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Domestic debt and economic growth nexus in Nigeria: An ARDL approach

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Abstract

This study examined the impact of domestic debt on economic growth in Nigeria for the period of 1980-2020 using autoregressive distributed lag (ARDL) model technique. Findings indicated that domestic debt has positive and significant impact on economic growth in the long run while interest rate and government capital expenditure on transfer were found to have a positive but insignificant impact on economic growth. Public debt servicing was found to have negative but significant impact on economic growth. In the short run, domestic debt, interest rate, and government capital expenditure on transfer were found to have negative and insignificant impact on economic growth while public debt servicing indicated positive but insignificant relationship. The study therefore recommends that borrowed fund should be channelled to productive sectors of the economy and more specifically in the real sector to create employment, reduce poverty and attract foreign direct investments.

Keywords: Domestic Debt, Economic Growth, Nexus, Nigeria, ARDL.

1. Introduction

The requisite to fund increasing government expenditure, conciliate budget deficits, and execute monetary policies has been discovered to be responsible for the fast increase in the stock of Nigeria's domestic debt (Abbas and Christensen, 2010). From 1980 to 2020, the ratio of domestic debt to gross domestic product (GDP) has been increasing as shown on figure 1 below. Even though Nigeria is not the only country experiencing the escalating levels of government domestic indebtedness, but when compared with other countries in sub-Saharan Africa, Nigeria's domestic debt-GDP ratio is clearly on the high side (Asogwa, 2005).

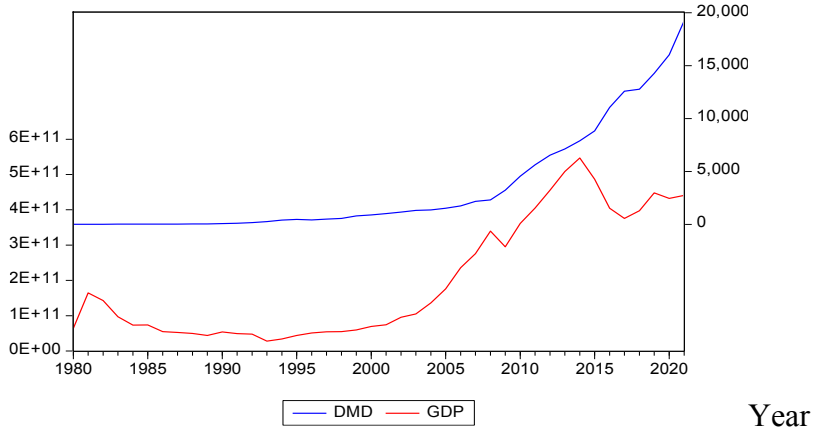

Figure 1: Ratio of Domestic Debt to GDP
Source: Author's computation using data obtained from WDI (2020).

According to Soludo (2003), countries take loans for two broad macroeconomic reasons: to meet up with higher investment, higher consumption (on education and health) and to finance temporary balance of payments deficits (to lower nominal interest rates abroad, lack of domestic long-term credit, or to overcome hard budget constraints). This implies that economies take loans to boost economic growth and reduce poverty. However, Soludo (2003) notes that once an initial stock of debt grow to a certain level, servicing it becomes a burden and countries find themselves in a position of high indebtedness.

The Nigerian Government utilises domestic debt to finance part of its expenditure. In principle, the state and local governments can also issue debt instruments, but their abilities to issue such, is limited by the resource at their disposal. The stock of government debt is calculated in relation to GDP in terms of nominal domestic debt structure as a percentage of total debt which has been rising tremendously over time (Asogwa, 2005).

Debt figures released by Nigeria's Debt Management Office (DMO) showed that Nigeria's domestic debt stock stood at about N1.86 billion in 1980. In 2015, it increased to about $43.185 billion or N7.25 trillion (DMO, 2015; Omoh, 2015), N10.606 trillion as at 30 June 2016 (DMO, 2016), and N20.144 trillion as at March 31, 2022 (DMO, 2022). As the debt profiles increase, the debt service charges for domestic debts as well as interest payable also increase. (DMO, 2022)

Economic growth is a continuous increase in a country's national output over a considerable period of time. Economic theory suggests that economic growth can be enhanced in a developing country by a reasonable level of borrowing. Peter et al, (2013) opines that a reduction in the level of poverty is likely to be achieved with an improvement in economic growth by at least 5% growth rate. Therefore, in order to encourage economic growth, developing countries like Nigeria take loans to augment what they have because of dominance of small capital stock; hence they are likely to have investment opportunities with rates of return higher than that of their counterparts in developed economies. This becomes effective as long as the loans taken and some internally generated revenues are properly utilized for investments that are productive and do not suffer from macroeconomic instabilities, policies that distort economic incentives, or sizable adverse shocks. Growth, therefore, is likely to increase and allow for timely debt repayments. When this trend is maintained for a period of time, growth will affect per capita income positively which is a necessary requirement for poverty reduction. These predictions are known to hold even in theories based on the more realistic assumption that countries may not be able to borrow freely because of the risk of debt denial (Pattillo, 2002).

According to World Bank and International Monetary Fund, IMF (2001), extensive use of domestic debt can have severe negative effects on the economy. Domestic debt service can consume a significant part of government revenues, especially given that domestic interest rates are higher than foreign ones. The cost of interest for domestic borrowing can escalate along with increases in the outstanding debt stock, especially in undeveloped financial markets. The increase in interest rates may likely be noticeable if the investor base is relatively narrow, since the government may be held captive by a particular group of investors.

Domestic debt servicing leads decline in private investment. When issuing domestic debt, governments use domestic private savings that would otherwise be available to private sector. This is usually followed by a rise in domestic interest rates, if these are flexible, adversely affecting private investment. However, even when interest rates are restrained, domestic borrowing can lead to credit rationing and lowering of

private sector investment (Fischer and Easterly, 1990).

This study is motivated by the fact that domestic debt has been one of the major macro-economic problems in Nigeria since 1980. The country's domestic debt has been rising despite the efforts being made by various administrations to manage and minimize its negative effects on the economy. The increasing domestic debt profile has affected the growth of the Nigerian economy with some of the identified factors as high budget deficit, low output growth, large expenditure growth and high inflation rate.

Therefore, what impact does domestic debt has on economic growth in Nigeria? is the major question of interest for this study.

The main objective of this study is to assess the impact of domestic debt on economic growth in Nigeria. Whereas the specific objectives are:

i. To examine the long run and short run relationship between domestic debt and economic growth in Nigeria.
ii. To examine the impact of public debt servicing and government expenditure on economic growth in Nigeria.

2. Literature Review

2.1 Conceptual Framework

2.1.1 Domestic debt

Domestic debts are component of total debts that originate from within a country. They are usually generated through debt instruments such as treasury bills, bonds and treasury certificates, development stocks and promissory notes (Anyanwu and Andrew, 2004).

Oshadami (2006) defines domestic government as the component of debt that is contracted through debt instruments issued by the monetary authority usually denominated in local currency. In principle, state and local government can also issue debt instrument, but that depends on the resources available for them to issue such. Debt instruments in Nigeria consist of treasury certificates, development stocks and treasury bonds. Out of these, treasury bills, treasury certificates and development stocks are marketable and negotiable while treasury bonds are not (Oshadami, 2006).

2.1.2 Economic Growth

Economic growth is a continuous increase in a country's national output over a considerable period of time. GPD as a measure of economic growth, like other macroeconomic indicators, can be expressed in both nominal and real terms. For real terms, nominal GDP is adjusted for the effects of inflation to provide a meaningful measure of growth over time (Atalay, 2015).

Jhingan, (2012) views economic growth as a quantitative sustained increase in the country's per capita output or income accompanied by expansion in its labour force, consumption, capital and volume of trade.

2.2 Theoretical Framework

2.2.1 The Keynesian Theory of Public Borrowing

Keynes views fiscal policy as the most suitable macroeconomic policy that leads to growth in any economy since it works in the interest of the general public (Jhingan, 2012).

According to Keynes, when the government embarks on taking internal loans to finance its development budget, unemployed funds are withdrawn from the private pockets and as such the consumption level of the private individuals is unaffected (Jhingan, 2012).

One of the most important macroeconomic objectives of every independent nation is to improve the standard of living of its citizens and to promote her economic well-being. To achieve sustenance in economic growth, a given level of capital and investment is required and, in a case, where it is not sufficient, government results in issuance of domestic debt instruments to raise capital for its investment purposes and thereby, increase the growth rate of the economy (Atalay, 2015).

2.2.2 Debt Cum-Growth Theory

The first stand of though in the debt cum-growth theory is to considered external debt as a substitute for domestic savings and investment. This is familiar with debt overhang theory which argued that foreign savings may be used for consumption rather than for investment. The burden of external debt is the concern of threshold school of thought which emphasizes the non-linear relationship between debt and growth (Jhingan, 2012).

This study adopted the Keynesian theory of public borrowing. This is because according to Keynes, when the Government increases its expenditure by borrowing from within the economy, total expenditure would increase. This leads to a multiple increase in output and hence employment. This according to Keynes is the multiplier effect of government expenditure (Jhingan, 2012). The theory will aid in achieving the main research objective of this study which is examining the impact of domestic debt on economic growth in Nigeria.

2.3 Empirical Literature Review

Various studies exploring the relationship between domestic debt and economic growth were reviewed. Abbas and Christensen (2007) investigated the impact of domestic debt on economic growth for 93 low-income countries from the period of 1975-2004 by applying Granger Causality Regression model. Result showed that moderate levels of domestic debt as a percentage of GDP had significant positive impact on economic growth, but debt levels exceeding thirty five percent of total bank deposits had negative impact on economic growth. This may likely be associated with the fact that majority of the low-income countries are having import dominated economy and are not producing most of the goods they consume and as such, outcome of the effort is shared with other external economies.

Similarly, Aminu et al. (2013) examined the impact of external and domestic on the growth of the Nigerian economy from 1970 to 2010, using ordinary least square (OLS). Findings revealed that external debt possessed negative impact on the economic performance of Nigeria While domestic debt possessed positive impact on economic growth through encouraging productivity and output level and on evolution of total factor productivity which also in line with theoretical postulations. This is also in line with findings of Peter et al (2013).

In same vein, Ozurumba and Kanu (2015) examined the impact of domestic debt on economic growth of Nigeria using multiple regression technique, and discovered that in the short-run, FGN Bond proved to have a positive significant relationship with economic growth, while development stock maintained a significant negative relationship. In the long-run, Treasury Bills and the lagged value of GDP variables were positively significant.

Onogbosele and Beni (2016) investigated the impact of domestic debt on economic growth in Nigeria from 1980 to 2015, using vector auto-regression model (VAR). Results of the study showed that domestic debt had positive impact on economic growth in Nigeria.

On the other hand, some scholars found a negative relationship between domestic debt and economic growth. Anyanwu and Andrew (2004) investigated the effect of domestic debt on economic growth in Nigeria, for the period ranging from 1970 to 2003. The results showed that domestic debt has a significant negative effect on economic growth due to high implicit domestic interest rate. The study recommended that Nigeria should open and improve access to holding domestic debt so as to strengthen competition.

In the same vein, Adofu and Abula (2010) investigated the relationship between domestic and economic growth in Nigeria from 1986 to 2005. Findings showed that domestic debt had affected the growth of the Nigerian economy negatively and recommended that taking internal debt

should be discouraged and Nigeria should instead concentrate on widening the tax revenue base.

The above findings are also in line with that of Ashraf and Chaudhary (2008), Ayuba and Mohammed (2019). Theory suggests that domestic debt should lead to economic growth, but some of the literatures reviewed above are having counterintuitive results. However, the negative findings may likely be associated with the improper utilization of the borrowed funds into. Also, Nigerian economy is import dominated where most of the goods consumed are imported and as such, outcome of the efforts are shared with other external economies.

Based on the literature reviewed above, it can be seen that some scholars found that domestic debt positively affects economic growth while others found that domestic debt impedes economic growth in Nigeria, therefore showing mixed results. Hence, this study narrows the gap by adding more explanatory variables such as; government capital expenditure on transfer and public debt service which are not common in the existing literature all in an attempt harmonizing the two categories of findings and come up with a more superior result.

3. Methodology

The study used secondary data ranging from 1980 to 2020 obtained from Central Bank statistical bulletin (2020) and World development Indicators (WDI), The variables used include; real gross domestic product (measured in billion naira) as the dependent variable, while domestic debt (measured in naira' billion), interest rate, measured in percentage (%), government capital expenditure on transfer (measured in naira' billion), and public debt serving (measured in naira' billion) are the independent variables.

3.1 Model Specification

The mathematical model could be symbolically expressed as:

$$RGDP = \beta_0 + \beta_1 DOD + \beta_2 INT + \beta_3 GCET + \beta_4 PDS \quad (1)$$

Equation (1) above is transformed into an econometric model by incorporating the disturbance term (μ) as follows:

$$RGDP = \beta_0 + \beta_1 DOD + \beta_2 INT + \beta_3 GCET + \beta_4 PDS + \mu \quad (2)$$

Logarithmic transformations are also a convenient means of transforming a highly skewed variable into one that is more approximately normal (Kenneth 2011).

The modified version of the model adopted for this study now takes the form:

$$\ln RGDP = \beta_0 + \beta_1 \ln DOD_t + \beta_2 INT_t + \beta_3 \ln GCTE_t + \beta_4 \ln PDS_t + \mu_t \quad (3)$$

3.2 Method of Data Analysis

3.2.1 Unit Root Test

The study employed the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root test to identify the order of integration of the variables under study to select appropriate methodology in order to avoid spurious regression.

3.2.2. The ARDL Methodology

The study employed the autoregressive and distributed lag model (ARDL) proposed by Pesaran, Shin and Smith (2001) to estimate the relationship between the variables. The model is therefore specified in unrestricted error correction form to test for cointegration relationship as follows:

$$\Delta \ln RGDP_t = \beta_0 + \sum_{i=1}^{k} \phi_i \Delta \ln RGDP_{t-1} + \sum_{i=0}^{k} \varphi_i \Delta \ln DOD_{t-1} + \sum_{i=0}^{k} \lambda_i \Delta INT_{t-1} + \sum_{i=0}^{k} \delta_i \Delta \ln GCET_{t-1} + \sum_{i=0}^{k} \gamma_i \Delta \ln PDS_{t-1} + \theta_1 \ln RGDP_{t-1} + \theta_2 \ln DOD_{t-1} + \theta_3 INT_{t-1} + \theta_4 \ln GCET_{t-1} + \theta_5 \ln PDS_{t-1} + \varepsilon_t \quad (4)$$

The inference here is that, if the computed F-statistic is greater than the upper bound critical value at 5%, there is said to be cointegration. If the computed F-statistic is less than the lower bound critical value at 5%, there is no cointegration. However, if the value of the computed F-statistic lies between the upper and the

lower critical values, then the inference is said to be inconclusive. Once cointegration relationship exists, the long-run model would be estimated as specified:

$$\ln RGDP_t = \beta_0 + \sum_{i=1}^{k} \theta_i \ln RGDP_{t-1} + \sum_{i=0}^{k} \theta_i \ln DOD_{t-1} + \sum_{i=0}^{k} \theta_i INT_{t-1} + \sum_{i=0}^{k} \theta_i \ln GCET_{t-1} + \sum_{i=0}^{k} \theta_i \ln PDS_{t-1} + \varepsilon_t$$

(5) Similarly, the short-run model of the error correction specification would be estimated to ascertain the short-run dynamic behavior of the variables in the model as:

$$\Delta \ln RGDP_t = \beta_0 + \sum_{i=1}^{k} \phi_i \Delta \ln RGDP_{t-1} + \sum_{i=0}^{k} \varphi_i \Delta \ln DOD_{t-1} + \sum_{i=0}^{k} \lambda_i \Delta INT_{t-1} + \sum_{i=0}^{k} \delta_i \Delta \ln GCET_{t-1} + \sum_{i=0}^{k} \gamma_i \Delta \ln PDS_{t-1} + \lambda ECT_{t-1} + \varepsilon_t$$

(6) Where the ECT in equation 5 is specified as:

$$ECT_t = \ln RGDP_t - \alpha_o - \sum_{i=1}^{k} \psi_i \ln RGDP_{t-1} - \sum_{i=0}^{k} \varphi_i \ln DOD_{t-1} - \sum_{i=0}^{k} \lambda_i INT_{t-1} - \sum_{i=o}^{k} \phi_i \ln GCET_{t-1} - \sum_{i=o}^{k} \partial_i \ln PDS_{t-1} \quad (7)$$

Lastly, this study diagnosed the model by conducting tests for serial correlation, heteroscedasticity, normality, and functional form. In addition, the study heeded the suggestion by Brown et al. (1975) by conducting cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) to assess how stable the model is along the sampled periods.

4. Results and Discussion

Table 4.1: Unit Root Test Using Augmented Dickey Fuller (ADF) & Phillips Perron (PP)

Variables	ADF Test Statistics				PP Test Statistics			
	Constant		Trend		Constant		Trend	
	Level	First difference	Level	First Difference	Level	First Difference	Level	First Difference
$lnRGDP_t$	0.750 (0.992)	-5.992 (0.000)***	-1.214 (0.895)	-6.372 (0.000)***	0.364 (0.979)	-5.266 (0.000)***	-1.078 (0.921)	-5.434 (0.000)***
$\ln GCET_t$	-8.450 (0.000)***	-6.518 (0.000)***	-4.531 (0.003)***	-6.467 (0.000)***	-8.622 (0.000)***	-15.611 (0.000)***	-8.460 (0.002)***	-14.657 (0.000)***
$\ln DOD_t$	-0.094 (0.944)	-4.717 (0.000)***	-1.718 (0.727)	-5.4342 (0.000)***	-0.214 (0.929)	-4.491 (0.000) ***	-1.962 (0.605)	-5.437 (0.000)***
$\ln PDS_t$	-1.579 (0.597)	-7.837 (0.000)***	-5.474 (0.000)***	-7.793 (0.000)***	-1.385 (0.581)	-7.679 (0.000) ***	-4.001 (0.015)**	-8.525 (0.000)***
$\ln INT_t$	0.560 (0.987)	-5.612 (0.000)***	-1.903 (0.639)	-5.751 (0.000)***	-0.304 (0.976)	-5.783 (0.000) ***	-1.992 (0.592)	-5.623 (0.000)***

***, ** and * Denotes 1%, 5% and 10% significance level respectively

From table 4.1 above, it can be seen that all the variables are stationary at first difference; (i.e RGDP, DOD, PDS and INT) are I(1) except (GCET) which is stationary at level I(0). Result of the optimal lag selection is presented on table 4.2 below:

Table 4.2:
Optimal Lag Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-200.8405	NA	0.124801	12.10826	12.33273	12.18481
1	-18.61436	300.1371*	1.22e-05*	2.859669*	4.206457*	3.318962*
2	-3.330651	20.67797	2.40e-05	3.431215	5.900327	4.273253

From table 4.2 above, the optimal lag was selected using the Schwarz Information Criterion and the optimum lag selected is lag 1. Result of the ARDL bounds test is presented on table 4.3 below:

Table 4.3: **Bounds Test Result**

Model	F-statistics	Lag	Level of significance	Bounds critical values Constant (Level) I(0)	I(1)
F($lnRGDP_t$|$lnDOD_t INT_t lnGCET_t lnPDS_t$)	**5.803703**	1			
			10%	1.9	3.01
			5%	**2.26**	**3.48**
			2.5%	2.62	3.9
			1%	3.07	4.44

From the table 4.3 above, result shows that the computed F-statistic is 5.803703 greater than the upper bound critical value at 5% significance level (3.48). This indicates the presence of cointegration relationship among the variables and therefore we could safely reject the null hypothesis of no co-integration among the variables. Having the discovered the evidence of cointegration, result of the long run ARDL is presented on table 4.4 below:

Table 4.4:
Estimated Long-Run ARDL Cointegration Results

Dependent Variable, InRGDP

Regressors	Coefficient	Std. Error	t-Statistic	Prob.
InΔDOD	2.264779	0.592649	3.821450	0.0006
ΔINT	0.094269	0.103053	0.914761	0.3672
InGCET	0.189164	0.417017	0.453613	0.6532
InΔPDS	-2.145150	0.587651	-3.650379	0.0009

The result from Table 4.4 reveals that domestic debt (InDOD) has a positive and statistically significant impact on economic growth in Nigeria in the long-run with the coefficient and the probability values of 2.264779 and 0.0006 respectively. A unit change in domestic debt would lead to 2.264779 unit increase in economic growth in Nigeria. Interest rate (INT) and government capital expenditure on transfer (InGCET) were also found to have a positive but insignificant impact on economic growth in Nigeria over the study period.

Result further indicates a negative but statistically significant relationship between public debt servicing (InPDS) and economic growth in Nigeria. To be specific, a unit increase in public debt servicing will lead to -2.145150 unit decreases in economic growth in Nigeria.

The R-squared of the model 0.993377 revealed that 99% of the proportion of the dependent variable has been explained by the explanatory variables, while only 1% of the variation is caused by the error term in the model. The Durbin Watson statistics is 1.55321 which indicates that the model is good fit; because it falls within the range of 1.5 and 2.5.

After establishing the long-run coefficient, the short-run model is estimated and the result is presented on table 4.5

Table 4.5: The Estimated Error Correction and Short-Run Model Results

Dependent Variable, InRGDP				
Regressors	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
$\Delta lnDOD_t$	-0.035701	0.024581	-1.452412	0.1561
ΔINT_t	-0.001486	0.002176	-0.683011	0.4995
$\Delta lnGCET_t$	-0.002982	0.005658	-0.527042	0.6018
$\Delta lnPDS_t$	0.033815	0.020476	1.651502	0.1084
ECT	-0.015764	0.008825	1.786231	0.0083

From table 4.5 above, finding reveals domestic debt (ΔlnDOD), interest rate(ΔINT) and government capital expenditure(ΔlnGCET) indicated negative and insignificant impact on economic growth in Nigeria. While public debt servicing (ΔlnPDS) had positive but insignificant impact on economic growth.

The error correction term (ECT) is negative, less than one (in absolute value) and significant. This confirms the earlier long run relationship among the series and also shows the speed of adjustment towards long run equilibrium to be 1% in the first year. The speed of adjustment is slow because only 1% of the short-term disequilibrium between the explained and the explanatory variables will converge to equilibrium in the long-run.

Table 4.6:
Diagnostic Test Results

Test Statistics	F(Prob)	Probability
Autocorrelation	F(2,22) = 0.266	0.6097
Hetroskedasticity	F(17,32) = 1.025	0.217
Normality	27.261	0.000
Stability	F(1, 23) = 0.894	0.352

The result of the diagnostic tests in table 4.6 above reveals that the Breusch-Godfrey LM test has probability value of 0.6097 which is greater than 5% and thus indicates that there is no serial correlation in the model. Breusch-Pagan Godfrey test for heteroskedasticity has a probability value 0.7778 is above 5% level of significance which shows that the model is homoskedastic. The probability value of the Jarque-Bera (normality) test is 0.00001 is significant because it is below 5% which indicates that the residuals in series are not normally distributed. The Ramsey RESET test for stability shows that the model is correctly specified because the probability value 0.3518 is insignificant. This means that the model is free from serial correlation, heteroskedasticity, and functional form problems. As such, the result of the model could be reliable. However, the model did not satisfy the requirement of the Ramsey-Reset test for stability which calls for further investigation.

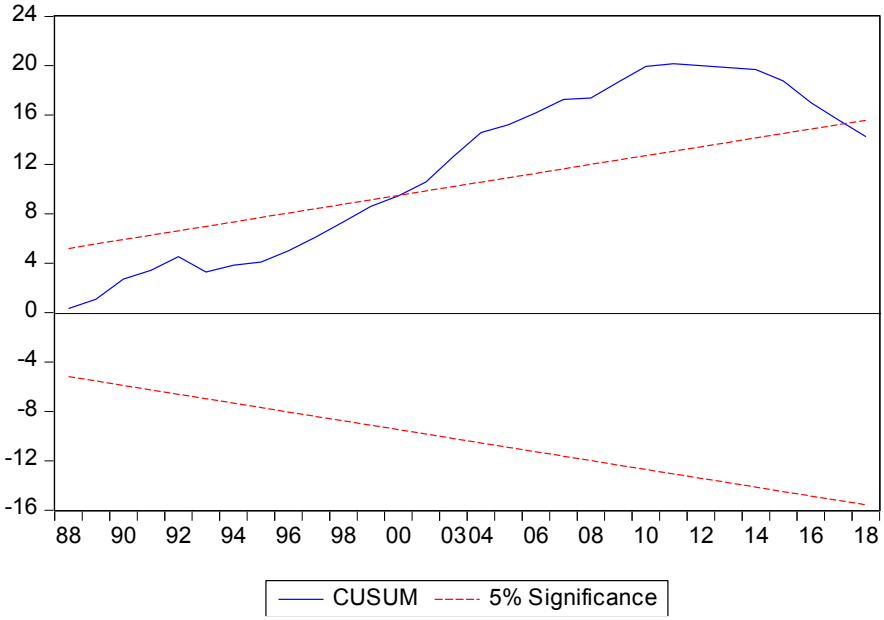

Figure 4.1: Plot of cumulative sum (CUSUM) of recursive residual.

The straight lines represent critical bounds at 5% significance level

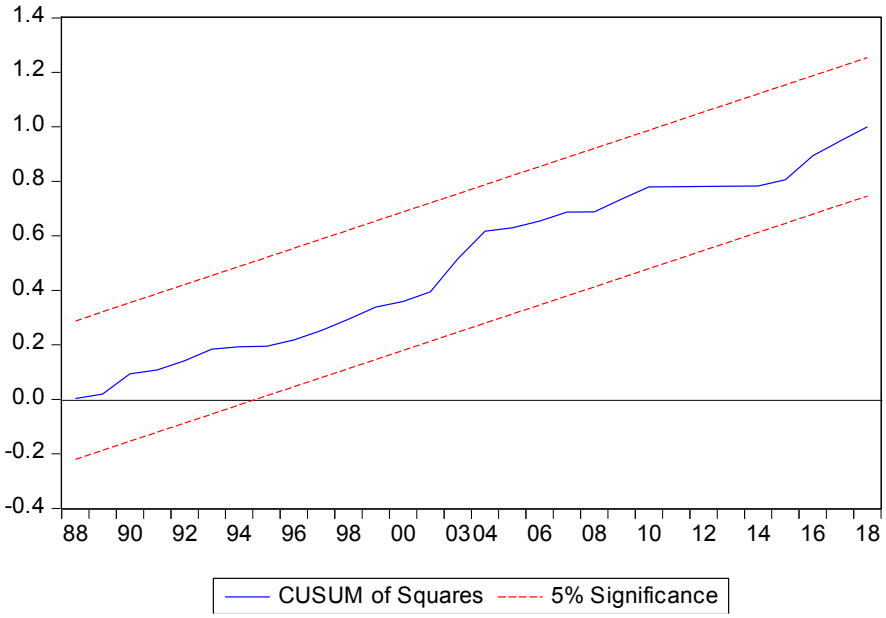

Figure 4.2: Plot of cumulative sum of squares (CUSUMsq) of recursive residual.

Figures 4.1 and 4.2 show that the residual lies within the critical bounds at 5% level of significance. These indicate that the model is reasonably stable.

5. Conclusion and Recommendation

5.1 Conclusion

The study concludes that domestic debt (DOD) had positive and significant impact on economic growth in Nigeria which is also in line with the findings of Peter, et al., (2013) and Onogbosele and Beni (2016). Public debt servicing (PDS) indicated a negative and significant relationship with economic growth in Nigeria, while Interest rate (INT) and government capital expenditure (GCET) indicated a positive but insignificant impact on economic growth in Nigeria over the study period.

5.2 Recommendation

The following recommendations were made based on the findings of the study:

1. Domestic debt should be channeled to productive sectors of the economy and more specifically in the real sector to create employment and reduce poverty and attract foreign direct investment in Nigeria.
2. Government should ensure that funds taken as loans are channeled towards those projects for which they are borrowed and ensure that utilization of funds is properly monitored for accountability and transparency to enhance economic growth in Nigeria.

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