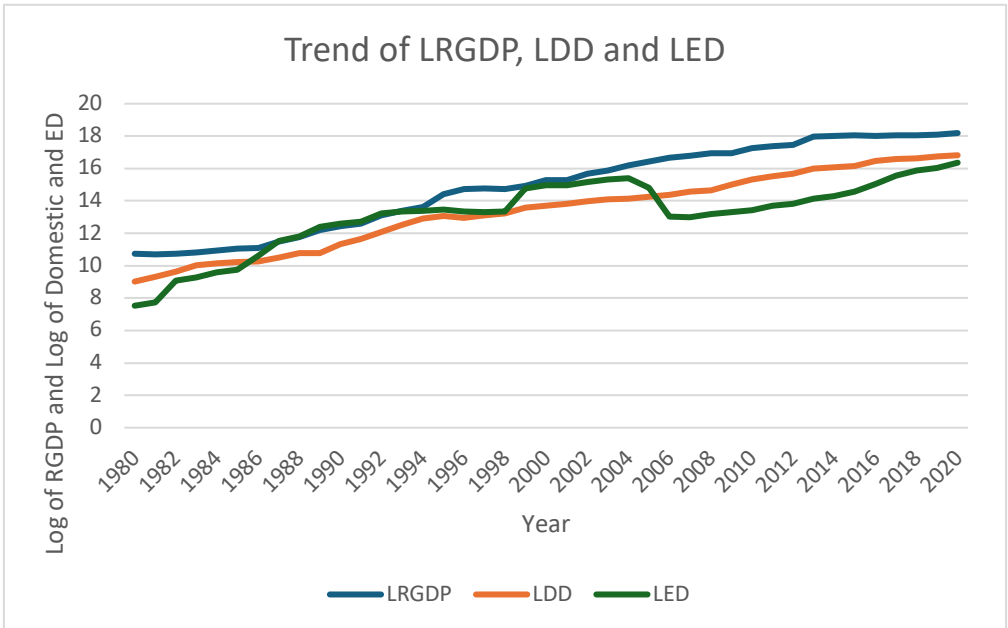

Figure 1. Trend of RGDP, LDD, and LED over 41 years in Nigeria
Source: Author's computation extracted from Excel output (2023)

The graphical depiction of the relationship between RGDP and public debt (external and DD) is presented in Figure 1. The trend suggests that the log GDP and the log of public debt (external and DD) co-move from the graphical illustration. For instance, between 1980 and 2006, Figure 4.1 indicates that public debt and GDP steadily rose. Though ED assumed a declining trend following the cancellation of Nigerian EDs, public debt, and RGDP continued to rise, especially from 2014 through 2020.

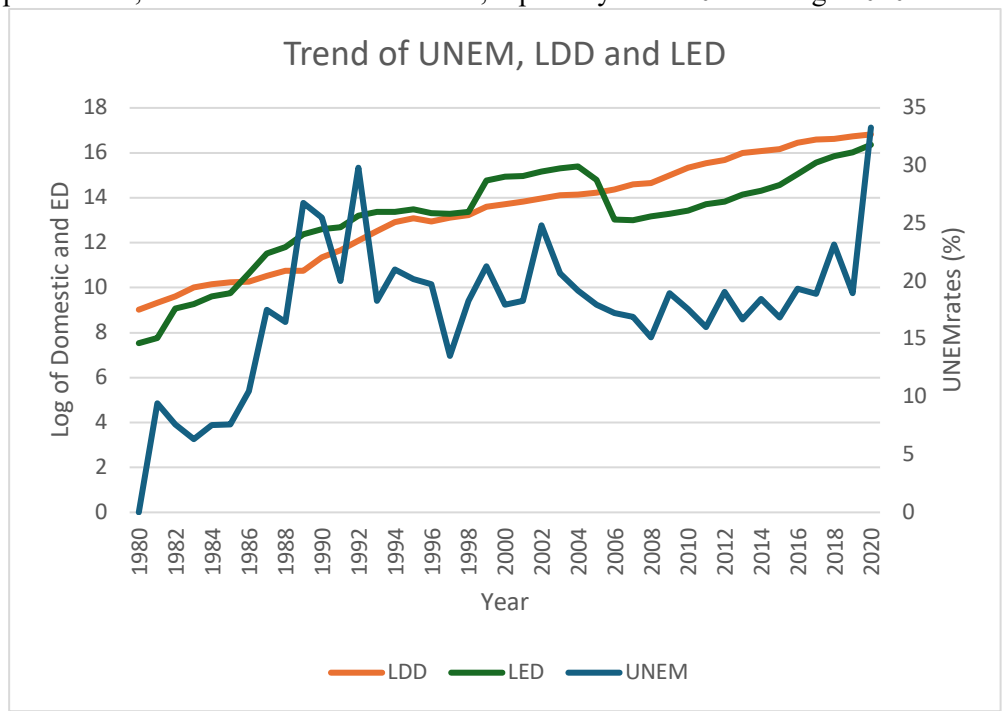

Figure 2. Trend of UNEM, LDD, and LED over 41 years in Nigeria
Source: Author's computation extracted from Excel output (2023)

With regards to the correlation between the UNEM rate and the logs of public debt (log of DD and log of ED), the trend indicates that while public debt (both external and DD) demonstrates a rising trend, UNEM has been fluctuating over time, rising sometimes and declining in other periods. Nonetheless, following the decline in public debt (ED) in 2006, UNEM significantly dropped from 24.85 percent in 2002 to 17.26 percent in 2006, and further to 16.94 percent in 2007 and 15.14 percent in 2008. Unfortunately, despite the country's rising trend of public debt, the UNEM rate was 33.3 percent.

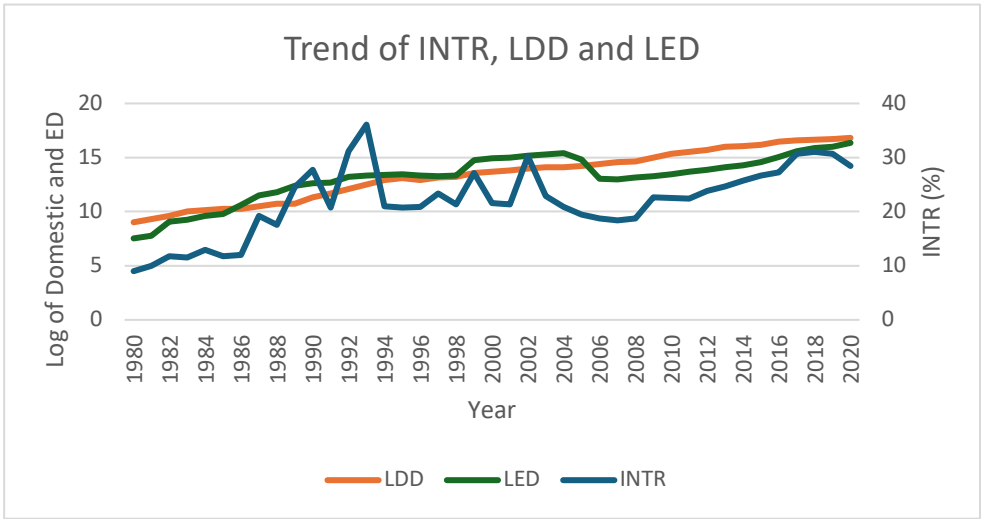

Figure 3. Trend of INTR, LDD, and LED over 41 years in Nigeria
Source: Author's computation extracted from Excel output (2023)

In addition, the trend of public expenditure (log of ED and log of DD) and INTR suggest an erratic movement in INTR despite the seemingly steady increase in public expenditure. However, both series assumed a similar movement. For instance, in most periods between 1989 and 1991 and from 1999 to 2008, the rise and fall in INTR are followed by an increase and decline in the log of public expenditure (domestic and external public debt). However, whereas the INTR declined from 30.72 percent in 2019 to 28.48 percent in 2020, public expenditure rose during the same period.

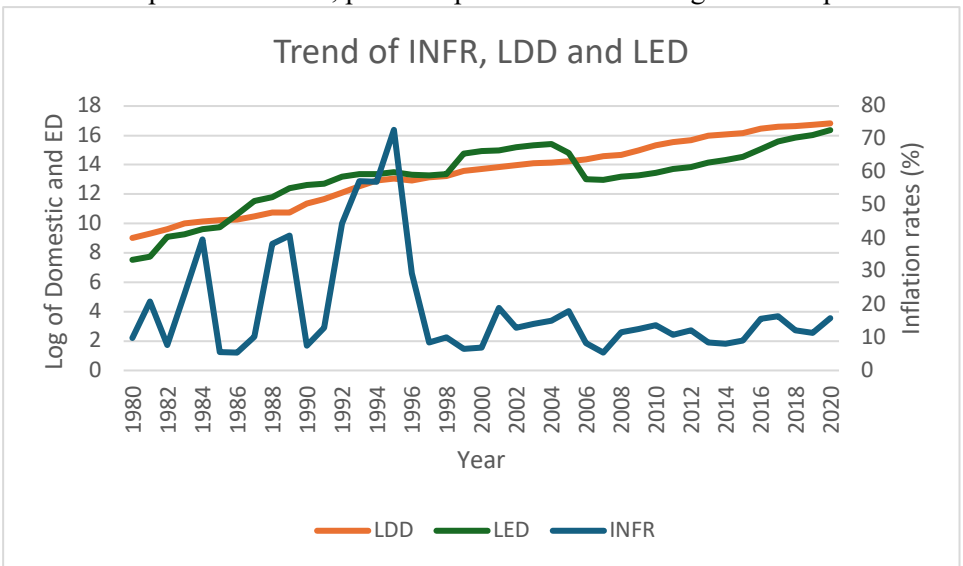

Figure 4. Trend of INFR, LDD, and LED over 41 years in Nigeria
Source: Author's computation extracted from Excel output (2023)

In terms of the INFR and the log of public debt (external and DD), the graphical depiction suggests that there is a proportionate relationship between inflation and

national debt in Nigeria. An increase in the general price level often accompanies a rise in public debt (external and DD).

Unit Root Test

After analysing the pattern and behaviour of the variables, the stationary characteristics of the series are taken into account prior to model estimation. This guarantees the inclusion of non-stationary series in the estimation, producing a false regression estimation outcome. In addition, as the ARDLbounds testing approach to cointegration and the NARDL techniques necessitate the regressors to have an integration order no higher than 1, it was only logical to perform unit root tests on the variables. In order to achieve this objective, the Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) tests are utilised. The ADF and PP unit roots test results are displayed in Table 2. The findings indicate that the logarithm of RGDP, unemployment, interest, and INFRs are stationary at this level. Regarding the log of external and DD, the unit root tests demonstrate that both series become stationary after being differenced once. This implies that estimates using variables at the same level will not conform to the standard distribution, and the problem of false regression is possible.

Table 2. Unit Root Tests Result

Variables	ADF			PP		
	Level	1st Diff.	Conclusion	Level	1st Diff.	Conclusion
LRGDP	3.199**	5.022**	I(0)	3.283**	5.043***	I(0)
UNEM	3.020**	3.262**	I(0)	3.024**	9.513**	I(0)
INTR	2.711*	7.013***	I(0)	2.579*	8.163***	I(0)
INFO	3.389**	6.129***	I(0)	3.091**	12.266***	I(0)
LDD	1.963	4.826***	I(1)	1.772	4.805***	I(1)
LED	2.482	4.461***	I(1)	2.389	4.461***	I(1)

Note: **** indicates significance at 1% level; ** significance at 5% level and * significance at 10% level*

Source: Author's computation extracted from E-views (2023)

Based on the unit root test outcomes, it is apparent that the variables fulfill the preconditions for adopting the ARDL and NARDL bounds testing approach to cointegration techniques. Therefore, the bounds testing approach within the ARDL and NARDL models can then be implemented, after which the ARDL and NARDL models are estimated.

Asymmetric Relationship Test

Before conducting limits testing and estimating the ARDL and NARDL models, the asymmetrical relationship between the variables is assessed using the Wald test. This is done to observe an asymmetrical relationship between the variables over an extended or brief period. The outcome of the unbalanced relationship is displayed in Table 3.

Table 3. Wald Test for Asymmetric Result

Model	Variables	Long – term		Short – term	
		T-Stat.	**F-Stat.**	**T-Stat.**	**F-Stat.**
1	**LDD & LED ± LRGDP**	12.838***	164.818***	12.838***	164.818***
2	**LDD & LED ± UNEM**	3.519**	3.308**	3.519**	2.308*
3	**LDD & LED ± INTR**	3.185***	10.144***	3.185***	10.144***
4	**LDD & LED ± INFR**	4.412***	4.169***	4.412***	4.169**

Source: Author's computation extracted from E-views Output (2023)

The results of the asymmetric relationship between the variables are recorded in Table 3. The Wald test results demonstrate a strong and statistically significant asymmetry association between the short-term and long-term variables. The findings demonstrate a notable and unequal correlation between public debt (both foreign and domestic) and the selected macroeconomic indicators (RGDP, unemployment, INTR, and inflation) at a statistically significant threshold of 1%, 5%, or 10%.

Results of ARDL Bound Testing approach to cointegration

Once the asymmetrical link between the variables has been determined, the existence or absence of cointegrating relationships can be determined using the limits testing approach within the ARDL and NARDL framework. The ARDL bounds testing results, as shown in Table 4, indicate the existence of a cointegrating (long-run) connection between RGDP and foreign and domestic public debt, unemployment, and public debt, as well as inflation and public debt. Nevertheless, the available evidence is inadequate to dismiss the null hypothesis that no cointegrating (long-run) link exists between INTR and public debt.

The findings provide sufficient evidence to reject the null hypothesis that no cointegration exists between all variables. This was tested using the limitations (Bound test) approach within the NARDL framework. Therefore, this demonstrates the symmetric and asymmetric connection between public debt and the chosen macroeconomic factors in the nation.

Table 4. ARDL and NARDL Bounds Testing Result

Model	**Dependent Variable(s)**	**Regressors**	**Symmetric (Linear)**	**Asymmetric (Nonlinear)**
1	**LRGDP**	LDD, LED	14.997***	4.496***
2	**UNEM**	LDD, LED	4.341**	12.814***
3	**INTR**	LDD, LED	2.486	9.362***
4	**INFR**	LDD, LED	6.904***	4.637***

Source: Author's computation extracted from Stata Output (2023)

Results of Residual Diagnostics

Table 5 displays the residual diagnostic outcomes for the Ordinary Least Squares (OLS) models' assumption. The study results are deemed reliable based on the residual diagnostic, which indicates that the residuals of our calculations follow a normal distribution and do not exhibit autocorrelation or heteroskedasticity issues. The test generally does not disprove the null hypotheses of non-normality, hence the absence of autocorrelation and homoscedasticity.

Table 5. Residual Diagnostic Test Result

Model	Normal Distribution	Serial Correlation	Heteroskedasticity
1	0.991	0.538	0.773
2	0.867	0.921	0.123
3	0.689	0.572	0.860
4	0.401	0.483	0.731

Source: Author's computation extracted from E-views output (2023)

Results of Model Stability

Table 6 displays the outcomes of the Ramsey RESET, CUSUM, and CUSUMQ tests. The Ramsey RESET test yielded a probability value of over 5 percent. This suggests that the model is well-specified, except for model 1, which exhibits a specification error. The stability of CUSUM and CUSUMQ is ensured as the probability value falls below the specified 5 percent threshold. The value is 0.05. Given these results, the policy advice derived from this study is justified.

Table 6. Stability Diagnostic Test Result

Model	Ramsey RESET	CUSTOM	CUSUMQ
1	0.039**	Stable	Stable
2	0.359	Stable	Stable
3	0.171	Stable	Stable
4	0.231	Stable	Stable

Source: Author's computation extracted from E-views output (2023)

Interpretation and Discussion of Results

Acquiring public debt aims to harness resources to finance the budget deficit and improve economic growth and development. However, further borrowing may endanger growth and development when debt reaches certain thresholds. The study examines the effects of public debt (LDD and LED) on national output, unemployment, INTR, and consumer price index (INFR) in Nigeria using Linear ARDL and Nonlinear NARDL models.

The Impact of Public Debt on National Output in Nigeria

The study's primary purpose is to examine the influence of public debt on the national output in Nigeria. The findings are displayed in the second column of Table 7.

Table 7. ARDL/NARDL Regression result

PANEL A (long-run and short-run ARDL results)				
Variables	*LRGDP*	*UNEM*	*INTR*	*INFO*
LDD	0.801***	-1.620**	0.008	-4.349*
LED	0.317	3.726***	2.564**	4.949
ΔLDD	-	5.781**	11.560***	4.601
$\Delta LDD(1)$	-	-	-	48.834***
ΔLED	-0.041	-	4.695***	-
ECT_{t-1}	-0.160***	-0.801***	-0.583***	-0.619***
R^2	0.287	0.482	0.573	0.553
$D-W$	1.881	1.679	1.972	1.812
PANEL B (long-run and short-run NARDL results)				
LDD^+	0.803***	-7.312***	-1.009	3.869
LDD^-	-7.864***	1.261***	4.737***	6.307
LED^+	0.034	7.994***	4.648***	-4.381*
LED^-	-0.177**	0.774*	2.442***	-1.976
ΔLDD^+	0.088	4.521*	6.485**	-9.577
ΔLDD^-	-2.321*	-5.159**	4.714**	6.081***
$\Delta LDD^+(1)$	-	-	14.179***	25.286***
$\Delta LDD^-(1)$	5.123***	-4.418**	-10.847***	5.797**
ΔLED^+	-	9.449***	12.026***	27.915***
ΔLED^-	-	-	3.561***	7.642**
$\Delta LED^+(1)$	-	-3.516***	-1.706	-20.630***
$\Delta LED^-(1)$	-	-	-2.210**	-
ECT_{t-1}	-0.741***	-0.528***	-0.847***	-0.348**
R^2	0.534	0.879	0.938	0.917
$D-W$	2.048	1.868	1.634	1.816

Notes: The estimation results for the long-term and short-term effects of the ARDL and NARDL models are presented in Panels A and B, respectively. The sign Δ denotes the operator referred to as the first difference. The asterisk symbols (*), (**), and (***) represent statistical significance at the 1 percent, 5 percent, and 1 percent levels, correspondingly. The superscripts "+" and "−" denote the positive and negative partial sums, respectively. The variable ECT_(t-1) denotes the value of the error correction term's coefficient in the preceding period. The abbreviation D-W stands for the Durbin-Watson statistic.
Source: Author's computation extracted from E-views output (2023)

The ARDL analysis in Panel A demonstrated that the lagged dependent variable (LDD) had a positive and statistically significant effect on Nigeria's long-run GDP (LRGDP). An increase in the LDD by a certain percentage would result in a corresponding increase of 0.80 percent in the LRGDP. This aligns with the theoretical expectations of the model and supports previous findings by Didia and Ayokunle (2020), Ifeanyi and Umeh (2019), Sanusi et al. (2019), Isibor et al. (2018), and Abula and Ben (2019). The year is 2016. In the long run, the LED has a positive but statistically insignificant effect on the LRGDP. However, it has a negative and insignificant influence in the short run. A one percentage point rise in the LED would lead to a long-term gain of 0.32 percentage points in the LRGDP and a short-term drop of 0.04 percentage points in Nigeria. This is in direct opposition to the theoretical

anticipation. Nevertheless, it aligns with the prior findings of Benjamin et al. (2020) and Tajudeen (2012).

Furthermore, panel B's asymmetric model indicates that the increase and decrease in LDD have a statistically significant positive and negative influence on the LRGDP in both the long-run and short-run, except for the short-run positive component. In Nigeria, a change in the LDD (Labour Demand and Development) would result in a corresponding rise or decrease in the LRGDP (Long-Run GDP). This change would amount to a 0.80 percent gain or a 7.86 percent decline in the long run and a 0.08 percent increase or a 2.32 percent decrease in the short run. According to the data, the negative factors of the LDD had a more significant influence on the LRGDP than the positive factors in both periods. Inferring that government policies to increase RGDP through DD are more conducive to increased national output than constraint. Likewise, the LED positive component inflates statistical insignificance, while the harmful component reveals a deflating statistically significant impact on Nigeria's LRGDP in the long run. A percent increase in the LED would bring about 0.03 percent appreciation and 0.18 percent depreciation in the LRGDP.

The Impact of Public Debt on Unemployment (UNEM) in Nigeria

The study's second goal is to analyze the impact of Nigeria's state debt on unemployment. The outcome of this study is presented in the third column of Table 8. The UNEM and public debt results demonstrate that LDD has an inverse and statistically significant influence on UNEM in the long run and a positive statistical significance in the short run, as reported in panel A. This means that a percentage appreciation in the LDD would lead to an average of 1.62 percent decrease in the UNEM rate in the long run and a 5.73 percent increase in the UNEM rate in Nigeria in the short run. The former contradicts the study's prior expectation, but similar findings were reported by Jude (2020), Ogonna et al. (2016), and Adams et al. (2016). They discovered that increasing domestic borrowing in Nigeria has a deteriorating effect on rising unemployment. DD in Nigeria has not contributed to reducing UNEM in any manner. The LED has a substantial and statistically significant influence on the UNEM. Specifically, a percentage rise in LED would result in a 3.73% enhancement in the UNEM rate in Nigeria during the study period. This indicates that the government's decision to increase ED has negatively impacted the UNEM rate in Nigeria. This is contrary to the anticipated outcome and may be attributed to the rampant corruption in the country, whereby a significant portion of the borrowed public monies is misappropriated for personal gain.

Table 8. ARDL/NARDL Regression Result

PANEL A (long-run and short-run ARDL results)				
Variables	*LRGDP*	*UNEM*	*INTR*	*INFO*
$\boldsymbol{LDD}$	0.801^{***}	-1.620^{**}	0.008	-4.349^{*}
$\boldsymbol{LED}$	0.317	3.726^{***}	2.564^{**}	4.949
$\boldsymbol{\Delta LDD}$	-	5.781^{**}	11.560^{***}	4.601
$\boldsymbol{\Delta LDD(1)}$	-	-	-	48.834^{***}
$\boldsymbol{\Delta LED}$	-0.041	-	4.695^{***}	-
$\boldsymbol{ECT_{t-1}}$	-0.160^{***}	-0.801^{***}	-0.583^{***}	-0.619^{***}
$\boldsymbol{R^2}$	0.287	0.482	0.573	0.553

$\boldsymbol{D-W}$	1.881	1.679	1.972	1.812
PANEL B (long-run and short-run NARDL results)				
$\boldsymbol{LDD^{+}}$	0.803***	-7.312***	-1.009	3.869
$\boldsymbol{LDD^{-}}$	-7.864***	1.261***	4.737***	6.307
$\boldsymbol{LED^{+}}$	0.034	7.994***	4.648***	-4.381*
$\boldsymbol{LED^{-}}$	-0.177**	0.774*	2.442***	-1.976
$\boldsymbol{\Delta LDD^{+}}$	0.088	4.521*	6.485**	-9.577
$\boldsymbol{\Delta LDD^{-}}$	-2.321*	-5.159**	4.714**	6.081***
$\boldsymbol{\Delta LDD^{+}(1)}$	-	-	14.179***	25.286***
$\boldsymbol{\Delta LDD^{-}(1)}$	5.123***	-4.418**	-10.847***	5.797**
$\boldsymbol{\Delta LED^{+}}$	-	9.449***	12.026***	27.915***
$\boldsymbol{\Delta LED^{-}}$	-	-	3.561***	7.642**
$\boldsymbol{\Delta LED^{+}(1)}$	-	-3.516***	-1.706	-20.630***
$\boldsymbol{\Delta LED^{-}(1)}$	-	-	-2.210**	-
$\boldsymbol{ECT_{t-1}}$	-0.741***	-0.528***	-0.847***	-0.348**
$\boldsymbol{R^{2}}$	0.534	0.879	0.938	0.917
$\boldsymbol{D-W}$	2.048	1.868	1.634	1.816

Notes: The estimation results for the ARDL and NARDL models are provided in Panel A and B, respectively, including both long-run and short-run effects. The symbol Δ represents the operator known as the first difference. The asterisk symbols (*), (**), and (***) indicate statistical significance at the 1 percent, 5 percent, and 1 percent levels, respectively. The superscripts "+" and "−" indicate positive and negative partial sums, respectively. The variable ECT_(t-1) represents the coefficient of the error correction term from the previous period. D-W refers to Durbin-Watson, a statistical test used to detect autocorrelation in regression analysis.

Source: Author's computation extracted from E-views output (2023)

Moreover, the influence of the positive aspect of LDD on UNEM is statistically significant, both in the long term and in the short term. An increase in the LDD by a certain percentage would decrease the UNEM by 7.31 percent over a long period. This finding further substantiated the theoretical framework of the current investigation. Furthermore, the long-term effect of the adverse aspect of LDD on the UNEM is substantial. A decline in the LDD by a certain percentage would result in a corresponding INFR of 1.26 percent on the UNEM in Nigeria in the long term. The conclusion implies that DD significantly influences reducing unemployment, as its inflation has a more significant effect on the UNEM than the partial deflation total. However, the positive component of the LED has a considerable and scientifically proven influence on the UNEM. A change in the LED would result in an average long-term appreciation of 7.99 percent and a depreciation of 0.77 percent in the UNEM rate. In the immediate term, the favourable aspect of the LED had a growing and statistically significant influence on the UNEM. A 9.45% rise in the LED would result in a corresponding 9.45% increase in the UNEM.

The Impact of Government Borrowing on the Interest Rate (INTR) in Nigeria

Furthermore, the study aims to analyse the influence of government borrowing on INTR in Nigeria. The regression outcome is displayed in the fourth column of Table 9.

In panel A, it was found that both in the long and short run, the LDD and LED have a beneficial influence on INTR. The effect of LED is statistically significant in both the long and short run. However, it is not significant for LDD in the long run. For example, a percentage increase in LDD would result in a 0.01% increase in the INTR rate in the long term and an 11.56% increase in the short term in Nigeria. This aligns with the anticipated outcome of the model and is corroborated by prior research conducted by Justus et al. (2018), Asma and Kashif (2017), Osuka and Achinihu (2014), Ebi et al. (2013), and Kolawale (2013).

Similarly, a proportional growth in the LED would increase the INTR by 2.56 percent in the long run and 4.70 percent in the short run. This is consistent with the anticipated outcome of the model and the prior research conducted by Idowu et al. (2018), Justus et al. (2018), Akinkunmi (2017), and Essien et al. (2016). Consequently, the INTR in Nigeria is adversely affected by the rise in both foreign and local borrowings.

Table 9. ARDL/NARDL Regression Result

PANEL A (long-run and short-run ARDL results)				
Variables	*LRGDP*	*UNEM*	*INTR*	*INFO*
$\boldsymbol{LDD}$	0.801***	-1.620**	0.008	-4.349*
$\boldsymbol{LED}$	0.317	3.726***	2.564**	4.949
$\boldsymbol{\Delta LDD}$	-	5.781**	11.560***	4.601
$\boldsymbol{\Delta LDD(1)}$	-	-	-	48.834***
$\boldsymbol{\Delta LED}$	-0.041	-	4.695***	-
$\boldsymbol{ECT_{t-1}}$	-0.160***	-0.801***	-0.583***	-0.619***
$\boldsymbol{R^2}$	0.287	0.482	0.573	0.553
$\boldsymbol{D-W}$	1.881	1.679	1.972	1.812
PANEL B (long-run and short-run NARDL results)				
$\boldsymbol{LDD^+}$	0.803***	-7.312***	-1.009	3.869
$\boldsymbol{LDD^-}$	-7.864***	1.261***	4.737***	6.307
$\boldsymbol{LED^+}$	0.034	7.994***	4.648***	-4.381*
$\boldsymbol{LED^-}$	-0.177**	0.774*	2.442***	-1.976
$\boldsymbol{\Delta LDD^+}$	0.088	4.521*	6.485**	-9.577
$\boldsymbol{\Delta LDD^-}$	-2.321*	-5.159**	4.714**	6.081***
$\boldsymbol{\Delta LDD^+(1)}$	-	-	14.179***	25.286***
$\boldsymbol{\Delta LDD^-(1)}$	5.123***	-4.418**	-10.847***	5.797**
$\boldsymbol{\Delta LED^+}$	-	9.449***	12.026***	27.915***
$\boldsymbol{\Delta LED^-}$	-	-	3.561***	7.642**
$\boldsymbol{\Delta LED^+(1)}$	-	-3.516***	-1.706	-20.630***
$\boldsymbol{\Delta LED^-(1)}$	-	-	-2.210**	-
$\boldsymbol{ECT_{t-1}}$	-0.741***	-0.528***	-0.847***	-0.348**
$\boldsymbol{R^2}$	0.534	0.879	0.938	0.917
$\boldsymbol{D-W}$	2.048	1.868	1.634	1.816

Notes: The estimation results for the ARDL and NARDL models are provided in Panel A and B, respectively, including both long-run and short-run effects. The symbol Δ represents the operator for calculating the initial difference. The asterisk symbols (*), (**), and (***) indicate statistical significance at the 1 percent, 5 percent, and 1 percent levels, respectively. The superscripts "+" and "–" indicate positive and negative partial sums, respectively. The variable ECT_(t-1) represents the coefficient of the error correction term from the previous period. D-W refers to the Durbin-Watson statistic.

Source: Author's computation extracted from E-views output (2023)

Once again, the findings in panel B demonstrate that both the positive and negative aspects of LDD and LED had a significant and positive influence on the INTR in both the short-term and long-term unless there was a negative and insignificant effect observed for the long-term LDD positive. The positive and negative components of the LDD have an impact the INTR. A percentage rise or decrease in these components would cause the INTR to fall or increase by 1.01% and 4.74% in the long run and increase by 6.49% and 4.71% in the short term in Nigeria. In addition, a proportional increase or drop in the positive and negative components of the LED would result in a 4.65% and 2.44% expansion of the INTR in the long term and a 12.03% and 3.56% increase in the short term in Nigeria.

The Impact of Government Borrowing on the Inflation Rate (INFR) in Nigeria

Ultimately, the study evaluates the influence of government borrowing on the INFR in Nigeria. Consequently, the outcome is displayed in the fifth column of Table 10 provided below.

Table 10. ARDL/NARDL Regression Result

PANEL A (long-run and short-run ARDL results)				
Variables	*LRGDP*	*UNEM*	*INTR*	*INFO*
$\boldsymbol{LDD}$	0.801***	-1.620**	0.008	-4.349*
$\boldsymbol{LED}$	0.317	3.726***	2.564**	4.949
$\boldsymbol{\Delta LDD}$	-	5.781**	11.560***	4.601
$\boldsymbol{\Delta LDD(1)}$	-	-	-	48.834***
$\boldsymbol{\Delta LED}$	-0.041	-	4.695***	-
$\boldsymbol{ECT_{t-1}}$	-0.160***	-0.801***	-0.583***	-0.619***
$\boldsymbol{R^2}$	0.287	0.482	0.573	0.553
$\boldsymbol{D-W}$	1.881	1.679	1.972	1.812
PANEL B (long-run and short-run NARDL results)				
$\boldsymbol{LDD^+}$	0.803***	-7.312***	-1.009	3.869
$\boldsymbol{LDD^-}$	-7.864***	1.261***	4.737***	6.307
$\boldsymbol{LED^+}$	0.034	7.994***	4.648***	-4.381*
$\boldsymbol{LED^-}$	-0.177**	0.774*	2.442***	-1.976
$\boldsymbol{\Delta LDD^+}$	0.088	4.521*	6.485**	-9.577
$\boldsymbol{\Delta LDD^-}$	-2.321*	-5.159**	4.714**	6.081***
$\boldsymbol{\Delta LDD^+(1)}$	-	-	14.179***	25.286***
$\boldsymbol{\Delta LDD^-(1)}$	5.123***	-4.418**	-10.847***	5.797**
$\boldsymbol{\Delta LED^+}$	-	9.449***	12.026***	27.915***
$\boldsymbol{\Delta LED^-}$	-	-	3.561***	7.642**
$\boldsymbol{\Delta LED^+(1)}$	-	-3.516***	-1.706	-20.630***
$\boldsymbol{\Delta LED^-(1)}$	-	-	-2.210**	-
$\boldsymbol{ECT_{t-1}}$	-0.741***	-0.528***	-0.847***	-0.348**
$\boldsymbol{R^2}$	0.534	0.879	0.938	0.917
$\boldsymbol{D-W}$	2.048	1.868	1.634	1.816

Notes: The estimation findings for the long-run and short-run effects of the ARDL and NARDL models are provided in Panels A and B, respectively. The symbol Δ represents the operator for calculating the

initial difference. The asterisk symbols (*), (**), and (***) indicate statistical significance at the 1 percent, 5 percent, and 1 percent levels, respectively. The superscripts "+" and "−" indicate positive and negative partial sums, respectively. The coefficient of the error correction term lagged by one period is denoted as ECT_(t-1). D-W refers to Durbin-Watson, a statistical test used to detect autocorrelation in regression analysis.
Source: Author's computation extracted from E-views output (2023)

The results in panel A suggest that the impact of LDD and LED on INFR is positive and not statistically significant in both the long run and short run, except for LDD, which shows a negative and statistically significant relationship in the long run. This is consistent with the previous studies undertaken by Iwedi (2020), Akingbade and Nicholas (2020), and Dikeogu (2018). This indicates that an increase in LDD by a certain percentage will lead to a 4.35% decrease in INFR in the long run and a 4.60% increase in INFR in Nigeria in the short term. Similarly, a proportional rise in the LED would lead to a 4.95% increase in the INFR in both the long and short term. The level of DD does not have an impact on Nigeria's INFR in the medium run. There are better metrics for calculating the INFR than foreign borrowing in Nigeria.

Panel B illustrates that the favourable and unfavourable factors of LDD have a beneficial impact on the INFR, but this effect is statistically insignificant in both the long and short term. Positive LDD has no significant short-term influence, whereas negative LDD has a big impact. The data suggests that a percentage increase or decrease in the positive and negative elements of the LDD would lead to a long-term increase of 3.87% and 6.31% in the INFR, as well as a short-term increase of 6.08% and a short-term decline of 9.58% in the INFR. In Nigeria, a slight increase or drop in the positive and negative elements of the LED would lead to a sustained fall of the INFR by 4.38% and 1.98%, respectively. In contrast, this would temporarily increase the INFR by 27.92% and 7.64%, respectively.

Furthermore, the adjustment rate, as indicated in panel A by the error correction term (ECT(-1)), is remarkably significant and consistently negative in all models. These findings indicate that the dependent variables respond to variations in the explanatory factors by approaching the long-term equilibrium level. The findings suggest a consistent relationship between the dependent and explanatory variables over a prolonged duration.

The coefficient of determination (R2) quantifies the extent to which the independent variable can account for the variation in the dependent variable. The explanatory variable explains 29% and 48% of the total variation in the dependent variable in models 1 and 2, respectively. This suggests that the model is not an appropriate fit, and the remaining 71 percent and 52 percent of the differences in the LRGDP and UNEM, respectively, cannot be ascribed to the LDD and LED in Nigeria. Models 3 and 4 show a significant association, as 57% and 55% of the variability in INTR and INFR in Nigeria, respectively, may be related to changes in the LDD and LED. All four models exhibit no autocorrelation, as evidenced by the Durbin-Watson statistic, with coefficient values equal to 2.

The ARDL results demonstrate that the LDD has a symmetrical/linear effect on UNEM and INFR in both the long and short term. Furthermore, over an extended period, LDD impacts LRGDP, but in the near term, it influences INTR. Conversely, LED has both long-term and short-term effects on UNEM and INTR.

Similarly, the rate of adaptation shown in panel B is highly significant and consistently negative in all the models. It can be inferred that the dependent variables slowly move toward the equilibrium level because of variations in the explanatory factors. The results further demonstrate a consistent relationship between the dependent and explanatory variables. The coefficient of determination (R2) measures the proportion of the total variance in the dependent variable that the independent variable can explain. The models have shown that LDD and LED significantly impact Nigeria's LRGDP, UNEM, INTR, and INFR, accounting for 53%, 88%, 94%, and 92% of the variation, respectively. The Durbin-Watson statistic demonstrates the absence of autocorrelation in all four models, as indicated by a coefficient value of 2 or near 2.

5. Discussions

This study examined the influence of both domestic debt (DD) and external debt (ED) on Nigeria's key macroeconomic indicators—real GDP (national output), inflation rate (INFR), unemployment rate (UNEM), and interest rate (INTR)—over the period 1980 to 2020. The research employed both the Autoregressive Distributed Lag (ARDL)bounds testing approach and the Nonlinear ARDL (NARDL) technique to explore cointegration relationships and asymmetric effects between variables.

The ARDL and NARDL results confirmed the existence of long-run cointegration among the variables, indicating that public debt—both domestic and foreign—has a persistent and long-term impact on macroeconomic performance in Nigeria. This aligns with Benjamin et al. (2020), who also found long-term relationships between public debt and economic growth across African countries, emphasizing the importance of managing debt effectively to support sustainable development.

The long-run estimates from the ARDL model revealed a positive and statistically significant relationship between domestic debt and real output, implying that when managed efficiently, domestic borrowing can stimulate economic activities and infrastructure investments that lead to higher GDP. This finding is supported by Matthew and Mordecai (2016) and Precious (2015), who argue that public borrowing—especially when directed toward capital formation and infrastructure—can enhance economic productivity and long-term growth.

Conversely, the short-run analysis showed that external debt has a diminishing but significant effect on real output, suggesting that while foreign borrowing might temporarily boost output, its long-term benefits may be limited if not allocated efficiently. This is consistent with Essien et al. (2016), who cautioned that external borrowing might increase short-term liquidity but often lacks sustained impact if misused or poorly managed.

The NARDL findings further revealed asymmetric effects: the positive component of domestic debt enhances output, while its negative component depresses it over time. A similar pattern was observed for external debt, indicating that the structure and purpose of debt utilization are crucial determinants of its economic impact.

Results showed that domestic debt has a deflationary (reducing) impact on unemployment, both in the short and long run. This suggests that when public borrowing is channelled into productive investments and employment-generating projects, it can effectively reduce joblessness—a result that supports Jude (2020), who emphasized the role of public debt in addressing unemployment, provided that corruption and inefficiencies are minimized.

In contrast, external debt demonstrated a statistically significant positive relationship with unemployment in the long run, implying that reliance on foreign borrowing—if not linked to domestic employment generation—may lead to rising unemployment. The NARDL model also revealed that both the positive and negative components of external debt significantly influence unemployment, reinforcing the importance of how borrowed funds are allocated and monitored.

These findings highlight the dual nature of debt: while domestic debt, when used productively, can create jobs, external debt may have adverse labour market implications unless tied to labour-intensive sectors. This aligns with concerns raised by Iwedi (2020) and James et al. (2016), who found that public debt—especially if poorly managed—could contribute to worsening unemployment and inflation.

The ARDL model demonstrated that domestic debt has a statistically significant and negative (deflationary) effect on inflation, indicating that such debt, when invested in productive sectors, may help stabilize prices. This is consistent with the findings of James et al. (2016) and Dikeogu (2018), who showed that domestic debt does not necessarily drive inflation, particularly when used for capital expenditure.

On the other hand, external debt was found to exert a statistically significant inflationary impact on interest rates, especially in the long term. This suggests that Nigeria's increasing reliance on foreign borrowing may place upward pressure on interest rates and price levels due to debt servicing obligations and exchange rate fluctuations, a point echoed by Essien et al. (2016).

The NARDL analysis confirmed that the negative shock in domestic debt leads to increased inflation, while the positive component helps reduce it, indicating an asymmetric influence. Similarly, external debt's harmful componentwas shown to elevate inflation, supporting the view that debt's macroeconomic outcomes are heavily dependent on whether it is used for consumption or productive investment (Khramov & Lee, 2013).

Both ARDL and NARDL estimations indicated that domestic and external debts have a significant and positive impact on interest rates in both the short and long term. This suggests that growing debt levels—regardless of origin—may crowd out private sector credit and increase the cost of borrowing, thereby raising interest rates. Essien

et al. (2016)support this, noting that spikes in external debt were often followed by increases in prime lending rates.

6. Conclusions

In conclusion, an asymmetric relationship was found among Nigeria's dependent and explanatory variables in both the long and short run. As a result of this, therefore, the following recommendations are made;

Given the adverse effect of public debts (external and DD) on macroeconomic variables considered in the short term, it is advised that the Federal Ministry of Finance should reduce the culture of borrowing to finance Nigeria's annual budget deficit. This will have to do with a significant rationalization of public expenditure, particularly the cost of governance to a sustainable limit. It is also recommended that the Federal Ministry of Finance look inward to generate more revenue through incremental taxes on luxury goods like tobacco and alcoholic drinks instead of borrowing, especially external borrowing. This is important because such an option often comes with a considerable cost, particularly with the depletion of the scarce external reserve to service the debts. It is important to emphasize that Nigeria's economy and the central government's income must be completely diversified away from crude oil into areas like agriculture and solid mineral mining. Undoubtedly, the volatility in oil prices contributes to the country's increasing trend of public debt.

In addition to diversifying the economy and increasing government revenue, the government must minimise corruption in the system by utilising the Economic and Financial Crime Commission (EFCC) and Independent Corrupt Practices and Other Related Offences Commission (ICPC) effectively and efficiently. This is because corruption is believed to cause revenue loss, leading to the need for borrowing to meet government obligations. Additionally, it is imperative for the Debt Management Office, the CBN, and the Federal Ministry of Finance, responsible for overseeing Nigeria's public debt, to maintain accurate records of debt payment obligations. It is crucial to ensure that the debt does not surpass a predetermined threshold, based on the debt-to-GDP ratio and debt service-to-revenue ratio, to prevent excessive debt burden.

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