



DOES EXTERNAL BORROWING AFFECT ECONOMIC GROWTH? A REVISIT OF THE AGE-LONG DEBATE FOR NIGERIA

Yakubu Dauda Ademola¹⁺



Wasiu Akintunde

Yusuf²



Kenneth Onyeka

Diyoke³

¹Central Bank of Nigeria (HQTR), Abuja FCT, Nigeria.

¹Email: yakubuademola@yahoo.com

²Nile University of Nigeria, Abuja FCT, Nigeria.

²Email: yusufwasuu@nileuniversity.edu.ng

³Email: dkofirst@yahoo.com



(+ Corresponding author)

ABSTRACT

Article History

Received: 11 September 2019

Revised: 16 October 2019

Accepted: 19 November 2019

Published: 30 December 2019

Keywords

ARDL

Budget deficits

Debt management office

ECM

External debt.

Given the recent phenomenon of government at all levels in Nigeria resorting to external loans to finance their annual budget deficits, the study then examined the implications of the external borrowing on the economic growth in Nigeria, using an Autoregressive Distributed Lag co-integration (ARDL) approach. Times series data spanning from 1987 to 2018 were collected from Central Bank of Nigeria and Debt Management Office. Corroborating some existing empirical evidence, the study finds a significant and positive effect of external debt stock on the economic growth in Nigeria, which is represented by gross domestic product growth rate (GDPRATE), and debt servicing impacts negatively on the economic growth both at the short run and the long run. The value of ECM-1 is -0.32281 indicating that the speed of adjustment from the short-run to the long run takes 32.28% and this is significant at 1%. The governments should channel these external loans in the value added sectors of the economy in order to boost employment, output, sustainable and collective growth of the economy. It therefore advises various organs of the government in charge of fiscal policy and policy implementation to beam their searchlights and oversights on the proper utilization of these loans to avoid diversion, misappropriation and non-implementation of vital projects.

Contribution/Originality: This is one of the few studies that actually adopted the scholarly evidences in the model of debt overhang in the theory of Krugman (1988); Sachs (1988); Elbadawi *et al.* (1997) and Chowdhury (2001); however, only a few scholars have used ARDL technique despite its robustness in ascertaining the long run and short-run of its estimated parameters (Pesaran and Shin, 1999; Pesaran *et al.*, 2001).

1. INTRODUCTION

1.1. Background to the Study

Nigeria has subjected itself to an uncontrollable borrowing to finance deficits over decades to such an extent that the debt burden is so huge, and her annual budget for debt servicing is bigger than capital expenditure. Despite the introduction of SAP in the 1980's and debt forgiveness in the mid 2000's, Nigeria has not been able to get herself out of the web of debt conundrum, with no end in sight to reduce or stop borrowing in its entirety. This study investigates the actual impacts of external borrowing on the economic growth in Nigeria. The breakdown of 2019 appropriation bill indicates that about 25% (NGN2.25T) of total budget will be used to service debt compared to 22% (NGN2.01T) in 2018. As Momodu (2012) posited, shortage of domestic savings to finance productive areas

of the economy prompts nation to borrow. Borrowing can come from domestic channels or from outside of the national border. External debt may be defined as debt owed to non-residents repayable in terms of service, food or foreign cash (World Bank, 2004). The Nigeria's public debt stock as at 31st December 2018 stood at USD79.43B, out of which USD25.27B was owed to external creditors accounted for 32% of total debt outstanding, compared to 2017 with USD70.999B out of which USD18, 913.44 was for external debt payment. 83% share of this external debt belongs to the Federal Government of Nigeria while the remaining 17% are spread among the 36 states of the federation and Federal Capital Territory. There has been large accumulation of debt by the Nigerian government from external borrowing from 2006 to date after Paris club debt exit. The foreign debt stood at USD3.54 in 2006 (Debt Management Office Publications, 2006) and rose sharply to prime at 25.27B in 2018, which is about 700% increase. Before the debt exit and forgiveness in 2005, the external debts were at USD35.94 and USD20.47B in 2004 and 2005 respectively. The high rise in debt burden might not be unconnected to shortage in export, fall in government revenue, massive corruption and resource mismanagement in public places and low investment in productive and value added sectors of the economy. The debt to GDP stood at 18.2% at the end of 2017, which moderately rose from 16.27% in 2016. Based on IMF estimation, Nigerian public debt is still sustainable as it falls under 56% debt to GDP. Nigeria serviced her external debt in 2018 with about USD1.47B, the highest in 12 years after the implementation of debt forgiveness agreement in 2006. This was about 300% increase from the previous year's debt servicing.

The quest for sustainable growth and economic development made Nigeria duty-bound to resort to external borrowing. Nigeria negotiated and obtained her first major external loan of US\$28m from the World Bank in 1958 to fund railway construction. In the post-independence, Ogunyemi (2011) revealed that Nigeria secured her major loan in the sum of USD13.1m in 1964 from the Paris Club of Creditors. This was a bilateral external borrowing for the building of Niger Dam; a project that was executed at the cost of about USD67m and described by the then Ministry of Finance as "the biggest single project that has ever undertaken in Nigeria". The loan was negotiated at the interest rate of 3.5% and to be repaid twenty years. By 1984, when the USD13.1m was due for repayment to the Paris Club, Nigeria found herself in a serious financial crisis with balance of payment problem and shortfall in revenue particularly from oil exports. Nigeria could not service the interest payment on this loan over the year and defaulted on the payment of the principal when due. This led to huge penalties and compounded fines on the loan and Nigeria dropped deep into debt burden and overhang in the 1980's. Ever since loans aimed at various development projects and initiatives has been piling up without tangible results as expected (Udeh *et al.*, 2016). As the amount of borrowing increased, Debt Management Office (DMO) was established in October, 2000 to properly handling of national debt with guidelines and frameworks to borrow and repay. Prior to the coming of the DMO, Central Bank of Nigeria (CBN) was in charge of managing debts for the country. At the moment, DMO in collaboration with CBN and Federal Ministry of Finance oversee the Nigeria's debts. Campbell (2009) expressed fear that government debt can easily become a burden on the economy by weakening its foundation, warning that the authorities should recognize that piling up debt also means accumulating risks by increasing claims on unearned future income. This can jeopardize the expectation that external borrowing would bring about economic growth. Based on the foregoing, it is obvious that there were divergent positions on the effect of external borrowing on the economy, thus the reason for policy makers to have proper appreciation of its effect on the growth and development at various levels to enable them make informed decisions. There are situations or times when debt is desirable and pertinent, while there are other times debts should be avoided to reduce unbearable burden to the growth.

The burden of debt has been a matter of great concern to the successful governments in Nigeria and the nation as a whole since 1980s, which has resulted in having large chunk of her national budget being set aside to service debt annually. The national budget has been on deficit financing for number of years now, prompting the governments to source for extra fund outside its statutory revenue. The governments at all level source for loan domestically and externally to fulfill their obligations of implementing budgets. This was as a result of Nigeria

being a mono-economy largely dependent on sales of crude oil. Over the years, the price of crude oil has not been stable with highest price of \$140 PB (per barrel) in 2012 and \$38 PB in 2015. Moreover, the government failed to save for raining days during boost era and has not made cognate effort to diversify the economy in order to enhance growth.

2. EMPIRICAL REVIEW

Ali and Mustafa (2012) undertook a study into the long run and short run impact of external debt on the economic growth of Pakistan from 1970 – 2010. The empirical evidence revealed that external debt has a negative impact on the economic growth; which means that higher external debt stock discourages economic growth. Disappointedly, labour force showed negative impact on economic growth mainly because of higher number of unskilled labour. Casares (2015) in his, study established that an increase in the external public debt to GDP ratio has a positive effect on the tradable sector by dropping the relative price of the non-tradable good. Thus, with the depreciation of the real exchange rate, the part of labour employed in the tradable sector increases and the proportion of non-tradable capital to tradable capital decreases the relationship between external public debt and economic growth. The two opposite effects on the growth rate of the economy explained the nonlinearity between the external public debt to GDP ratio and growth. Kharusi and Ada (2018) explored relationship between government external borrowing and economic growth in Oman. Time series data for the period 1990-2015 was processed using the Autoregressive Distributed Lag co-integration approach. The finding reveals a negative and significant influence of external debt on economic growth. It therefore recommends that government of Oman should make more productive use of the external debt fund in order to affect positive growth. Mohamed (2013) probed the effect of external debt on the economic growth of Tunisia at short run and the long run, using the Engel and Granger econometric techniques to analyze annual time-series data for 1970-2010. The finding confirmed that the external debts are growth-damaging, which means that the external debt has negative relationship to the growth. It attributed the results to the detrimental role of the traditional 'crowding-out effect' associated with service of debt and interest payments, and the one associated with the corruption in the country. Specifically, corruption has been identified as an additional avenue for the impact of debt on growth. The high level of corruption in the country may provide an explanation of why the debt threshold is too low, which stood at 30 per cent of GDP in comparison with other similar nations. He advised the government of Tunisia to implement drastic policy changes that reduce fiscal deficit. Furthermore, Adeniran *et al.* (2016) explored the relationship between external debt and economic growth in Nigeria using quarterly time series data for 2004-2014. Causality test, VAR and VEC models, impulse response function and variance decomposition function were conducted. The study found that external debt has a positive and significant impact on economic growth of Jordan, while domestic debt has a negative and significant impact on economic growth. However, the impulse response shows that a shock to external debt has a significant and positive effect on real GDP almost after the first quarter. Therefore, countries should obtain external debt basically for economic reasons rather than social or political reasons. Jebran *et al.* (2016) studied the effect of public debt on economic growth for Pakistan over the period 1972 to 2012. The study utilized the Autoregressive distributed lag (ARDL) bounds testing technique to run long and the short run relationship between public debt and economic growth. The study found that there was an existence of significant negative relationship between external debt on GDP and GNP in the long run and in the short run. Furthermore, debt servicing negatively influenced the GDP and GNP in the short run. However, domestic debt is found to have no relationship with economic growth. It therefore suggested that reliance on public debt should be cut as it adversely affects economic growth in Pakistan. In addition, Akram (2017) looked into the consequences of public debt on economic growth and investment in Sri Lanka, using the Autoregressive Distributed lag Model (ARDL) technique. The result showed that public external debt has helped the economy; but debt servicing has a negative relationship to per capita GDP and investment. Public external debt has a positive and significant relationship with per capita

GDP and investment, both in the short-run and long-run. On the other hand, debt servicing has a positive and significant relationship with per capita GDP and investment. He affirmed that the external debt contributed to the development of the civil war which had ravaged the country; but debt servicing was a major concern. He therefore gave an advice that for developing nations to accelerate economic growth, they must adopt such policies, which are likely to result in cutting their debt exposure or make sure that their debt profile does not rise to an unsustainable threshold.

In Nigeria, Udeh *et al.* (2016) studied the impact of external debt on the Nigerian growth for the period 1980-2013 using Ordinary Least Square for the analysis. The result showed that external debt was positively related to the GDP in the short run but negative at the long run; also external debt service was negatively related to the GDP while exchange rate had a positive relationship with it. The DMO should put appropriate mechanism in place to ensure that loans were spent in the sectors that would ensure value addition and GDP growth. Adamu and Rasiah (2016) also studied the impact of external debt on economic growth in Nigeria using data from 1970 to 2013. It investigated the complementarity effect of external debt sustainability index on the growth. Adopting the ARDL bound testing to co-integration approach, the finding discovered a unique long-run co-integrating relationship between per capita GDP and the control variables in both models. The main outcome of this study confirmed that external debt is negatively correlated with the growth. However, the external debt sustainability index proxy of external debt indicators is positive and highly significant; indicating that the debt ratios are below the threshold level with capacity for Nigeria to manage its current debt stock and servicing commitments.

3. MATERIALS AND METHODS

This study focuses on the model of debt overhang in which external debt leads to negative effect on the economic growth. Some of the scholarly evidences supporting the theory including Krugman (1988); Sachs (1988); Elbadawi *et al.* (1997) and Chowdhury (2001).

3.1. Nature and Sources of Data

The secondary data examined in this study include Nigeria's external debt stock, debt services payment, Gross Domestic Product Rate (GDP), foreign direct investment (FDI) and exchange rate. They were collected from Debt Management Office (DMO), and Central Bank of Nigeria (CBN) databases. The FDI data were obtained in Naira but converted to USD using official exchange rates.

3.2. Estimation and Evaluation Technique

The model assumes a linear relationship between economic growth and external debt stock, debt payment, FDI, and exchange rate. An Auto-regressive Distributed Lag (ARDL) technique was utilized partly due to its robustness in ascertaining the long run and short-run of its estimated parameters (Pesaran and Shin, 1999; Pesaran *et al.*, 2001).

Also, unlike the classical co-integration methods like Johansen (1988) and Johansen and Juselius (1990) testing for stationarity in ARDL is not compulsory though it may be necessary to determine the behaviour of the data. The ARDL technique will easily diagnose the dynamic interaction between variables (both dependent and independent) when series are not definite whether at I(1) or I(0). Similarly, the technique can ascertain the required parameter needed to be estimated for long-and short-run simultaneously. As found in Pesaran *et al.* (2001) the F-test can be applied to test the level of co-integration. The basic conditional requirement is for the computed F-stat must fall above the lower and upper-bounds critical value. Again, given an alternative method of justifying the existence of co-integration in the model, Banerjee *et al.* (1998) illustrate that a negative and significant error-correction term (ecm-1) could be a different measure to define long-run relationship among variables.

3.3. Model Specification

The following models were formulated using GDPR as a dependent variable, and EDS, EDP, FDI, and EXR as exogenous variables.

$$\text{Mathematically, } \text{GDPR} = f(\text{EDS, EDP, FDI, EXR}) \tag{1}$$

Equation 1 was used to derive econometric function to be estimated and all variables were moderated into natural logarithm, the values that will be used during estimation. Thus:

$$\text{GDPR}_t = \beta_0 + \beta_1 \text{GDPR}_t + \beta_2 \ln \text{FDI}_t + \beta_3 \ln \text{EDP}_t + \beta_4 \ln \text{EDS}_t + \beta_5 \text{EXCR}_t + \varepsilon_t \tag{2}$$

Where;

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ are regression parameters or coefficients of the model

GDPR = Gross Domestic Product Rate or Economic growth.

EDS= External Debt Stock or External Borrowing

EDP = External Debt Payment or External Debt Servicing.

FDI = Foreign Direct Investment.

EXR = Official Exchange Rate.

μ_t = Error Term which captures the effects of other factors or variables on dependent variable but not include in the model.

Meanwhile, given the methodology adopted for the analyses i.e. ARDL. Equation 2 was also adjusted to the broad form of an Auto-regressive Distributed Lag Model (ARDL) as follows:

$$\Delta \text{RGDP}_t = \beta_0 + \beta_1 \text{RGDP}_{t-1} + \beta_2 \ln \text{FDI}_{t-1} + \beta_3 \ln \text{EDP}_{t-1} + \beta_4 \ln \text{EDS}_{t-1} + \beta_5 \text{EXCR}_{t-1} + \sum_{i=0}^p \beta_7 \Delta \text{RGDP}_{t-i} +$$

$$\sum_{i=0}^p \beta_8 \Delta \ln \text{FDI}_{t-i} + \sum_{i=0}^p \beta_9 \Delta \ln \text{EDP}_{t-i} + \sum_{i=0}^p \beta_{10} \Delta \text{EDS}_{t-i} + \sum_{i=0}^p \beta_{11} \Delta \ln \text{EXCR}_{t-i} + \varepsilon_t \tag{3}$$

Note that all variables remain as earlier described, Δ stand for the difference in respective variables and (-) is a lag sign. To satisfy the long-run relationship, ARDL bound test requires a null hypothesis for no co-integration $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$; for Equation 3. Consequently, all things being equal, at the end of the analysis, it is expected that external debt stock should impact positively on the growth while external debt service should impact negatively the economic growth, while the exchange rate, and FDI should have positive relationships with the economic growth.

4. RESULTS AND DISCUSSION

The study began by testing the correlation among the variables as shown in Table 1. There exists a linear relationship among the variables particularly among the variables that formulate the hypotheses. However, there is a mix of positive and negative correlations, and these are expected.

Table-1. Correlation matrix.

Variable	GDPRATE	LNEDP	LNEDS	LNEXR	LNFDI
GDPRATE	1	0.083361	-0.18307	0.181601	0.13858
LNEDP	0.083361	1	0.518772	-0.41968	-0.47921
LNEDS	-0.18307	0.518772	1	-0.53494	-0.73394
LNEXR	0.181601	-0.41968	-0.53494	1	0.627314
LNFDI	0.3858	-0.47921	-0.73394	0.627314	1

4.1. Unit Root Test and Lag Selection Criteria

Following the standard procedure in econometrics, unit root test is first conducted using ADF test to establish stationarity and the order of integration for each variable; this is shown in Table 2. Given that stationarity property

of the variables under consideration are mostly at first difference I(1) except GDPRATE, which was significant at level, ARDL bound testing technique was deemed suitable for the estimation. All the variables are also significant at 1%.

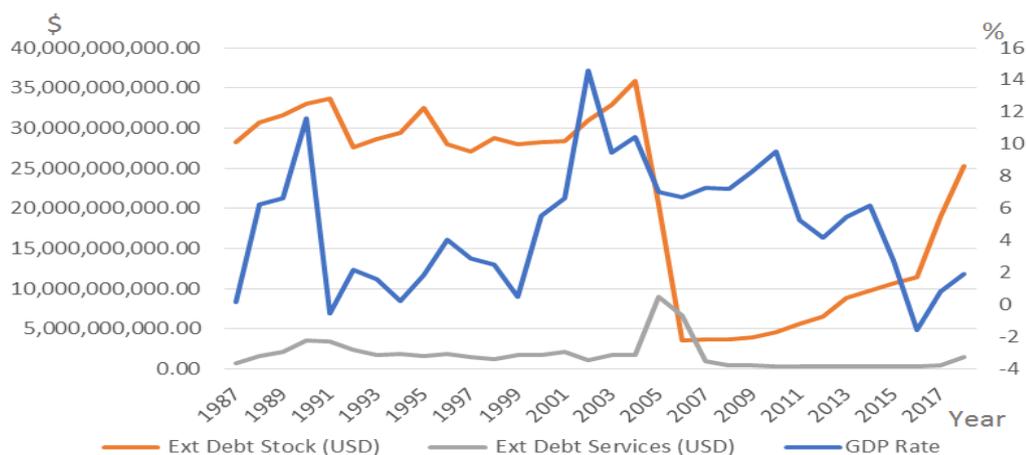


Figure-1. External debt and economic growth.

Table-2. Result of unit root test.

Variables	Level		Ist Diff		Remarks
	F-stat	P-Value	F-stat	P-Value	
GDPRATE	-3.122261	0.0352	-7.605197	0.0000	I(0)
LNFDI	-2.247291	0.1947	-6.95942	0.0000	I(1)
LNEDP	-1.802286	0.3725	-4.082959	0.0036	I(1)
LNEDS	-1.762312	0.3911	-3.8006	0.0073	I(1)
LNEXR	-1.880223	0.3368	-5.225282	0.0002	I(1)

The study further employed the use of VAR Lag selection criteria to appropriately determine the lag level for the estimation from ARDL model. Lag selection is very important such that the outcome from F-statistics could be affected see Table 3. Lag 4 is selected for our estimation given that the sign falls mostly on lag 4 for all criteria except SC which settled for Lag 3.

Table-3. VAR lag order selection criteria.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-111.767	NA	0.002883	8.340477	8.57837	8.413203
1	51.70596	256.8856	1.51E-07	-1.55043	-0.12306	-1.11407
2	77.98675	31.91238	1.67E-07	-1.64191	0.97492	-0.84192
3	128.5928	43.37663*	4.68E-08	-3.47092	0.335383	-2.30729
4	188.2127	29.80995	1.68e-08*	-5.943766*	-0.947999*	-4.416510*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error				SC: Schwarz information criterion		
AIC: Akaike information criterion				HQ: Hannan-Quinn information criterion		

4.2. Bound Test for Cointegration

Given that the unit root property of variables under consideration is within the I(0) and I(1) boundaries, ARDL bound test technique was deemed suitable for the estimation. The study then examined the long-run relationships among the variables using the Wald test on the coefficients of unrestricted ECT variable in Equation 3 to obtain an F-statistic for the joint significance of lagged levels of the variables see Table 4. Going by the assumptions and criteria given by Banerjee et al. (1998) for establishing long-run relationship in ARDL, the model satisfies the condition with the negative and significant value of ECM (-0.32281). It also fulfilled the criteria set by Pesaran et

al. (2001) which submitted that the F statistics falls outside the lower and upper bounds respectively for any of the respective significant levels. As indicated in the table, the calculated F-statistics 4.99838 falls above the upper bound at 1%, 5% and 10% levels of significance, which thus affirmed that there exists long-run relationship between the dependent variable (growth rate) and independent variables. Overall, the speed of adjustment towards long run equilibrium is 32.28%. This means that convergence to long-run needs an average speed of 32.28% to meet up with a significant long run relationship. Thus, the null hypothesis of no co-integration among the data series can be rejected.

Table-4. Cointegration bound tests result.

F-statistic	4.99838	ECM_{t-1}	-0.32281***	(-6.80324)
Significant level		10%	5%	1%
F-Bounds Test	Lower bound	2.2	2.56	3.29
	Upper bound	3.09	3.49	4.37

Note: the number in parenthesis represents t-statistics, *** signifies 1% level of significant, F-statistics is determined with restricted constant and no trend.

Table 5 shows the short run results for the relationship between economic growth (endogenous variable) and debt stock, debt service, FDI, and exchange rate (independent variable) based on the computation of Error Correction Methods for ARDL. Furthermore, it can be deduced from the result that there exists possible long run relationship in the regression, as denoted by the ECM_{t-1} (-0.32281). Meanwhile, all variables under investigation are significant in the short run within the two lag periods. This is in line with the apriori and it indicates that external debt stock (EDS) has a significant and positive relationship with the economic growth in Nigeria in the short run. It is significant at 1% for level and first lag and 5% for second lag. At level, lag one and lag two, 1% increase in EDS is related to 10.21%, 10.14% and 7.67% boost in the economic growth respectively. The reason for the positive effect on the growth may not be farfetched, because external borrowing brings cash into the economy and there are a lot of economic activities in the short term. However, the external debt payment has a negative relationship with the economic growth in the short run. The relationship is significant at 5% for level and lag two, but not significant for lag one. This condition means that at level and lag two, 1% change in the EDP will be associated with 3% and 2.29% reduction in economic growth respectively. This situation may not be far from the truth such that debt servicing takes away fund from the economy. Basically, large chunk of national budget is being used to service debt; the fund that would have ordinarily be used for the development of critical sectors of economy. The foreign direct investment has a mixture of positive and negative relationships with the economic growth and is significant at 10%, 5%, and 1% for level, lag one and lag two respectively. This implies that at level, 1% change in the FDI will increase the economic growth by 2.09%. On the other hand, for lag one and lag two, 1% variation in the FDI will impede the economic growth by 3.01% and 4.52% respectively. This economic condition can be explained in such a way that FDI should stimulate the economic with investor bring in foreign exchange but as time passes by the positive effect on the economy may be eroded due to mismanagement of the underlying projects and initiatives, corruption and shortage of counterpart funding from the government.

Exchange rate on the other hand, has negative relationship with the economic growth in the short run, which is significant at 5% and 1% for lag one and lag two respectively. It shows that at lag one and lag two, 1% rise in the exchange rate, declines the economic growth by 3.4% and 5.12% respectively. The value of Naira has been getting weak against other foreign currencies such as dollar, euro and yuan. Most of the Nigerian external borrowings were denominated in these currencies, leaving it to pay more on debt servicing in the aftermath of currency devaluation and depreciation. Nigeria can get out of problem with increase domestic output, reduction on imports, and containment of economic sabotage and corruption. Moreover, depreciation in the value of Naira against US dollar, and Nigeria being an imported dominated nation required more of its currency to be exchanged for dollar to pay for

foreign goods and services; thus leaving little for the development of local production that could have boosted economic growth.

Table-5. The short-run analysis: ARDL error correction regression.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPRATE(-1))	0.006988	0.116267	0.060102	0.9538
D(GDPRATE(-2))	-0.40008	0.115066	-3.47692	0.0103
D(GDPRATE(-3))	-0.3925	0.119216	-3.29232	0.0133
D(LNEDP)	-3.00476	1.163338	-2.58288	0.0363
D(LNEDP(-1))	-2.37154	1.93145	-1.22786	0.2592
D(LNEDP(-2))	-2.29392	0.810264	-2.83107	0.0254
D(LNEDS)	10.20744	1.698127	6.011002	0.0005
D(LNEDS(-1))	10.13939	2.788424	3.636244	0.0083
D(LNEDS(-2))	7.672028	2.628833	2.918416	0.0224
D(LNEXR)	-0.8046	1.48248	-0.54274	0.6042
D(LNEXR(-1))	-3.40402	1.443016	-2.35896	0.0504
D(LNEXR(-2))	-5.12492	1.210237	-4.23464	0.0039
D(LNFDI)	2.087452	0.973022	2.14533	0.0691
D(LNFDI(-1))	-3.01337	1.111298	-2.71158	0.0301
D(LNFDI(-2))	-4.52431	0.73318	-6.1708	0.0005
CointEq(-1)*	-0.32281	0.047449	-6.80324	0.0003

Note: Restricted constant and no trend.

Given the earlier result, there is a long run relationship between the endogenous and the exogenous variables, and the speed of convergence or adjustment from the short-run to the long run is about 32.32% which is statistically significant at 1%. However, critical examination of result reveals that the long run linear relationship between the endogenous and exogenous variables under investigation is not significant. This means the effect of external debt stock, external debt payment and FDI on the economic growth could not be relied upon since they are not statistically significant. Thus, we cannot be definite that the long run impact is positive since the likelihood of it being wrong is too high. The EDS coefficient of 2.213365 implies that a 1% increase in EDS is associated with the 2.21% rise in economic growth. Also, the EDP coefficient of 32.63718 means that a 1% increase in EDP is related to the 32.64% deplete in the economic growth. The FDI coefficient of 13.2621 indicates that a 1% variation in FDI will increase the economic growth by 13.26% see Table 6.

Lastly, the exchange rate coefficient of 10.42 shows that a unit change in the EXR will boost the economic growth by more than 10 units. Long run positive impact of EDS and EDP on the economic growth is expected as the loan would be used to finance the capital infrastructure thus stimulate the economic activities. This will lead to reduction in the debt stock and debt payment hence freeing money to fund critical sectors of the economy. Also, increase in local production will bring down import volume and therefore make the Naira to be strong and stable against foreign currencies, encourages foreign direct investment and both factors would have positive effect on the economic growth. One interesting outcome of this work is that besides the EDS, all other independent variables adjusted from negative relationship in the short run to the positive relationship in the long run, though the results of the latter are not significant. Therefore, we rely more on the result of the short run relationship of the economic growth and debt stock, debt payment, exchange rate and FDI.

Table-6. The long-run analysis: Long run results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEDP	32.63718	36.21182	0.901285	0.3974
LNEDS	2.213365	8.517501	0.259861	0.8024
LNEXR	10.42323	10.64067	0.979565	0.3599
LNFDI	13.2621	19.05697	0.695919	0.5089
C	-1056.32	1356.661	-0.77862	0.4617

Note: Restricted constant and no trend.

4.3. Stability and Diagnostic Tests

The need for stability test could not be over emphasized. It is of necessity to test for the stability of the model employed to ensure credibility and reliability of the results. These tests are conducted to determine the suitability and stability of the model applied in this study. We resolved for Cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUM of Square) tests. The test statistic based on the CUSUM of recursive residuals was introduced in [Brown et al. \(1975\)](#) and adapted herein. In a simulation study, [Ploberger and Kramer \(1992\)](#) show that the CUSUM Test based on recursive residuals has better power to detect parameter instability occurring early in the sample than the test based on OLS residuals. Both CUSUM and CUSUM of Square tests could be graphically represented to show such needed stability of models [Figure 2](#) and [Figure 3](#).

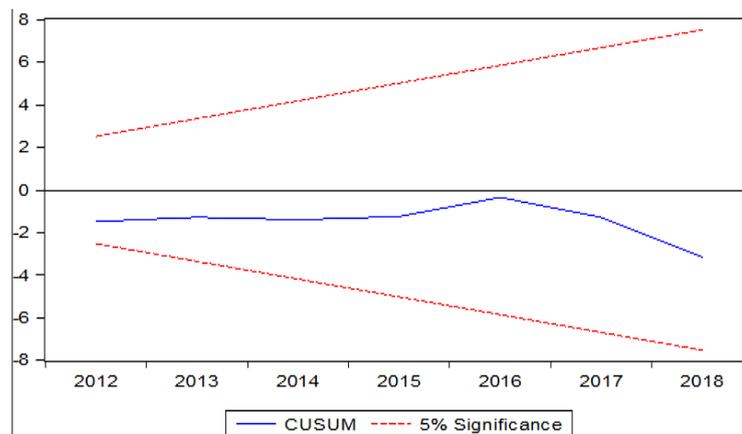


Figure-2. CUSUM – 5% significance.

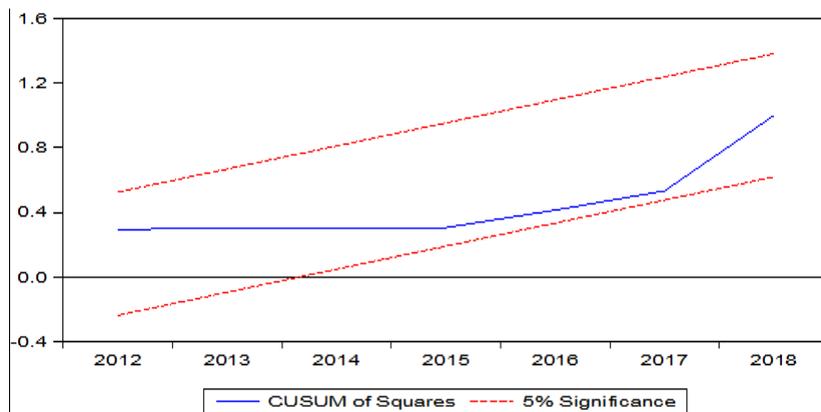


Figure-3. CUSUM of Squares – 5% significance.

In the model herein, there is an indication of perfect stability with no specification errors since the plotted lines are within the region of stability. A drift from this region of stability will mean an error in model specification but the result has stated otherwise, hence this report could be relied upon for further reference. In another diagnostic test as shown in [Table 7](#), the study also applied the Jarque-Bera test for Normality and Breusch-Pagan-Godfrey Heteroscedasticity test. These tests have further indicated the model is normal with no heteroscedasticity. The R-square and Adjusted R-Square are high enough which means the independent variables have high degree of influence over the dependent variable. The null hypotheses for normality test and heteroscedasticity test could not be rejected since their probabilities are very high. Generally, this implies that the short run coefficients in the ECM model are stable and therefore credible.

Table-7. Diagnostic test.

R-Square	0.918162
Adjusted R-square	0.815864
Jarque- Bera Normality Test	6.626964
Durbin-Watson	2.647561
Heteroscedasticity Test	0.331454 (0.9753)
Heteroscedasticity Test II	0.74256 (0.7193)

Note: Numbers in parentheses are probabilities, Jarque Bera Normality Test was utilized, Heteroscedasticity test is with Breusch-Pagan-Godfrey test.

5. CONCLUSION

Some of the findings from this study are consistent with economic literature and evidences particularly on the debt overhang theory work adopted. External debt stock has a positive relationship with the economic growth in Nigeria and it is significant at the short run but not significant at the long run. External debt service has a negative relationship with the economic growth and it is significant in the short run. Though the sign of the relationship changed positive at the long run with the speed of 32.28% disequilibrium, but not significant.

The study discovered that external debt stock is significant and has positive impact on the economic growth in the short run. Though, the relationship is also positive in the long run but not significant. In general term, as debt stock increases, the GDP also rises. The result follows the apriori expectation such that borrowing would improve economic growth in line with the neoclassical debt theory. The study also rejected the null hypothesis - H_0 : External debt has no significant effect on economic growth in Nigeria. This result is in consonance with the findings of Udeh *et al.* (2016). The study ascertained that the external debt payment has a negative and significant relationship with the economic growth in the short run. The long run result is not significant and it is in contrast with short run result. This means that debt service has a negative impact on the economic growth. It conformed to the evidences for the debt overhang model as posited by Krugman (1988) and Sachs (1988). The result follows the apriori expectation such that debt service is detrimental to the growth as the fund could be used to grow critical segment of the economy. This result also corroborates the works of Adesola (2009); Udeh *et al.* (2016); Jebran *et al.* (2016) and Akram (2017).

6. RECOMMENDATIONS

Based on the research findings, the following recommendations are hereby suggested; The government should endeavor to spend these borrowings in the value added sectors of the economy in order to boost employment, output and collective growth. This action will encourage high foreign direct investment into the country. The Debt Management Office, National and State Assemblies and Budget Offices should try to beam their searchlights and oversight on the proper utilization of these loans to avoid diversion, misappropriation and non-implementation of vital projects. The central bank of Nigeria should endeavor to lower the interest so as enable commercial banks to grant more credit facilities to businesses in order to stimulate the economy.

Funding: This study received no specific financial support.

Competing Interests: The authors declare that they have no competing interests.

Acknowledgement: All authors contributed equally to the conception and design of the study.

REFERENCES

- Adamu, I.M. and R. Rasiah, 2016. External debt and growth dynamics in Nigeria. *African Development Review*, 28(3): 291-303. Available at: <https://doi.org/10.1111/1467-8268.12206>.
- Adeniran, A.O., M.I. Azeez and J. Aremu, 2016. External debt and economic growth in Nigeria: A vector auto-regression (VAR) approach. *International Journal of Management and Commerce Innovations*, 4(1): 706-714.
- Adesola, W.A., 2009. Debt servicing and economic growth in Nigeria: An empirical investigation. *Global Journal of Social Sciences* 8(2): 1-11. Available at: <https://doi.org/10.4314/gjss.v8i2.51574>.

- Akram, N., 2017. Role of public debt in economic growth of Sri Lanka: An ARDL approach. *Pakistan Journal of Applied Economics*, 27(2): 189-212.
- Ali, R. and U. Mustafa, 2012. External debt accumulation and its impact on economic growth in Pakistan. *Pakistan Development Review*, 51(4): 79-97. Available at: <https://doi.org/10.30541/v51i4iipp.79-96>.
- Banerjee, A., J. Dolado and R. Mestre, 1998. Error-correction mechanism tests for cointegration in a single-equation framework. *Journal of Time Series Analysis*, 19(3): 267-283. Available at: <https://doi.org/10.1111/1467-9892.00091>.
- Brown, R.L., J. Durbin and J.M. Evans, 1975. Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society: Series B (Methodological)*, 37(2): 149-163.
- Campbell, K.A., 2009. *The economic role of government: Focus on stability, not spending*. Washington, DC: Heritage Foundation.
- Casares, E.R., 2015. A relationship between external public debt and economic growth. *Estudios Económicos (México, DF)*, 30(2): 219-243.
- Chowdhury, A.R., 2001. External debt and growth in developing countries: A sensitivity and causal analysis. Discussion Paper No. 95. World Institute for Development Economics Research (WIDER), United Nations University, Helsinki.
- Debt Management Office Publications, 2006. Annual report and statement of account. Available from <https://www.dmo.gov.ng/publications/reports/dmo-annual-report-statement-of-accounts>.
- Elbadawi, I.A., B.J. Ndulu and N. Ndung'u, 1997. Debt overhang and economic growth in Sub-Saharan Africa. In: Iqbal, Z., Kanbur, R., editors. *External Finance for Low-income Countries*. Washington, DC: International Monetary Fund.
- Jeban, K., A. Ali, U. Hayat and A. Iqbal, 2016. Public debt and economic growth: A reassessment. *Pakistan Business Review*, 18(2): 307-324.
- Johansen, S., 1988. Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*, 12(2-3): 231-254. Available at: [https://doi.org/10.1016/0165-1889\(88\)90041-3](https://doi.org/10.1016/0165-1889(88)90041-3).
- Johansen, S. and K. Juselius, 1990. Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52(2): 169-210. Available at: <https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x>.
- Kharusi, S.A. and M.S. Ada, 2018. External debt and economic growth: The case of emerging economy. *Journal of Economic Integration*, 33(1): 1141-1157. Available at: <https://doi.org/10.11130/jei.2018.33.1.1141>.
- Krugman, P., 1988. Financing vs. Forgiving a debt overhang. *Journal of Development Economics*, 29(3): 253-268. Available at: [https://doi.org/10.1016/0304-3878\(88\)90044-2](https://doi.org/10.1016/0304-3878(88)90044-2).
- Mohamed, B.M., 2013. Assessing the short-and long-run real effects of public external debt: The case of Tunisia. *African Development Review*, 25(4): 587-606. Available at: <https://doi.org/10.1111/1467-8268.12054>.
- Momodu, A., 2012. Effect of debt servicing on economic growth in Nigeria. *Reiko Journals of Business and Finance*, 4(3): 116-124.
- Ogunyemi, A.O., 2011. Rethinking the origin of Nigeria's debt burden: A historical reconstruction. *Journal of the Historical Society of Nigeria*, 20(2011): 26-44.
- Pesaran, H.M. and Y. Shin, 1999. Autoregressive distributed lag modelling approach to Cointegration analysis. In: S. Storm (Ed.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*, chapter 11. Cambridge: Cambridge University Press.
- Pesaran, M.H., Y. Shin and R.J. Smith, 2001. Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3): 289-326. Available at: <https://doi.org/10.1002/jae.616>.
- Ploberger, W. and W. Kramer, 1992. The CUSUM test with OLS residuals. *Econometrica*, 60(2): 271-285. Available at: <https://doi.org/10.2307/2951597>.
- Sachs, J., 1988. The debt overhang of developing countries. In: Calvo, A.G., Findlay, R., Kouri, P., de Macedo, J., editors. *Debt, Stabilization and Development: Essays in Memory of Carlos Diaz Alejandro*. Oxford: Basil Blackwell. pp: 80-102.

Udeh, S.N., J.I. Ugwu and I.O. Onwuka, 2016. External debt and economic growth: The Nigeria experience. *European Journal of Accounting Auditing and Finance Research*, 4(2): 33-48.

World Bank, 2004. *World development indicators 2004* (English). Washington, DC: World Bank. Available from <http://documents.worldbank.org/curated/en/517231468762935046/World-development-indicators-2004>.

Views and opinions expressed in this article are the views and opinions of the author(s). The Economics and Finance Letters shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.