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Research Article

Public Borrowing and the Nigerian Economy: An Autoregressive Distributed Lag Model (ARDL) approach

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ABSTRACT: This study examined the effect of public borrowing on growth of the Nigerian economy over the period 1980 – 2015. Employing the ARDL method in analysing data sourced from the CBN and World Bank, the results indicated that external debt positively and significantly stimulated growth while domestic debt significantly retarded growth in Nigeria both in the long and short runs. Total debt services stock was found from our result to negatively and insignificantly affected economic growth while net foreign direct investment and foreign exchange reserves impacted on economic growth positively and were both significant at 5% level at lag 3. Though the goodness of fit was robust and reasonable in explaining changes in growth, the non-significance of the error correction term implies that economic growth reacts slowly to changes in public debts dynamics in Nigeria. Based on this results, the study recommends: reduction in local borrowing to enhance private investment, prudent utilization of borrowed funds to enhance results, better debt management strategies to ensure efficiency and borrowing from organization with low interest rate and longer term in order to reduce the burden on the economy and the growth of the economy.

1. Introduction

The underdeveloped private sector in most developing economies has created a serious burden on the public sector in management of the economy and influencing the macroeconomic environment. In these economies especially that of Nigeria, the government has become the predominant economic decision maker with various implications for economic growth and macroeconomic stability.

The paucity of funds and the quest for improvement in social and economic infrastructures in order to achieve sustainable economic growth and development have created additional demand on government/public finances in most developing economies and Nigeria in particular. Public debts therefore emanate from government expansionary fiscal policy in order to meet the demand of the citizens thereby leading to shortage of revenue over expenditure. The process of financing the needs of government and that of the citizens give rise to public debts. Government can finance its fiscal deficits through domestic and external sources. The domestic source includes; borrowing from the central bank, deposit money banks and the public through issuance of bonds while the external source comprises of concessional and non-concessional assistance from multilateral or bilateral creditors and the foreign capital market.

The quest by government to meet its demand of ensuring sustainable growth, reduce poverty and unemployment and stabilize the macroeconomic environment have increased public debts from N382.71billion or 143.0percent of GDP in 1990 to N3,372.18billion or 105.6 percent in 1999. Also during this period, external debt profile rise by a mean of 42.5% or 66.9% of GDP with the proportion of debt owe Paris Club rising to 64% on an average. In like manner, local debt increased by 35.1% and formed 29.1% of GDP. Though local debts increased following the introduction of FGN Bonds, the period witnessed serious reduction in foreign debt due to the debt cancellation by the Paris and London Clubs in 2005 and 2006 hence debt was reduced from N3,097.38b to N689.84b (CBN, 2013).

Though public debts and spending have been on the increase in Nigeria, growth remain very sluggish while unemployment, poverty and inequality assumed spiral dimension. For instance, evidence from the Central Bank of Nigeria 2015 shows that real GDP growth rate in Nigeria was 2.9 percent in 1980 but decline to 2.2 percent in 1991. It however, increased to 7.7 percent in 2000 with the rise in crude oil prices in the International market till 2010 with 10 percent growth rate. However, the trend was reversed with the decline in oil output and fall in its price from 2011with GDP growth rate at 4.9 percent and by 2015 growth rate of real GDP was 2.7 percent. Just like growth rate of real GDP, unemployment and poverty have followed similar trend unemployment rate increased from 13.1 percent in 2000 to 14.9 percent in 2008. By 2010, unemployment rate had risen to 21.1 percent and 25.4 percent in 2014. Poverty level in 1980 was about 27.2 percent but increased to 42.7 percent in 1992, 65.6 percent in 1996 but dropped marginally to 54.4 percent in 2004 and increased again to 69 percent in 2010. These statistics are evidence that Nigeria has not achieved inclusive and steady growth despite increase in public debts and spending over the years.

Government in developing countries and Nigeria in particular have relied on debt financing as means of achieving basic

macroeconomic objectives such as; sustained economic growth, stable prices, full employment, poverty reduction and external sector equilibrium. However, some scholars have berated this position. Ciarione and Trebeschi (2006) argued that using more debt to finance government spending attracts interest payments on principal and arrears which can hamper public liquidity and leads to insolvency through debt accumulation. Also Bernheim (1989) posited that increase in government debt tend to have negative impact on private investment as its crowd-out private investment and increase consumer expectation on tax increase. Based on these contending views, the paper seeks to examine the contributions of public debts in enhancing economic growth in Nigeria. we shall continue the investigation by reviewing works by other scholars on the topic, followed by the methodology employed to achieved the objectives, results of our investigation and finally, the concluding remarks.

2. Literature Review

Keynes in his early works argued that public spending was key in enhancing rapid and sustainable growth in an economy. In his study, Keynes provided the framework that saw the emergence of budget deficit (public debts) as a tool for macroeconomic management. Keynes position was built on the fact that a significant proportion of the populace is suspected to have high tendency to consume out of their current disposable income hence a reduction in tax is expected to have serious implication on aggregate demand. He further argued that the economy's resources are initially underemployed signalling capability for growth. In his multiplier effect syndrome, Keynes posited that since deficits spending (public debts) stimulate both consumption and national income, saving and capital accumulation will not negatively be affected. This implies that government deficit spending/borrowing have positive contribution on the economy. Keynes therefore argued that in periods of low economic activities/recession, there was no need for balance budget and that deficit spending and budgeting is a compensatory fiscal measure to manage the economy in such period. Hence during economic downturn, government debts could serve as a boost to economic growth by propelling aggregate demand/consumption. The position of Keynes was also supported by Chakraboty (2006) who agreed that budget deficit tend to have positive implication on macroeconomic aggregates as a rise in total consumption will raise both private and public consumption which will further stimulates savings and investment, even at high interest rate.

The Two-Gap model Chenery and Strout (1966) posited that less developed countries' low income level cumulates into low savings and investment. They therefore argued that for economic growth to be achieved by less developed countries external finance either grants or loans is necessary to supplement domestic resources. McKinnon (1964), Findlay (1973), and others also applied the *Harrod- Domar* growth model to show that foreign capital can raise the growth rate of an economy by raising the availability of capital for production, where the capital-output ratio is held constant. In their drive to develop and achieve economic growth, most developing countries including Nigeria borrow due to low personal and national income and savings. Hence borrowing help to bridge the gap between savings and investment in less developed countries.

Myriad of studies are available in literature on the effect of public borrowing on economic performance. Ndikumana and Boyce (2004) argued that public borrowing or debt can be a good or bad, from the position of the well-being of the citizens of a country. For instance, if the borrowed fund is invested productively in activities that enhances a rapid rate of return high enough to offset the debt with interest and still breakeven, then it is a good thing. To the authors, even if the borrowed fund is used to procure items for consumption, rather than invested, this may be beneficial if it helps the citizens through difficult times and lets them repay when there is improvement in the economy. In this case, borrowing could be beneficial. However, if the borrowed funds are neither invested productively nor used for consumption needs, then public debt can be very bad, mortgaging future governments and citizens with debts service costs without corresponding gains. This implies that public borrowing can stimulate growth and improves the wellbeing of the people if properly utilized.

Empirically, Akram (2010) used the Autoregressive distributed lag (ARDL) to study the nexus between public debt and economic growth in Pakistan.in order to achieved the objective of the study, he developed a hybrid model linking public debt to economic growth. the result of his study shows that both domestic and external borrowing have negative relationship with GDP per capita and level of investment. This result confirmed the effect of debt overhang which hampers private investment and growth.

In a similar study, Amassoma (2011) analysed the causal relationship between public debt and economic growth in Nigeria during the period 1970-2009. to achieved the objectives of the study, the Vector Autoregressive (VAR) and a Vector Error Correction (VECM) models were used. They discovered from the result that there was no long-run relationship between domestic debt and economic growth but found a long-run nexus between external debt and economic in Nigeria. The result also shows that a bi-directional causality existed between domestic debt and economic growth while economic growth was found to trigger foreign debt in Nigeria.

In another study, Barik (2012) used an econometric technique with an augmented Solow (1956) Neoclassical growth model in investigating the relationship between public debt and economic growth in India over the period 1981-2011. The results of his findings show that an indirect linkage existed between public debt and economic growth in India. The result also indicated that public borrowing appeared to be directly linked to both investment and output hence has an indirect implication on economic growth via its direct impact on investment.

Employing a panel autoregressive distributed lag (ARDL) model, Kabadayi et al (2012) studied the contribution of

foreign borrowing on economic growth in 19 developing economies. The findings from their study indicated that foreign debt has direct impact on economic growth. The results also show that degree of economy's openness has positive implication on growth in the long run while the ratio of foreign debt to export was found have impacted negatively on economic growth in developing economies in the short run.

Ishola et al (2013) conducted a study on the contribution of foreign borrowing on economic growth in Nigeria over the period 1980-2010. To achieved the objectives of the study, the OLS method was used. The results of the study show that 12.3% variation in economic growth was attributed to foreign borrowing and prime lending rate in Nigeria. The study therefore suggests summon a strong political will in addressing the basic causes of foreign debt and ensure efficient use of debts in developing critical sectors of the Nigerian economy for rapid and sustainable growth in the country.

Tajudeen (2012) used the Vector Autoregressive (VAR) model to investigate the causal link between aggregate public debt and the growth of the Nigerian economy over the period 1970 - 2010. The results revealed that revealed that there existed a bi-directional causation between public debt and economic growth in Nigeria. The study thereby suggests that government should be prudent with the loans by investing such funds into project with high propensity to growth and development instead of diverting it to personal used.

Emmanuel (2012) studied public debt and economic growth in Nigeria using the Ordinary Least Squares (OLS) method. His findings indicated the joint effect of debt on economic growth was negative and very significant in the long-run. however, the effect of public debt and growth was found to be positive in the short-run. He attributed this finding to poor and inefficient debt management.

Uma, Eboh and Obidike (2013) analysed the impact of aggregate public debt (domestic debt, external debt and external debt servicing) on the economic development of Nigeria from 1970-2010. Employing the method of Ordinary Least Squares in their analyses, the results show that local and foreign debts are negatively linked to economic growth (GDP) but were insignificant at 5 % level. on the other hand, external debt servicing and economic growth were positively related but also insignificant at 5%. based on this findings, the study suggests prudent debt management and redirecting attention on internally generated revenue (IGR) to finance development.

Ndikumana and Boyce (2003) studied external debts and capital flight in 30 Sub Saharan African countries over the period 1970-96. They discovered that for every dollar of external borrowing in a given year, on average, approximately 80 cents leave the country as capital flight. Later findings by same authors all laid credence to the hypothesis that debt overhang has an independent effect on capital flight: a one-dollar increase in the stock of debt adds an estimated 3.5 cents to annual capital flight in subsequent years. They however, concluded that the causal relationship between capital flight and external debt can be bidirectional, that is, foreign borrowing can cause capital flight, while capital flight can lead to more external borrowing.

Boyce (1992) identifies and differentiates the four possible causal relationship between public debt and capital flight. First, foreign borrowing causes capital flight by contributing to an increased tendency of a debt crisis, worsening macroeconomic conditions, and hampering investment climate. Second, foreign borrowing provides the resources as well as a reason for channelling private capital abroad. In the other relationship, capital flight drains national foreign exchange resources, forcing the government to borrow abroad. Capital flight also causes "back-to-back loan. That is a situation where capital flight provides directly the funds to finance foreign loans to the same people who export their capital.

Aminu, Ahmadu and Hamidu (2013) investigated the effect of government borrowing on economic growth in Nigeria over the period 1970-2010. In order to achieved the objectives of the study, the ordinary least squares (OLS) regression method was used to analysed the data. the results revealed that external debt diminished capabilities for achieving economic growth in Nigeria while local debt tends to spurred the growth of the economy. The results further indicate that a bi-directional causality existed between external debt and GDP growth while a zero causality was found between domestic debt and economic growth and between external and domestic debts. Based on this findings, the study concluded that sustainable economic growth could be linked to local borrowing and debt from foreign source.

In similar vein, Obiwuru et al. (2013) studied domestic borrowing and its impact on economic growth in Nigeria. utilizing time series data spanning from 1990-2010 and using the ordinary least squares method in their analyses, the results indicated that local debt and credit to the economy had direct and significant implications on economic growth while interest rate had an inverse and insignificant implication on economic growth in Nigeria. The result further showed that the causal variables in the model had significant joint effect on economic growth and influenced higher proportion of the systematic change in dynamics of growth in Nigeria during the period of the study.

Okwu et al (2016) studied the impact of domestic debt on economic growth in Nigeria over the period 1980-2015 by employing the cointegration and error correction model (ECM) to analysed variables like real gross domestic product (RGDP), domestic debt stock (DDS) and domestic debt servicing expenditure (DDSE) as determinant variables while government expenditure (GEXP) and banks' lending rates (BLR) as moderating variables. The results of the investigation provided prove of significant short- and long-run direct implication for Domestic Debt Stock; inverse relationship between domestic debt stock expenditure but an inverse and insignificant relationship between lending rate of banks and economic growth. The result further found that the

independent variables jointly impacted significantly and showed very high strength in explaining changes in economic growth in Nigeria. The study therefore concludes that domestic debt had short and long-run capabilities for improving economic growth in Nigeria and suggested prudent allocation of local borrowed funds to the real sectors to enhance sustainable economic growth in the country.

Though several studies have been done on debts and its implications on economic growth, divergent views still exist. This study seeks to contributes to the on-going debate on public debt and economic growth through an empirical means.

3. Methodology

The theoretical supports for this study are the Keynesian argument that government deficit is needed to spur the economy during times of recession (Keynes, 1936) and the Two-gap model which argues that due to low income level and savings in less developed countries, the countries are entangled in the saving-investment gap. To Chenery and Strout (1966), proponents of the Two-gap model, borrowing is necessary to augment disequilibrium in saving and investment due to low income level. Hence due to low income level in Nigeria both at the personal and public level (per capita income level was $2548.17 as at 2015 while gross capital formation same year was N10636.22billion). Given this scenario and the high poverty index (more than 60%), borrowing by the government of Nigeria appeared to be justified. Based on these theoretical background, we specified a functional relationship between growth rate of Nigerian economy (GDPR) and public borrowing (external debt, domestic debt, debt service stock). In order to really capture the effect of debts on growth we introduced net foreign direct investment and foreign exchange reserve into the model. This is because debt stock diminishes investors' confidence in an economy and depletes foreign exchange reserves. Thus the model for estimation is stated thus:

$$GDPR = f(EXDT, DODT, DSTR, NFDI, FERX) \quad 1$$

In order to capture the effect of the random term 'U' the equation is stated as follows

$$GDPR = b_0(EXDT)^{b1}(DODT)^{b2}(DSTR)^{b3}(NFDI)^{b4}(FERX)^{b5} + U^t \quad 2$$

To enhance estimated using the ordinary least squares, model 2 is transformed into log-linear form below except GDPR which as negative values in most years.

$$GDPR_t = b_0 + b_1 \ln EXDT_t + b_2 \ln DODT_t + b_3 \ln DTSR_t + b_4 \ln NFDI_t + b_5 \ln FERX_t + U^t \quad 3$$

Where: Ln = natural logarithm, GDPR = growth rate of GDP, EXDT = external debt stock, DODT = domestic debt stock, DTSR = total debts service stock, NFDI = net foreign direct investment, FERX = foreign exchange reserves and U = disturbance term. All things being equal, the theoretical apriori expectation is; $b_1>0$, $b_2>0$, $b_3>0$, $b_4>0$ and $b_5>0$.

The error correction model framework based on equation 1 is stated thus:

$$GDPR_{t-1} = \sum_{i=1}^{n} b_0 \Delta GPDR_{t-1} + \sum_{i=1}^{n} b_1 \Delta \ln EXDT_{t-1} + \sum_{i=1}^{n} b_2 \Delta \ln DODT_{t-1} + \sum_{i=1}^{n} b_3 \Delta \ln DSTR_{t-1} + \sum_{i=1}^{n} b_4 \Delta \ln NFDI_{t-1} + \sum_{i=1}^{n} b_5 \Delta \ln FERX_{t-1} + \Psi_1 \Delta GDPR_{t-1} + \Psi_2 \Delta \ln EXDT_{t-1} + \Psi_3 \Delta \ln DODT_{t-1} + \Psi_4 \Delta \ln DSTR_{t-1} + \Psi_5 \Delta \ln NFDI_{t-1} + \Psi_6 \Delta \ln FERX_{t-1} + \varepsilon_t \quad 4$$

i =1,2,3,4,5 represent the long-run multipliers for parameter Ψ , whereas, for the parameter b_i, i =1,2,3,4,5 are coefficients of the short-run equation for the ARDL model. ε_t is assumed to be serially uncorrelated with the disturbance term with zero mean and constant variance (assumptions of OLS) while Δ is the operator of the first difference. The verification of long-run relationship amongst the variables, gave rise to the long run equation for economic growth as stated below:

$$GDPR_t = b_0 + b_1 GDPR_{t-1} + b_2 \ln EXDT_{t-1} + b_3 \ln DODT_{t-1} + b_4 \ln DSTR_{t-1} + b_5 \ln NFDI_{t-1} + b_6 \ln FERX_{t-1} + \varepsilon_t \quad 5$$

The chosen ARDL model lag length was the Akaike Information Criterion (AIC). This was based on the sample size of 36 years or data point. Consequently, the estimated short-run equation and the error correction term are expressed in the equation 6

$$\Delta GDPR_{t-1} = \sum_{i=1}^{n} b_0 \Delta GPDR_{t-1} + \sum_{i=1}^{n} b_1 \Delta \ln EXDT_{t-1} + \sum_{i=1}^{n} b_2 \Delta \ln DODT_{t-1} + \sum_{i=1}^{n} b_3 \Delta \ln DTSR_{t-1} + \sum_{i=1}^{n} b_4 \Delta \ln NFDI_{t-1} + \sum_{i=1}^{n} b_5 \Delta \ln FERX_{t-1} + \sum ECT_{t-1} + \varepsilon_t \quad \text{----------6}$$

b_i i=1,2,3,4,5 represent the short-run coefficients. ECT is the lagged error correction term estimated from the long-run dynamics. It symbolizes the adjustment in the coefficient, and it is always negative and significant statistically to affirm a cointegration nexus.

Results

we started the presentation of our results by reporting the descriptive statistics and graph which give us an idea of the trend in the variables. This is followed by the unit roots test, ARDL bounds test, long run result and the short run error correction model.

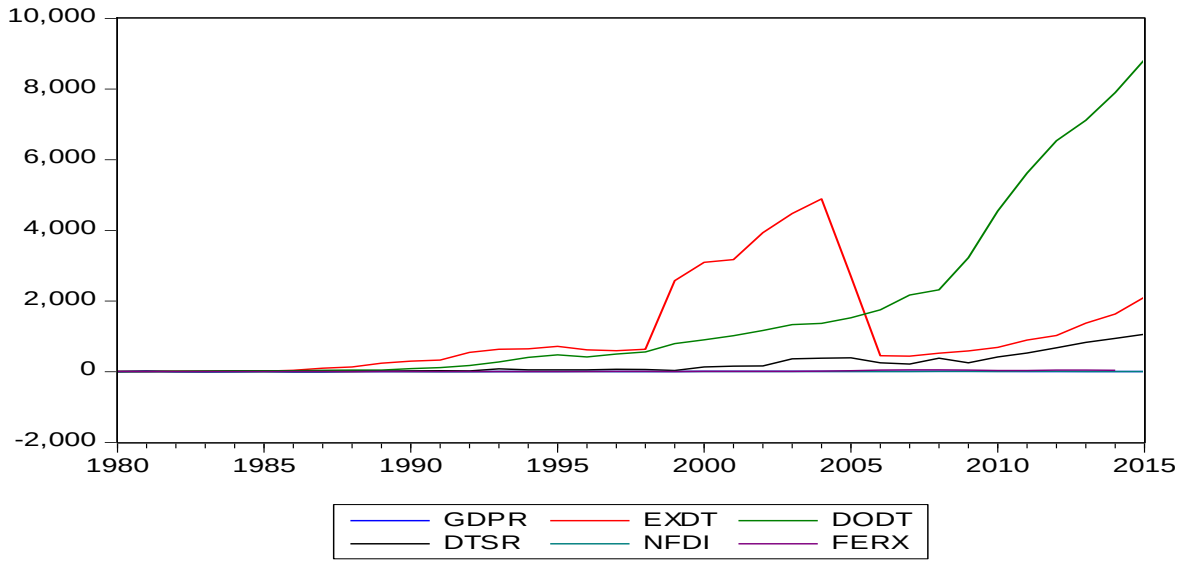
Table 1. Descriptive Statistics

Statistic	GDPR	EXDT	DODT	DTSR	NFDI	FERX
Mean	5.264943	1087.401	1502.797	188.0343	2.584320	15.60720
Median	6.310000	595.9300	501.7500	64.39000	1.345369	7.298546
Maximum	20.83800	4890.270	7904.020	941.7000	8.841114	53.59929
Minimum	-10.75200	1.870000	8.230000	0.840000	0.189165	0.932990
Std. Dev.	5.839903	1356.873	2195.241	248.0351	2.675078	18.11571
Skewness	-0.567552	1.532277	1.758031	1.556398	1.146000	0.994049
Kurtosis	4.838315	4.172677	4.911370	4.690298	2.899745	2.320846
Jarque-Bera	6.807303	15.70138	23.35672	18.29712	7.675673	6.436763
Probability	0.033252	0.000389	0.000008	0.000106	0.021540	0.040020
Sum	184.2730	38059.03	52597.88	6581.200	90.45119	546.2521
Sum Sq. Dev.	1159.552	62597543	1.64E+08	2091729.	243.3055	11158.09
Observations	35	35	35	35	35	35

The descriptive statistic reported in *Table 1* indicates that growth rate of GDP has mean value of 5.3%, while external debt, domestic debt total debt service stock, net foreign direct investment and foreign exchange reserves had mean values of N1087.4billion, N1502.8billion, N188.03billion, $2.6billion and $15.6billion respectively during the period under investigation. GDP growth rate has maximum rate of 20.8%, external debt has maximum value of N4890.3bilion, domestic debt, maximum value stood at N7904.0billion, debt service stock stood at N941.7billion, net foreign direct investment peak value was $8.8b and foreign exchange reserves highest value stood at $53.6billion during the period under review. Minimum growth of GDP was -10.8% while external debt stock, domestic debt value, debt services value, net foreign direct investment and foreign exchange reserves were N1.9billion, N8.2billion, N0.8billion, $0.2billion and $0.9billion respectively. The standard deviation for the variables were 5.8% for GDP, N1356.9billion for external debt, N2195.2billion for domestic debt, N248.0billion for debt services, $2.7billion for net FDI and $18.1b for foreign exchange reserves. The statistics revealed that all the variables witnessed increasing trend except growth rate of GDP.

The behaviour in the variables is shown in the graph in figure 1. It shows that domestic debt stock, external debt and foreign exchange reserves have been increasing over the years. However, external debt unlike domestic debt witnessed some level of fluctuations. After moving at same space with domestic debt till 1997, external debt rises and got to its peak in 2003 but fell by 2006 after the debt cancellation by the Paris and London Club. External debt has been on the rise again through borrowing by successive government in Nigeria. Domestic debt from the graph formed the greatest proportion of public debt in Nigeria.

Figure 1. Graph Showing Trend in GDPR, EXDT, DODT, DTSR, NFDI & FERX in Nigeria 1980-2015



The unit root tests reported in Table 2, revealed that all the variables under consideration were not stationary at level except growth rate of GDP. However, at first difference, external debt, domestic debt, debt services stock, net foreign direct investment and foreign exchange reserves all attained stability. The attainment of stability in the variables is the precondition for testing for long-run dynamics amongst the variables. However, given that the variables were not stationary at same order {GDPR at i(0)and others at i(1)}, we used the ARDL bound test and ARDL cointegration tests for detecting the long run relationship between economic growth and public debts variables.

Table 2: Unit Root Tests Result

Augmented Dickey Fuller (ADF) Test Statistic						Philip-Perron (PP) Test Statistic				
Variable	ADF Statistic	1%	5%	10%	Decision	PP Statistic	1%	5%	10%	Decision
GDPR	-4.712696	-3.632900	-2.948404	-2.612874	i(0)	-4.740055	-3.632900	-2.948404	-2.612874	i(0)
Log(FERX)	-4.941248	-3.653730	-2.957110	-2.617434	i(1)	-5.417770	-3.646342	-2.954021	-2.615817	i(1)
Log (EXDT)	-4.189170	-3.639407	-2.951125	-2.614300	i(1)	-7.223385	-3.639407	-2.951125	-2.614300	i(1)
Log (DODT)	-4.373454	-3.639407	-2.951125	-2.614300	i(1)	-5.789090	-3.639407	-2.951125	-2.614300	i(1)
Log (DTSR)	-7.539606	-3.639407	-2.951125	-2.614300	i(1)	-7.517711	-3.639407	-2.951125	-2.614300	i(1)
Log(NFDI)	-10.79126	-3.639407	-2.951125	-2.614300	i(1)	-5.257780	-3.639407	-2.951125	-2.614300	i(1)

The ARDL bounds test reported in *Table 3*, shows that the F-statistic of 7.150796 is greater than the critical value bounds at 10%, 5%, 2.5%, and 1% significance level respectively. The significance of the bound test implies the rejection of the null hypothesis that no long-run relationship exist between the dependent and explanatory variables. That is, a long-run relationship exist among the variables under investigation.

Table 3. ARDL Bounds Test

Test Statistic	Value	K
F-statistic	7.150796	5
Critical Value Bounds		
Significance	10 Bound	11 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Table 4. long-run coefficients of ARDL with selection model (3,3,1,1,3,3)

Cointeq = GDPR - (4.0427*LOG(EXDT) -4.9021*LOG(DODT) -1.2466 *LOG(DTSR) + 5.5077*LOG(NFDI) + 2.2832*LOG(FERX) + 10.3181)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EXDT)	4.042720	0.907406	4.455248	0.0008
LOG(DODT)	-4.902099	1.149400	-4.264921	0.0011
LOG(DTSR)	-1.246625	1.264843	-0.985596	0.3438
LOG(NFDI)	5.507709	1.933865	2.848032	0.0147
LOG(FERX)	2.283169	0.545003	4.189279	0.0013
C	10.318084	3.628879	2.843325	0.0148

The result of the short run error correction ARDL model indicates that external debt is positively and significantly related to economic growth at all levels. This result corroborates the long run result and shows that external debt has significant and direct implications on economic growth. This result is in tandem with the findings of Kabadayi et al (2012). Using ARDL they found a direct relationship between foreign debt and growth. However, it deviated from the findings of Ndikumana and Boyce (2003) and Uma et al (2013). Though external borrowing leads to leakages from the income stream through debt repayment and services, if properly utilized, external borrowing could help bridge the gap(s) between savings and investment hence stimulate growth.

Domestic debt and economic growth were found to be negatively related and significant at 5% level. This was the case both in the long and short runs. It implies that domestic borrowing significantly retarded economic growth in Nigeria. The result is in consonance with the findings of Okwu et al (2016), they found an inverse link between local debts and economic growth in Nigeria using OLS but deviated from the result of Obiwuru et al 2013. Increase public borrowing from the domestic source may crowd-out private investment and hamper growth in an economy.

Debts service stock conforms to our apriori expectation by bearing a negative sign. It is however, insignificant at 5% level. This implies that debt service retarded economic growth. Increase debts and interest paid on both local and foreign debts diminishes funds meant for infrastructural development thus reduce public investment and growth. This result contrasts that of Uma et al (2013) in which a positive nexus was found between growth and debt services.

Net foreign direct investment was positive and significantly related to economic growth both in the long and short runs. This result is in tandem with our theoretical expectation. Increase in foreign investment help bridge gap between saving-investment, increase productive capacity of the economic, create jobs and spur growth.

Foreign exchange reserve was found to be positively related to growth from our result in the long run and short run. This implies that foreign reserve significantly spurred growth in Nigeria. foreign reserves help provide buffer for the economy, increase credit worthiness and restore confidence of investors in an economy. Though public borrowing depletes foreign reserves, a rising reserves still provide positive signal to both local and foreign investors which is a basic ingredient for growth.

The result further indicates that the error correction term is negatively signed but insignificant at 5% level. This implies that the speed of adjustment of public debts to economic growth in Nigeria is slow. The poor debt management in Nigeria may have explained this scenario. However, the adjusted R^2 of 0.61 indicates that 61 percent of the systematic variation in economic growth is explained by external debt, domestic debt, debts services stock, net FDI and foreign reserves in Nigeria over the period under study. Also, the significance of the ARDL growth model implies that it is robust and fit for prediction. Durbin Watson statistic of 2.5 suggests serial correlation is absent.

Table 5. Short run, Error Correction Model of Public Debt and Economic growth in Nigeria Selection Model: ARDL (3, 3, 1, 1, 3, 3)

Dependent Variable: GDPR				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPR(-2)	-0.697397	0.167592	-4.161266	0.0005
GDPR(-3)	-0.147928	0.118004	-1.253591	0.2252
LOG(EXDT(-1))	4.162826	1.622527	2.565644	0.0189
LOG(EXDT(-3))	2.895275	1.031167	2.807766	0.0112
LOG(DODT(-1))	-10.23457	2.391476	-4.279603	0.0004
LOG(DTSR)	-0.616051	1.867306	-0.329914	0.7451
LOG(NFDI(-2))	3.637745	2.018545	1.802162	0.0874
LOG(NFDI(-3))	6.321896	1.747931	3.616787	0.0018
LOG(FERX)	1.167657	1.136440	1.027470	0.3171
LOG(FERX(-3))	3.235629	1.471924	2.198232	0.0405
C	20.81091	7.117834	2.923770	0.0087
ECT(-1)	-0.364642	0.324222	-1.124667	0.2747
R^2 = 0.75; R^2-adjusted = 0.61; F-stat = 5.18;Prob (F-stat = 0.0009); DW = 2.5; AIC = 5.43; SC = 5.99				

The empirical results for autocorrelation, autoregressive, heteroscedasticity and normality tests and that for the residual are reported below:

Table 6. Diagnostic Test Results

Test	F-statistic	Probability
Breusch-Godfrey serial correlation LM test	2.829502	F(2,17) 0.0869
Normality test(Jarque-Bera)	1929574	0.381064
Heteroscedasticity(ARCH)	0.257585	F(1,28) 0.6158
Heteroscedasticity(Breusch-Pagan-Godfrey)	1.190485	F(11,19) 0.3556
Chow-Breakpoint	0.564580	F(12, 7) 0.8166

The results of the diagnostic test reported in Table 6, indicate that the short-run ARDL growth model scaled through the diagnostic tests. The results revealed that the null hypotheses of no serial correlation, normal distribution, no heteroscedasticity

and no structural break are accepted based on the Breusch-Godfrey serial correlation LM result, Jarque-Bera normality test result, ARCH and Breusch-Pagan-Godfrey and Chow-Breakpoint tests. Also the test for the stability of long run and short run coefficients were done using the recursive residual and CUSUM test. As shown in the recursive residual and CUSUM graphs in figures 2 and 3, the recursive residual and CUSUM lines do not go beyond the 5% critical lines. This also affirm the stability of the long-run and short-run coefficients of the independent variables on economic growth in Nigeria during the period of this study.

Figure 2. Recursive Residual Test

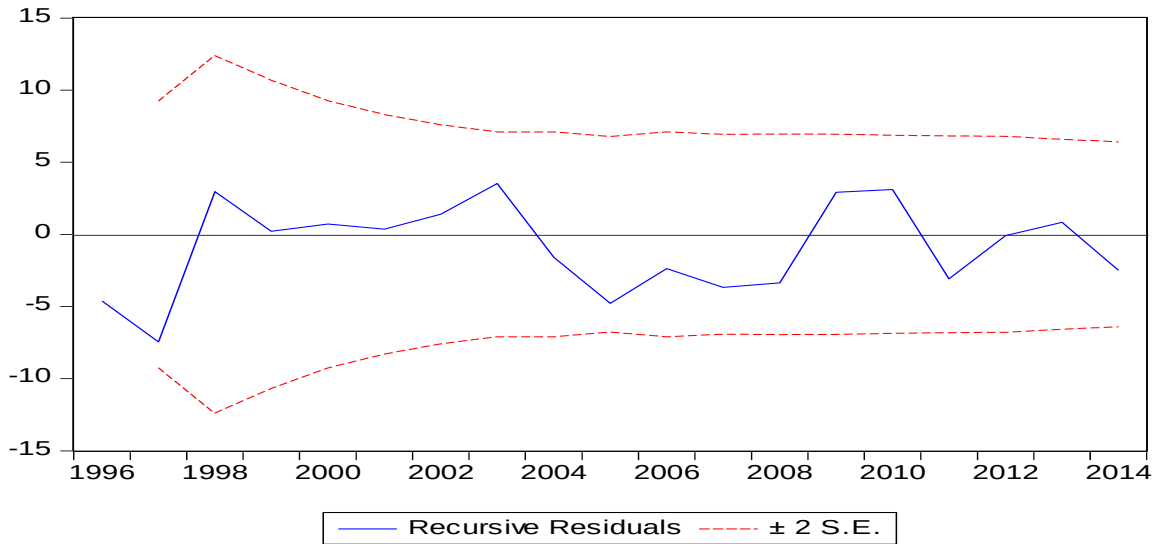
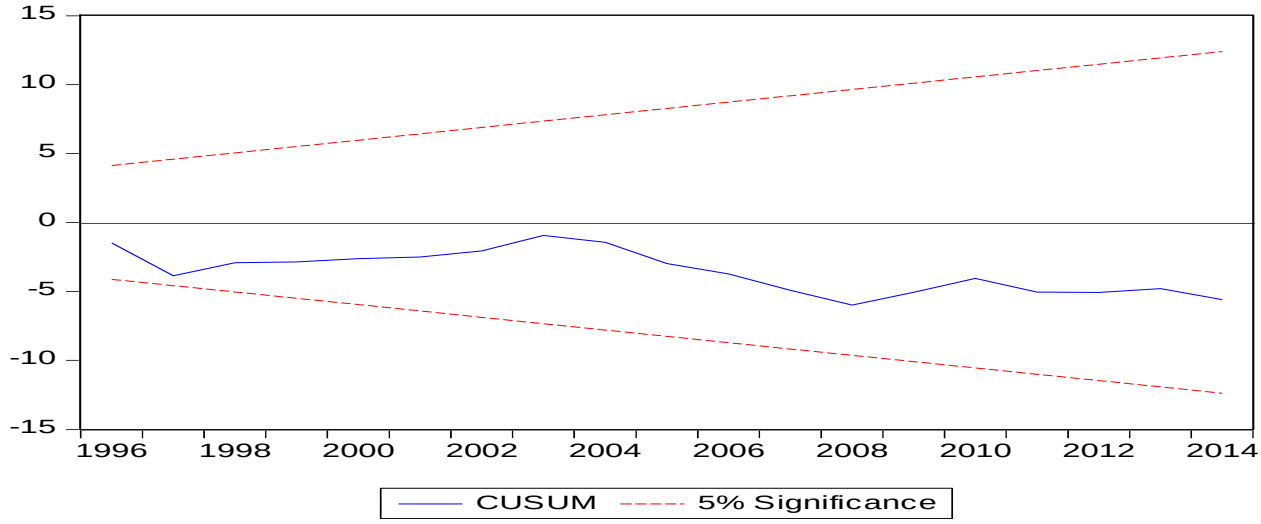


Figure 3. CUSUM Test



4. Concluding Remarks

This study examined the effect of public borrowing on the growth of the Nigerian economy over the period 1980 – 2015. Employing the ARDL method in analysing the data sourced, the results indicated that external debt positively and significantly stimulated growth while domestic debt significantly retarded growth in Nigeria both in the long and short runs. Total debt services stock was found to negatively and insignificantly affected economic growth while net foreign direct investment and foreign exchange reserves impacted on economic growth positively but were both significant at 5% level at lag 3. Though the goodness of fit was robust and reasonable in explaining changes in growth, the non-significance of the error correction term implies that economic growth reacts slowly to changes in public debts dynamics in Nigeria. Based on this results, the study recommends: reduction in local borrowing to enhance private investment, prudent utilization of borrowed funds to enhance results, better debt management strategies to ensure efficiency and borrowing from organization with low interest rate and longer term in order to reduce the burden on the economy and stimulate growth.

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