



EXTERNAL DEBT-GROWTH NEXUS IN NIGERIA REVISITED



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ABSTRACT

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After about a decade of exiting sovereign debt havoc; there is now another panic that a new sovereign-debt problem may loom in Nigeria given the current rising debt profile in the country. In this light, this paper sought to enhance the existing literature on the debt growth-nexus by analyzing the relationship between debt variables and economic growth within Solow (1956) growth framework. The study adopted econometric technique of Autoregressive Distributive Lag (ARDL) model and applied on time-series data for Nigeria spanning between 1981 and 2016. The results show that external debt is negatively related with economic growth in both short and long runs. The evidence suggests that increase in external debt will lead to decline in economic growth. Based on the findings, the study suggests that debt service obligation should not be allowed to rise more than foreign exchange earnings and that the loan contracted should be invested in profitable and productive ventures, which will generate a reasonable amount of money for debt repayment.

Contribution/ Originality: This study contributes to the existing literature on debt-growth nexus by incorporating various debt components and adopting one of the advanced methodological approaches in analysing the effect of external debt on economic growth.

1. INTRODUCTION

It is roundly believed that developing countries face shortage of capital and other financial resources needed to finance their large developmental projects and consequent upon this reason, the countries resort to borrowing, particularly externally, to supplement their domestic revenue. Akin to majority of the developing countries, Nigeria had engaged in massive external borrowing so much so that it was once classified by World Bank and IMF as one severely indebted low income countries in the world. This pathetic situation has prompted the Multilateral, bilateral and commercial creditors to design a framework in 1996 aiming at providing relief to such countries. In fact, the decades of 1970s and 1980s had stood out to be an era of pain for Nigeria and other developing nations of

Asia, Africa and Latin America. Most of these countries during these decades are characterized by high debt profile which has caused severe macroeconomic shocks and declining national output.

Debt servicing made the problem of external debt more serious in Sub-Saharan Africa in 1980s despite the fact that their level of indebtedness was smaller than those of Latin American and Asian countries. This was because of their low income and instability of their export earnings during the period (Da Costa, 1991; James *et al.*, 2014). In view of the gravity of the problem, academics and policy makers became seriously perturbed. They were perturbed for the debts had not been fully utilized and that could be justified by the poor economic performance of the countries over the years. The situation is even more disquieting in Nigeria considering the way and manner the state governments borrow from both international and local markets to finance all sorts of projects without much priorities given to capital projects and appropriate feasibility studies especially during election periods.

Debt servicing remains a huge resource leakage in Nigeria. It occupies a significant portion in the country's recurrent expenditure profile. Meeting debt obligations continues to pose a threat to growth and development of Nigeria since paying it means sacrificing welfare and capital projects for social and economic development. The available empirical studies on the effect of debt on economic growth in various countries produced mixed findings and inconclusive results (Cerra *et al.*, 2008; Malone, 2010; Reinhart and Rogoff, 2010a; Sefdari and Mehrizi, 2011). This necessitates the need for further studies on the topic in order to provide more explanations on the relationship between the macroeconomic variables. Thus, this is what motivated the present study to empirically examine the effect of external debt on economic performance of Nigeria.

The present study has an edge over previous studies in threefold: firstly, it has used a wide specification by incorporating many variables including external debt, domestic debt, labour, capital and public debt servicing which are all essential in explaining growth. Secondly, the study specifically looked at post deregulation period in Nigeria, the choice of this period lies on the fact that the economy of Nigeria has witnessed numerous changes due to implementation of Structural Adjustment Program in 1986 which has affected the debt profile of the country. Lastly, the study applied sound and robust methodological tools of analysis for efficient and reliable results.

The paper is divided into six sections. Following the introduction, profile of public debt in Nigeria is briefly discussed in section two. Section three focuses on theoretical and empirical literature. Econometric methodology is highlighted in section four. Discussion of results is done in section five, while conclusion and recommendations are presented in the last section.

2. EXTERNAL DEBT IN NIGERIA: SOME STYLIZED FACTS

Over the years external debt has been used to finance budget deficits in Nigeria, and though it is applied in combination with domestic debt; it is mostly greater than domestic debt given the crowding effect of the latter. This section discussed the trend of external debt in Nigeria, sources of external borrowings and the link between external debt and economic growth in the country.

Table-1. Trend of External Debt in Nigeria, 1981-2015

Year	Total External Debt (₦ million)	External Debt as a % of Nominal GDP
1981-1985	10,767.52	6.52213
1986-1990	163,041.18	48.20631
1991-1995	574,308.18	38.68472
1996-2000	1,504,205.44	30.46849
2001-2005	3,834,569.38	26.49675
2006-2010	531,200.06	1.329905
2011-2015	1,408,080.00	1.769054

Source: Central Bank of Nigeria (CBN) (2016)

Table 1 depicts that external debt had been terribly high in Nigeria during the period 1986-2005 thereby defying the constitutional fiscal rule on budget deficit (4 percent of the GDP). For instance, although it was just ₦163.04 billion in absolute term on average during the period 1986-1990; it was 48.21 percent of the GDP, the highest proportion of external debt in Nigeria's history. The average level of the debt increased considerably in absolute terms from ₦163.04 billion for the period 1986-90 to about ₦574.31 billion, ₦1.50 trillion and ₦3.83 trillion for the periods 1991-95, 1996-2000 and 2001-05 respectively. However, in relative terms, the level of the debt (external debt as a % of nominal GDP) was downsized marginally by about 10, 8 and 4 percent during the periods 1991-95, 1996-2000 and 2001-05 respectively from 48.21 percent for the period 1986-1990. The economic crisis of 1980s due to oil glut and subsequent formulation and implementation of Structural Adjustment Programme (SAP), which encouraged massive external borrowing, could perhaps be the reason for the excessive external debt in Nigeria during the periods.

Debt forgiveness in 2005 has drastically reduced the Nigeria's external debt from ₦3,834,569.38 (26.5% of GDP) to ₦531,200.06 (1.3% of GDP) in 2010. This was a great achievement.

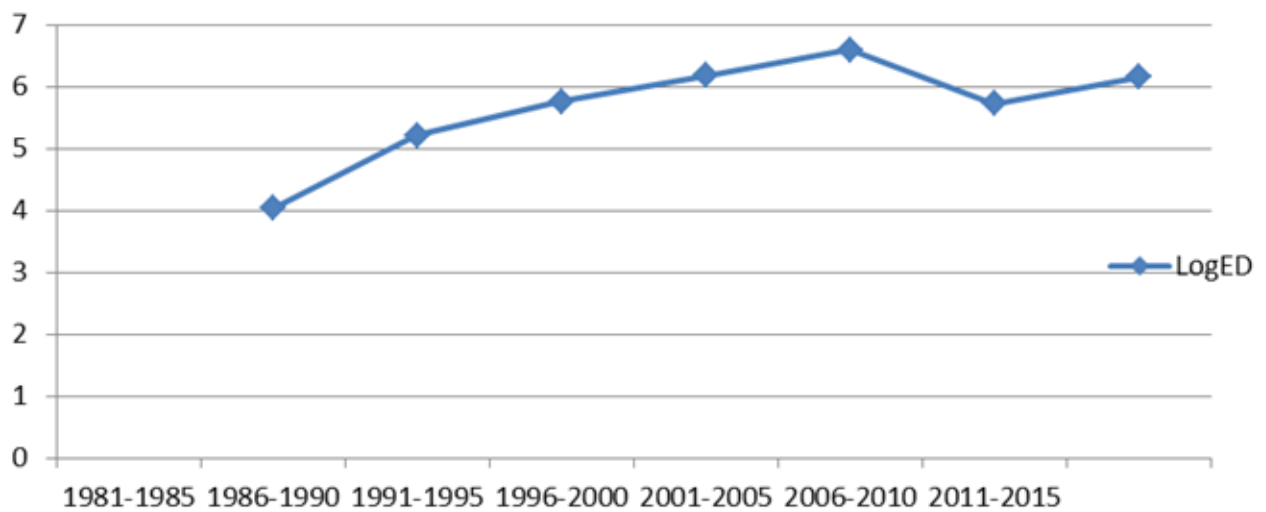


Figure-1. Log of External Debt in Nigeria, 1981-2015

Source: Authors' Construction using CBN Statistical Bulletin, 2016.

Figure 1 confirms the above assertion as the logarithm of external debt in Nigeria increasingly moved up since 1981 until 2006 when it drastically went down. Again, the log of external debt slightly increased during the period 2011-15 may be due to political business cycle created during the electioneering that took place within the period and economic crisis that occurred.

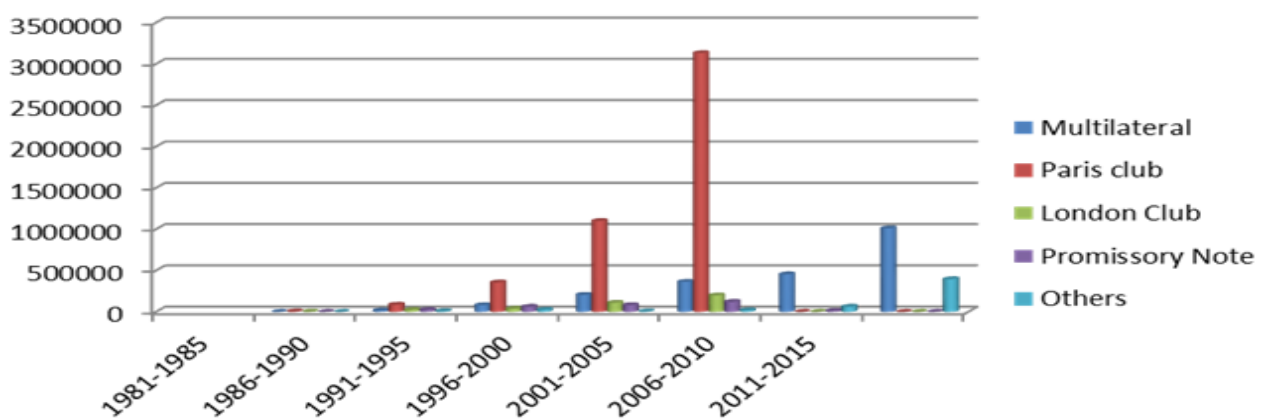


Figure-2. Sources of External Debt in Nigeria, 1981-2015

Source: Authors' Construction using CBN Statistical Bulletin, 2016

Figure 2 presents the major sources of external borrowing in Nigeria over the years. The figure suggests that Paris club has been the major source of external borrowing in Nigeria since 1981 up-till 2006–2010, and this is as a result of the debt relief package offered by Paris Club creditors during the period. This is so because *Debt Management Office (DMO) (2005)* reported that it was only Paris Club creditors that offered to relieve Nigeria a debt of US\$ 18 billion (60 percent) out of US\$30.84 billion outstanding as at December 31, 2004. And Nigeria was able to clear its books on 21st April, 2006. Multilateral source remains the major source of external debt in Nigeria since 2006 to 2015 followed by other sources.

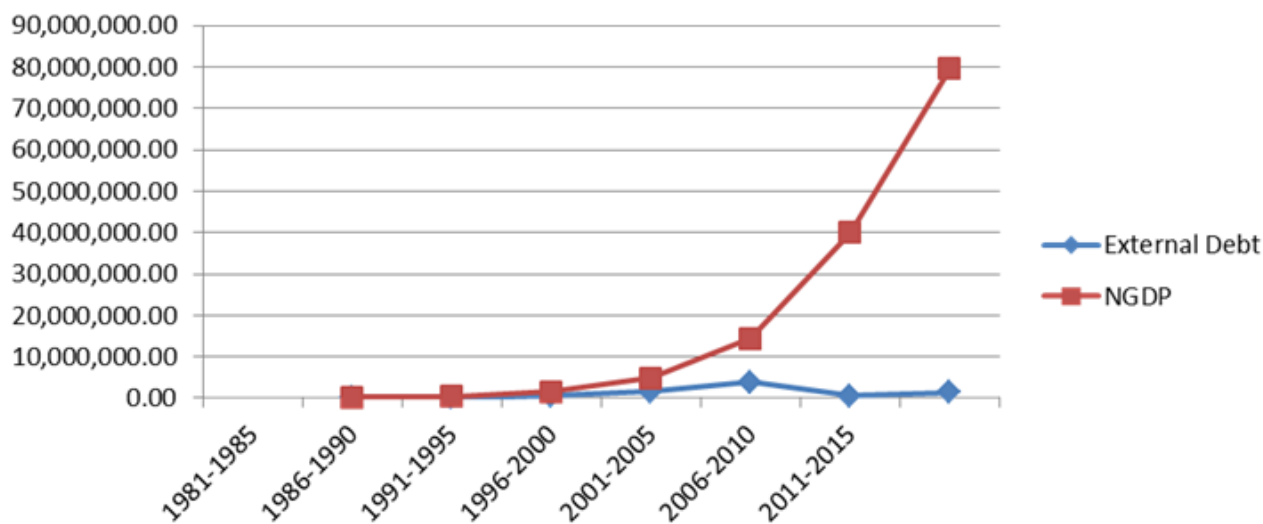


Figure-3. Nominal GDP-External Debt Nexus in Nigeria, (1981-2015)

Source: Authors' Construction using CBN Statistical Bulletin, 2016.

Figure 3 shows the link between nominal GDP and external debt in Nigeria over the period 1981–2015. The figure has clearly revealed that there is an inverse relationship between them. It is very obvious in the chart that nominal GDP increased very slowly during the period of the debt crisis (1986–2005) until 2006 when the GDP rose rapidly given the low debt burden during the period 2006–2015 as the average external debt constituted less than 3 percent of nominal GDP.

3. LITERATURE REVIEW

3.1. Theoretical Issues

Global economic crises and expansionary government expenditure around the world have degenerated into fast growing debt and unsustainable public debts in many countries of the world.

Choudbury (2001) identified the factors causing expansion in country's debt profile and summarized them into six viz; (1) Exogenous factors such as negative term of trade; (2) the absence of sustained adjustment policies especially when facing exogenous shocks, and inability to strengthen capacity for debt servicing; (3) the lending and refinancing policies of creditors, especially lending on commercial terms with short repayment period by many creditors in the late 1970s and early 1980s; (4) the poor prudent debt management by debtor countries; (5) lack of precise and cautious management of currency composition of debt by many countries; (6) political factors such as occurrence of civil wars and conflicts and political instability.

Furthermore, economic literature has provided many channels through which a growing public debt might halt long term growth prospect. A large and unmanaged public debt might cause debt overhang; macroeconomic instability; results in price volatility; and blocks capital inflows and encourages capital flight (Krugman, 1988; Alesina and Tabellini, 1989; Singh, 2006; Cerra *et al.*, 2008; Malone, 2010). Again, Mohammed *et al.* (2013) observed that debt servicing consumes a large share of government revenue thereby weakens government efforts in providing

basic facilities in a country. A heavy debt burden also discourages growth and development through multiple avenues like crowding out private investment and public investment expenditure due to high interest rate and debt servicing respectively.

Notwithstanding, there is a number of theoretical models, like dual gap model, which suggests that a reasonable amount of foreign debt is required to supplement local resources and foster growth and development through public investment. In the same vein, the Keynesian economists advocate for expansionary fiscal policy through deficit financing especially in the period of recession in order to foster long-term growth through creating aggregate demand which in turn may bring about numerous multiplier effects. In furtherance to this, the Dual gap model also posits that development is determined by investment, and domestic savings are usually insufficient to finance such investments, hence the need for foreign debt to supplement internal funds. Thus, the debate on the use of debt to finance developmental projects is an old one and has spawned volume of studies over the years.

3.2. Empirical Review

There is proliferation of studies on the relationship between public debt and economic growth in the literature. For instance, Lee and Ng (2015) investigated the nexus between public debt and economic growth in Malaysia using annual time series data spanning between 1991 and 2013. Their finding indicates that public debt has a negative impact on Malaysian economy. Similarly, Ogunmuyiwa (2011) examined whether external debt actually promotes economic growth in Nigeria using time series data from 1970 to 2007, the result reveals that causality does not exist between external debt and economic growth for the period of study. Izedonmi and Ilaboya (2012) examined the impact of public debt on economic growth of Nigeria Using annual time series data from 1980 to 2010. The result reveals that there is significant negative association between public debt and economic growth. The ratio of debt burden service to export was found to have negative and significant effect on economic growth. Correspondingly, Matiti (2013) found similar evidence that there is negative association between public debt and economic growth. Sefdari and Mehrizi (2011) also found identical evidence for Iran.

Greiger (1990) used a lag distributional model to assess the impact of external debt on economic growth for nine South American countries for a period of 12 years (1974-1986). The study found a statistically significant and inverse relationship between debt and economic growth. In the same vain, Iyoha (1999) used simulation approach to investigate the impact of external debt on economic growth in Sub-Sahara African countries using small macroeconomic model for the period 1970-1994. It was found that mounting external debt depresses investment through a crowding out effect and disincentive effect. The study tested the effects of 5%, 10%, 20% and 30% reductions in debt stock on investment and economic growth one year after. It was found that debt reduction has a significant positive effect on growth. To be specific, it was observed that a 20% debt stock reduction will increase investment and GDP by 18% and 1% respectively. Pattillo *et al.* (2002) using a large panel data set of 93 developing countries over the period 1969-1998 found empirical support for a nonlinear impact of debt on growth: at low levels, debt has positive effects on growth; but above particular thresholds or turning points, additional debt tends to have a negative impact on growth.

Reinhart and Rogoff (2010a) in a sample of 20 developed countries between 1990-2009, using a sample correlation statistics, found a weak relationship between government debt and economic growth for debt to GDP ratio below a threshold of 90% and above 90% the median growth rate decreased by 1% and the average by considerably more. Ugo and Presbitero (2012) focused on OECD countries and used instrumental variable approach to investigate the relationship between public debt and economic growth. The result was consistent with the existing negative relationship in empirical literature. The study reported that the relationship broke down when the instrument debt with a variable that captures valuable effects caused by the interaction between foreign currency, debt and exchange rate volatility. Al-Zeaud (2014) examined the association between public debt and economic growth in Jordan and found that population growth and external debt contribute positively to Jordanian economy.

Abba and Christensen (2010) in a panel study of low income and emerging economies, found that domestic debt has a positive contribution to economic growth. Contrary to this, Reinhart and Rogoff (2010b) analysed the impact of public debt on economic growth for a set of data covering 44 countries and found that government debt is unrelated to economic growth as long as it does not exceed 90% of GDP. Similar evidence was found by Kumar and Woo (2010) that nonlinear relationship exists between external debt and economic growth. Correspondingly, Boboye and Ojo (2012) using data set for Nigeria found that debt burden has negative effect on economic growth.

Siddique *et al.* (2017) using time series data for Pakistan found a significant negative correlation between debt and economic growth. Similarly, Esteve and Tamarit (2017) using Spanish spanning between 1851 and 2013 revealed a negative association between external debt and economic growth. In another panel study for 40 countries by Chudik *et al.* (2017) found no evidence of universally applicable threshold, but a negative association exists between debt and output growth. Furthermore, Manik and Khan (2017) empirically examined the effect of public debt on economic growth of India using VEC model. The results show the presence of long run relation between public debt and economic growth. In investigating the channels through which public debt affect the performance of an economy, Bal and Rath (2017) using Indian data set found that household savings, public investment and productivity growth are the essential variables that influence growth through debt dynamics.

However, a careful scrutiny of the above discussions on the theoretical and empirical literature shows that the evidence is not only contestable (which prompts the need for further investigations), but also these studies, (panel and country specific) are limited in terms of robustness and methodologies used. This is because their results are mixed and conflicting. This is attributed to the fact that different sample sizes and methodological frameworks were used. Based on that, this study suggests two improvements over existing studies in this area. Firstly, majority of the previous studies did not applied appropriate growth model and used limited number of independent variables. Therefore, their conclusion seems to be inadequate. The present study plans to adopt famous neoclassical growth model and incorporates relevant variables for robust specification and analysis. On the methodological ground, it is also observed that majority of the studies applied simple econometric techniques of OLS and have not properly solved for the problem of non-stationary as time series data are mostly associated with this statistical problem. Hence, the present study sought to contribute to literature by solving these problems through applying modern econometric techniques of ARDL. The choice of ARDL method of co-integration lies on the fact that the approach can be applied even when the variables appear to be co-integrated on different levels. The pre-tests conducted reveals that the variables are not co-integrated on the same order of integration. It is also a suitable technique to be applied for small sample period as in the case of this study. In the same vein, understanding the nexus between external debt and economic is very paramount as it will pave way to building a sound fiscal policy that is required for the overall growth and development of a country.

4. ECONOMETRIC METHODOLOGY

4.1. Data and Theoretical Model

This section of the study explored data sources, model and econometric tools of analysis that are used in the study. The study employed annual time series data and were all sourced from secondary sources. It includes annual data for Nigeria on real gross domestic product which was taken as proxy for economic growth, external debt, domestic debt, labour force, capital stock and public debt servicing collected for the period spanning between 1981 and 2016. The data were obtained from Central Bank of Nigeria Statistical Bulletin and World Bank (2016). Furthermore, in an effort to determine the relationship between external debt and economic growth in Nigeria, the study adopted the famous Cobb-Douglas production function with constant return to scale in line with the one used by previous studies such as Jibir and Abdu (2017) and Fambon (2013). Thus, it is stated in the equation 1 as:

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha} e^{u_t} \text{-----} \quad (1)$$

Y_t is the output of the economy and it represents real GDP at time t ; A_t , K_t , and L_t are productivity factor, the physical capital stock and the labour force respectively at time t , μ_t is the stochastic error term and e is the base of natural logs. The impact of external debt can be captured through the A_t component of (Y_t) . Since the objective of this study is to measure the nexus between external debt and related components (domestic debt and public debt servicing) on the performance of Nigerian economy through the changes in A_t , the study therefore, assumes that A_t is a function of external debt and the other components that are incorporated.

$$A_t = f(ED_t, Z_t) \text{-----} (2)$$

Where: ED= External debt; and Z = Control variables which include domestic debt and public debt servicing. Therefore, by combining equation 1 and 2, we obtained equation 3:

$$Y_t = K_t^{\alpha_1} L_t^{\alpha_2} ED_t^{\alpha_3} Z_t^{\alpha_4} e^{\mu_t} \text{-----} (3)$$

Where $\alpha_1, \alpha_2, \alpha_3,$ and α_4 , are the constant elasticity of output relative to L, ED and Z.

Thus, taking the natural log of equation 3, we have:

$$\ln Y_t = \alpha_0 + \alpha_1 \ln K_t + \alpha_2 \ln L_t + \alpha_3 \ln ED_t + \alpha_4 \ln Z_t + \mu_t \text{---(4)}$$

Where:

All the variables remain the same as defined above, α_0 is the constant term, and μ_t is the stochastic error term which represents all the variables that are not captured in the model. In line with previous studies like [Jibir and Abdu \(2017\)](#) the capital stock is proxy by gross fixed capital formation. This is because of the difficulties in measuring the stock of capital especially in less developed economies like Nigeria. Moreover, the labour input is measured by working population.

Our a priori expectations are as follows: The regression coefficient of K and L are expected to be positively related with Y in line with economic theory. On the other hand, the expected coefficient of external debt and control variables is ambiguous; it depends on how the funds are being used in the country.

4.2. Estimation Procedure

4.1.1. Unit Root Test

As explained earlier, the ARDL approach does not require all variables to be integrated of same order, but it is not applied for variables whose order of integration is greater than one i.e. I(2). Therefore, testing for unit root test was done using both ADF and Philips-Perron unit root tests. The test is based on an estimate of the following regression:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum_{i=1}^n \alpha_i \Delta y_i + \mu_t \text{-----} (5)$$

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum_{i=1}^n \alpha_i \Delta y_i + \delta_t + \mu_t \text{-----} (6)$$

Where:

Y is a time series, t is a linear time trend, Δ is the first difference operator, α_0 is a constant, n is the optimum number of lags on the dependent variable and μ is the stochastic error term. The difference between equation (5)

and (6) is that, the first equation includes just drift. Moreover, the second equation includes both drift and linear time trend. The study employed ADF and Philips-Perron tests based on Dickey and Fuller (1979) and Philips and Perron (1987) respectively. Due to the probability of the presence of structural break, this makes Augmented Dickey Fuller test unrealistic for stationary test. The presence of structural break causes biasedness and influences the ADF test towards a non-rejection of the null hypothesis of a unit root. This necessitates the need for the application of Philips-Perron test, and as such the regression equation for the PP test is given as;

$$\Delta Y_t = \alpha + bY_{t-1} + \mu_t \text{-----} (7)$$

4.1.2. ARDL Bonds Test

The study employed this co-integration approach in order to estimate both short and long run effect between the variables. This approach was first developed by Pesaran *et al.* (2001). The approach is based on the estimation of unrestricted error correction model which has numerous advantages over other co-integration approaches. It can be applied for a small sample data (Pesaran and Pesaran, 1997; Pesaran *et al.*, 2001) and therefore conducting bounds test would be appropriate for this study. Secondly, it can be applied for variables with I(1) or I(0) or combination of the two which is not applicable in the traditional co-integration methods. Lastly, ARDL approach provides unbiased estimate of the short and long run estimates of the variables (Harris and Sollis, 2003). In view of the advantages of ARDL bounds test, equation (8) is applied as the general functional form, thus it is changed by transforming it into an ARDL in order to examine the effect of public debt components on economic growth of Nigeria. The ARDL function is specified in equation (8):

$$\ln Y_t = \alpha_0 + \sum_{i=1}^p \phi_i \ln K_{t-1} + \sum_{i=0}^q \chi_i \ln L_{t-1} + \sum_{i=0}^r \delta_i \ln ED_{t-1} + \sum_{i=0}^s \gamma_i \ln Z_{t-1} + \mu_t \text{-----} (8)$$

Where: Y, K, L, ED, and Z remain as previously defined. α denotes the drift, p, q, r, s, t, and u denotes the lag lengths; ϕ , χ , δ , and γ are coefficients to be estimated while \ln denote natural logarithms and μ_t is the stochastic error term. Since the objective is to understand both short and long run effect of external debt on economic growth, specification of short and long run ARDL model is necessary. In this regard, the specification of the short run of ARDL approach to co-integration is done in error correction form which can be seen in equation (9):

$$\Delta \ln Y_t = \beta_0 + \sum_{i=1}^p \beta_1 \Delta \ln K_{t-1} + \sum_{i=1}^p \beta_2 \Delta \ln L_{t-1} + \sum_{i=1}^p \beta_3 \Delta \ln ED_{t-1} + \sum_{i=1}^p \beta_4 \Delta \ln Z_{t-1} + \theta ECM_{t-1} + \mu_t \text{-----} (9)$$

While all the variables remain as previously defined, and ECM_{t-1} denotes the error term.

In order to estimate the ARDL model specified above, maximum lag length of the model has to be selected. To do this, Akaike Information Criterion (AIC) is applied as specified in equation 10.

$$AIC(p) = \ln \left| \sum_{uu} (p) \right| + (k + pk^2) \frac{2}{T} \text{-----} (10)$$

where $\left| \sum_{uu} (p) \right|$ denotes the determinants of the variance covariance matrix of the estimated residuals while P, K and T denotes the lag order, the number of variables and the number of observations respectively.

5. RESULTS AND DISCUSSIONS

Before estimating the ARDL bounds test approach to co-integration, the study first tested for the stationary status of all the selected variables to measure their order of integration. This is to avoid regressing of variable at order $I(2)$ given the fact that the computed F statistics developed by Pesaran *et al.* (2001) are valid only when the variables are either $I(0)$ or $I(1)$ or combination of $I(0)$ and $I(1)$. Thus, the study employed Augmented Dickey Fuller and Philips Perron tests followed by ARDL approach to co-integration.

Table-2. ADF Results of the Unit root test

Variable	Order of integration	Included in the model	ADF Test Statistic	McKinnon Critical value
<i>lnRGDP</i>	$I(1)$	Trend & intercept	-3.574153	10% = -3.207094
<i>lnGFCF</i>	$I(0)$	Trend & intercept	-4.301660	5% = -3.544284
<i>LBF</i>	$I(0)$	Trend & intercept	-17.88469	1% = -4.296729
<i>lnDOMDEBT</i>	$I(1)$	Trend & intercept	-4.992635	5% = -2.955125
<i>lnEXDEBT</i>	$I(1)$	Trend & intercept	-3.775952	10% = -3.207094
<i>lnDEBTSERV</i>	$I(0)$	Trend & intercept	-8.390313	1% = -4.252879

Source: Computed by authors using E-view 9.0.

The results of the unit root tests show the presence of a unit root (non-stationary) tested against alternative hypothesis of the absence of a unit root (stationary). On the application of the ADF for the variable to be stationary, the ADF statistic (in absolute terms) must be greater than the standard critical value at the levels of significance: 1%, 5%, or 10%. The ADF result shows that the RGDP, domestic debt and external debt are non stationary at level but they became stationary after taking first difference of the series at integration of order one i.e. $I(1)$ at 10%, 5%, and 10% significance levels respectively. Gross fixed capital formation, labour force and debt servicing are all stationary at integration of order zero i.e. $I(0)$ at 5%, 1%, and 1% respectively.

Table-3. Philips-Perron test for unit root

Variable	Order of integration	included in the test equation	Philips-Perron test Statistic	Mackinnon Critical value
<i>lnRGDP</i>	$I(1)$	Trend & intercept	-3.581027	10% = -3.207094
<i>lnGFCF</i>	$I(0)$	Trend & intercept	-4.248380	5% = -3.544284
<i>LBF</i>	$I(1)$	Trend & intercept	-2.742428	1% = -2.634731
<i>lnDOMDEBT</i>	$I(1)$	Trend & intercept	-5.493812	5% = -3.548490
<i>lnEXDEBT</i>	$I(1)$	Trend & intercept	-4.541878	10% = -3.207094
<i>lnDEBTSERV</i>	$I(0)$	Trend & intercept	-8.691827	1% = -4.252879

Source: Computed by authors using E-view 9.0

Philips-Perron test of the unit root is also applied and this can be seen by comparing the Philips-Perron test statistics with the critical values (in absolute terms) at 1%, 5%, and 10% levels of significance. The Philips-Perron result shows that the labour force, domestic debt and external debt are all not stationary at level but they became stationary at integration of order one i.e. $I(1)$ at 10%, 1%, 5%, and 10% significance levels respectively. While, gross fixed capital formation, labour force and debt servicing are all stationary at integration of order zero i.e. $I(0)$ at 5%, 1%, and 1% respectively.

Table-4. Result of Bounds Test Approach to Co-integration

Significant Levels	Critical Values	
	Lower bound	Upper bound
1% Significance level	3.41	4.68
5% significance level	2.62	3.79
10% significance level	2.62	3.35
F. Statistics	5.4646*	K=5

* Indicates computed statistic falls above the upper bounds value of 1%, 5% and 10% level of significance. Source: computed by authors using E-view 9.0

Table 4 shows the result of bounds test approach to co-integration. It can be seen from the table that the value of F. statistic is 5.4646 which is greater than the upper critical values at 1%, 5% and 10% levels of significance. This implies that the null hypothesis of no co-integration between external debt and economic growth is rejected, and hence there exists a long run or co-integrating relationship between external debt and economic growth in Nigeria over the period under review. Having established the existence of the long run relationship between external debt and economic growth, the ARDL co-integration approach can now be applied to estimate the individual long run relationship between the variables.

From table 5 it can be deduced that in the long run, external debt is negatively related with economic growth but not significant. This signifies that an increase in the level of external debt will adversely affect the economy. This cannot be disconnected from the fact that developing economies like Nigeria are in most cases channeling resources particularly external loan into unproductive sectors and misappropriation also prevails. Furthermore, the result also reveals that domestic debt has positive and significant effect on economic growth.

Table- 5. Estimated Long Run Coefficient Using the ARDL Approach

ARDL (4, 1, 1, 1, 1, 0) selected based on AIC. 32 observation used for estimation from 1981-2016				
Variables	Coefficient	Standard error	T. statistic	P. values
<i>C</i>	13766	58.676	-2.0357	0.0568
<i>lnGFCF</i>	0.1424	0.0652	2.1832***	0.0425
<i>LBF</i>	2790.19	1313.62	2.1240***	0.0478
<i>lnEXTDEBT</i>	-0.0008	0.0008	-1.0179	0.3222
<i>lnDOMDEBT</i>	3.2166	0.6800	4.7299***	0.0002
<i>lnDEBTSERV</i>	0.0099	0.0111	-0.8947	0.3828

Note: *** denote significance level at 1%. RGDP is the dependent variables.
Source: computed by authors using E-view 9.0

Debt servicing also has positive but insignificant relationship with economic growth. Gross fixed capital formation and labour force are found to have positive and significant relationships with the level of growth and development. Since the long run relationship is established, the next step is to estimate the short run dynamic within the framework of ARDL model.

Table-6. Estimated Short run Error Correlation Model Using ARDL Approach

ARDL (4,1,1,1,1,0) selected based on AIC 32 observation used for estimation from 1981 to 2016				
Variables	Coefficient	Standard error	T. statistic	P. values
$\Delta \ln GFCF$	0.0022	0.0148	0.1536	0.8716
ΔLBF	3867.5	1303.4	-2.9671***	0.0083
$\Delta \ln EXTDEBT$	-0.0001	0.0002	-0.0599	0.9450
$\Delta \ln DOMDEBT$	1.5285	0.5480	2.7890**	0.0121
$\Delta \ln DEBTSERV$	0.0029	0.0023	1.2508	0.2271
ECM_{t-1}	-0.8110	-2.0159	0.0256***	0.0345

Dependent variable = RGDP.

R² = 0.8924

F = statistics = 11.487 (0.0004)

DW statistics = 2.11

Source: computed by authors using E-view 9.0

From table 6 it can be noted that the short-run estimate of the impact of external debt on economic growth confirms the long-run finding as it indicates a negatively significant relationship between external debt and economic growth in the short run. Also, in the short run, domestic debt has a significant positive relationship with economic growth. Similarly debt servicing has an insignificant positive relationship with economic growth.

Additionally, gross fixed capital formation and labour force have positive effects on economic growth as in the case of long run. But while labour force is significant, gross fixed capital formation is insignificant. Moreover, the estimated error correction coefficient is negative and significant at five percent level of significant ensuring that the

adjustment process from the short run deviation is very fast. This suggests that the model adjusts itself towards equilibrium by 81 percent annually. Thus, the model has high convergent adjustment rate.

Diagnostic and significance tests were conducted on the variables in order to examine the robustness of the ARDL estimation. The results are presented below:

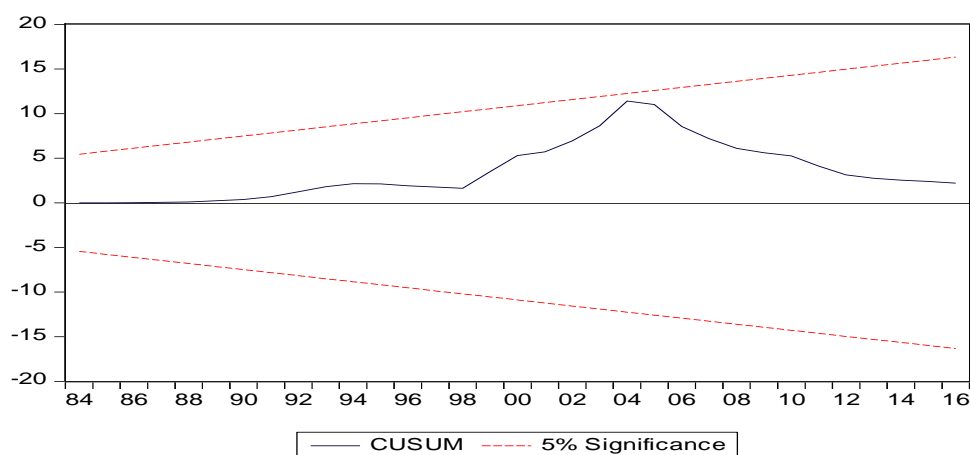
Table- 7. Model Diagnostic Test

Diagnostics test techniques	Statistics	Probabilities
Serial correlation LM test	0.3434	0.5010
Heteroscedasticity test	2.5416	0.2630
Normally test	12.056	0.0020
Ramsey reset test	0.5526	0.7815

Computed by authors using E-view 9.0

From table 7 it can be seen that the model passes all the diagnostic tests. It shows that there is no evidence of serial correlation and the model is normally distributed. In the same vein, the model passes the tests for heteroscedasticity and linearity.

At this juncture, the study tested for the stability of the model. The techniques applied is cumulative sum (CUSUM) test proposed by Brown *et al.* (1975). If the plot of the CUSUM remains within the critical limits of 5 percent significance level, the null hypothesis that all the coefficients are stable cannot be rejected. However, if one or another of the parallel line crosses, then the null hypothesis of parameters stability is rejected at 5 percent significant level. Figure 4 shows the result of CUSUM test. It indicates evidence of stability of the model as the critical line remains within the boundary at 5 percent significance level.



Source: Computed by authors using E-view 9.0

6. CONCLUSION AND RECOMMENDATIONS

The primary objective of this study is to empirically examine the impact of external debt on economic performance of Nigeria using time series data spanning between 1981 and 2016. Autoregressive Distributed Lag (ARDL) bounds testing approach to co-integration is employed. By and large, the analysis reveals that external debt is negatively associated with economic growth in both short and long run. This may be due to the fact that the funds are not mostly utilized for productive investment and the high level of interest charged on the loan. Poor policies and institution for proper utilization of external debt are likely to be the second-order constraint to achieving sustainable economic growth in Nigeria. On contrary, domestic debt is found to have positive and significant effect in both short run and long run. This shows that domestic debt in Nigeria is growth enhancing.

Debt servicing is also found to be positive but insignificant. Gross fixed capital formation and labour force that are incorporated into the model are found to be positive and significant in line with neo-classical postulation. This

implies that meaningful economic growth cannot be achieved without promoting labour efficiency and increasing the availability of capital into production process.

From a policy perspective, the finding of this paper can assist in shaping debt-oriented policies. Specifically, the existence of a negative effect of debt on output in Nigeria has to be taken into consideration and requires an urgent shift from a present external debt paradigm to a new one based on the available windows for domestic debt since it has shown positive impact on growth. Additionally, it is generally argued that where debt is large, macroeconomic policies are less efficient and volatile and can result in low output growth over a long period (Presbitero, 2008; 2010). The federal government of Nigeria, as a matter of urgency, should henceforth ensure that foreign loan are used only for projects of highest priority, visible economic benefits and productive sectors of the economy. More so, the government should avoid loans with flexible interest rate. Tangible proportion of foreign exchange earnings should be placed for debt servicing. There should also be vigorous promotion of external trade and drastic reduction in import particularly food items. Government at all levels should support and encourage labour efficiency and ensure availability of capital in all sectors of the economy.

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REFERENCES

- Abba, A.S. and J.E. Christensen, 2010. The role of domestic debt markets on economic growth: Empirical evidence for low income countries and emerging markets. *IMF Staff Papers*, 57(1): 209-255. [View at Google Scholar](#) | [View at Publisher](#)
- Al-Zeaud, H.A., 2014. Public debt and economic growth: An empirical assessment. *European Scientific Journal*, 10(4): 148-155. [View at Google Scholar](#)
- Alesina, A. and G. Tabellini, 1989. External debt, capital flight and political risk. *Journal of International Economics*, 27(3-4): 199-220. [View at Google Scholar](#) | [View at Publisher](#)
- Bal, D.P. and B.N. Rath, 2017. Do macroeconomics channels matter for examining relationship between public debt and economic growth in India? *Journal of Quantitative Economics*, 7(1): 1-22. [View at Google Scholar](#) | [View at Publisher](#)
- Boboye, A.L. and O.M. Ojo, 2012. Effect of external debt on economic growth and development of Nigeria. *International Journal of Business and Social and Sciences*, 3(12): 297-304. [View at Google Scholar](#)
- Brown, K.L., J. Durbin and J. Evans, 1975. Techniques for testing the constancy of regression relations over time. *Journal of the Royal Statistical Society*, 37(2): 149-192. [View at Google Scholar](#)
- Central Bank of Nigeria (CBN), 2016. CBN statistical bulletin (Special Issue). Abuja: CBN.
- Cerra, V., M. Rishi and S.C. Saxena, 2008. Robbing the riches: Capital flight, institutions and debt. *Journal of Development Studies*, 44(8): 1190-1213. [View at Google Scholar](#) | [View at Publisher](#)
- Choudbury, A., 2001. External debt and growth in developing countries: A sentivity and causal analysis. WIDER-Discussion Paper, No. 95.
- Chudik, A., K. Mohaddes, M.H. Pesaran and M. Raissi, 2017. Is there a debt-threshold effect on output growth? *Review of Economics and Statistics*, 99(1): 135-150. [View at Google Scholar](#) | [View at Publisher](#)
- Da Costa, G.C., 1991. External debt of developing countries: Crisis of growth. *Economic and Political Weekly*, 26(8): 433-438. [View at Google Scholar](#)
- Debt Management Office (DMO), 2005. Nigeria's debt relief deal with the paris club. Abuja, Nigeria: Debt Management Office.
- Dickey, D.A. and W.A. Fuller, 1979. Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 74(366a): 427-431. [View at Google Scholar](#) | [View at Publisher](#)

- Esteve, V. and C. Tamarit, 2017. Public debt and economic growth in Spain, 1851–2013. *Cliometrica*: 1–31. [View at Google Scholar](#) | [View at Publisher](#)
- Fambon, C., 2013. Foreign capital inflows and economic growth in Cameroun. UNU-WIDER Working Paper, No. 2013/124.
- Greiger, L.T., 1990. Debt and economic development in Latin America. *Journal of Developing Areas*, 24(2): 181–194. [View at Google Scholar](#)
- Harris, R. and D. Sollis, 2003. *Applied time series modelling and forecasting*. West Sussex: Willey.
- Iyoha, M.A., 1999. External debt and economic growth in Sub-Sahara African countries. An econometric study. AERC Research Paper, No. 90.
- Izedonmi, F.L. and O.J. Ilaboya, 2012. Public debt–growth dynamics: The Nigerian experience. *Jorind Journal*, 10(3): 258–260. [View at Google Scholar](#)
- James, O.B., S. Kiprop, A.M. Kalio and M. Gisore, 2014. External debt and economic growth in the East African community. *African Journal of Business Management*, 8(21): 1011–1018. [View at Google Scholar](#) | [View at Publisher](#)
- Jibir, A. and M. Abdu, 2017. Foreign direct investment – growth nexus: The case of Nigeria. *European Scientific Journal*, 13(1): 304–318. [View at Google Scholar](#) | [View at Publisher](#)
- Krugman, P., 1988. Financing vs. Forgiving a debt overhang. *Journal of Development Economics*, 29(3): 253–268. [View at Google Scholar](#) | [View at Publisher](#)
- Kumar, M.S. and J. Woo, 2010. Public debt and growth. *IMF Working Papers*, 10(174). [View at Google Scholar](#) | [View at Publisher](#)
- Lee, S.P. and Y.L. Ng, 2015. Public debt and economic growth in Malaysia. *Asian Economic and Financial Review*, 5(1): 191–126. [View at Google Scholar](#) | [View at Publisher](#)
- Malone, S.W., 2010. Sovereign indebtedness, default and gambling for redemption. *Oxford Economic Papers*, 3(3): 34–56. [View at Google Scholar](#) | [View at Publisher](#)
- Manik, N. and N.A. Khan, 2017. Public debt and economic growth in India: Evidence from granger causality test. In: Khan N. (eds) *Challenges and issues in Indian fiscal federalism*. *India Studies in Business and Economics*: 123–142. [View at Google Scholar](#) | [View at Publisher](#)
- Matiti, C., 2013. The relationship between public debt and economic growth in Kenya. *International Journal of Social Sciences and Project Planning Management*, 1(1): 65–86. [View at Google Scholar](#)
- Mohammed, D.N., A.A. Halim and Azman-Saini, 2013. Does external debt contribute to Malaysia economic growth? *Economiska Economic Research*, 26(2): 346–363. [View at Google Scholar](#) | [View at Publisher](#)
- Ogunmuyiwa, M.S., 2011. Does external debt promote economic growth in Nigeria? *Current Research Journal of Economic Theory*, 3(1): 29–35. [View at Google Scholar](#)
- Pattillo, C., H. Poirson and R. Ricci, 2002. External debt and growth. *IMF Working Paper*, 02(69).. [View at Google Scholar](#) | [View at Publisher](#)
- Pesaran, M.H., Y. Shin and R.J. Smith, 2001. Bound testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3): 289–326. [View at Google Scholar](#) | [View at Publisher](#)
- Peseran, M.H. and B. Peseran, 1997. *Working with microfit 4.0. Interactive econometric analysis*. Oxford University Press.
- Phillips, P.B. and P. Perron, 1987. Trends and random walks in macroeconomic time series: Further evidence from a new approach. *Journal of Dynamics and Controls*, 12: 297–332. [View at Google Scholar](#) | [View at Publisher](#)
- Presbitero, A.F., 2008. The debt–growth nexus in poor countries: A reassessment. *Economics. Open–Assessment E-Journal*, 2(30): 34–55. [View at Google Scholar](#) | [View at Publisher](#)
- Presbitero, A.F., 2010. Total public debt and economic growth in developing countries. *European Journal of Development Research*, 24(4): 606–626. [View at Google Scholar](#) | [View at Publisher](#)
- Reinhart, C.M. and K.S. Rogoff, 2010a. Growth in a time of debt. *American Economic Review*, 100(2): 573–578. [View at Google Scholar](#) | [View at Publisher](#)
- Reinhart, C.M. and K.S. Rogoff, 2010b. Growth in a time of debt. *NBER Working Paper*, No. 15639. [View at Google Scholar](#) | [View at Publisher](#)

- Sefdari, M. and M.A. Mehrizi, 2011. External debt and economic growth in Iran. Journal of Economics and International Finance, 3(5): 322-327. [View at Google Scholar](#)
- Siddique, H.M.A., K. Ullaha and I.U. Haq, 2017. External debt and economic growth Nexus in Pakistan. International Journal of Economics and Empirical Research, 5(2): 73-77. [View at Google Scholar](#)
- Singh, A., 2006. Macroeconomic volatility: The policy lessons from Latin America. IMF Working Papers, 06(166).
- Solow, R.M., 1956. A contribution to the theory of economic growth. Quarterly Journal of Economics: 65-94.. [View at Google Scholar](#) | [View at Publisher](#)
- Ugo, P. and A.F. Presbitero, 2012. Public debt and economic growth is there a causal effect? Polis Working Paper, No. 128.
- World Bank, 2016. World development indicators. World bank database 2016. Washington DC: World Bank Group.

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