Does External Debt Impair Economic Growth in Nigeria?

Maxwell Ekor
(Ecopol Associates Limited, Nigeria)

Tayo Orekoya
(Freelance Researcher, Canada)

Philip Musa
(Federal Polytechnic, Ilaro Nigeria)

Osikwemhe Damisah
(Freelance Researcher, United Kingdom)

Abstract
The debt and economic growth debate remain topical in Nigeria given the controversies that often trail the government's plan to always borrow to fund the annual budget deficits. This study provides an empirical contribution to the national discourse by assessing the impact of foreign debt on the Nigerian economy. Applying a dynamic variant of the auto-regressive distributed lag model, the main result from this study is that in the long run, external debt accumulation and the associated service payments have negative effects on the economy. The policy implication is that government should always ensure that external debt accretion is sustainable and used for infrastructure development.
Key Words: *Economic Growth; External Debt; Auto-Regressive Distributed lag Model.*

I. Introduction

Nigeria borrows mainly to finance its budget deficits given that projected revenues, both from oil and non-oil sources often fall short of expectations. External borrowing is believed to be harmful as it makes a country susceptible to outside circumstances, especially during rising global interest rates and domestic currency depreciation. Putting this in the Nigerian perspective, the country, prior to the return to civilian rule in 1999, was under huge external debt burden. Although estimates of the actual debt stock varied according to different sources, Ajayi and Edewusi (2020) noted that it was slightly above £30bn before the deal with the Paris club of creditors in 2006. While the country's external debt comparative to the gross domestic product (GDP) is below the 40% international threshold, there is genuine anxiety about the rising debt level.

This concern has again manifested in the recent time as the country grapples with the need to mobilize resources to implement its developmental projects. The proposition for more borrowing resulted from the massive revenue shortfall arising from negative shocks to oil prices on the one hand, as well as the domestic disruptions to oil production on the other. Expectedly, opinions are divided on the implications of external borrowing for the economy. Accordingly, the goal of this paper is to contribute to the extant literature by providing an empirical intuition into the long run impact of external debt on the Nigerian economy. This is with a view to reinforcing or otherwise, the submission that external borrowing has negative effect on the economy.

II. Theory & Literature

Hassan *et.al*. (2015) provided a succinct explanation of the main theories that describe the nexus between debt and economic performance. These are the debt overhang theory, crowding-out effect theory, dual-gap theory, and the dependency theory. While the debt overhang theory explains the debt position that is huge and prohibits further borrowing, the crowding-out hypothesis depicts the level of public sector debt that limits or 'crowd-out' the private sector from assessing the debt market. The Dual-Gap theory depicts that the gap arising from investment needs of a country and its savings means that external borrowing becomes inevitable. Proponents of the dependency theory posit that because of the capitalist tendencies of developed economies, poor countries will continue to depend on them of support, including borrowing to finance their needs (Prebisch, 1968; Ferraro, 2008).

The connection between external debt and economic performance remains a topical issue given that countries will continue to experience financing gaps for developmental projects. This literature review provides evidence in a sequential manner from studies that have examined empirically, the relationship between external debt and the economy. The rationale for this chronological order is to understand how results on the subject matter have evolved over time. In addition, given that outcomes of empirical works are a function of data and the estimation technique, the chronological order explains how advances in econometric techniques have helped explain the relationship between external debt and economic growth.

Ajayi (1991) explained that instability in the economic condition of Nigeria motivated the huge borrowing needs, including from external sources, at unmanageable levels and thus affected domestic resource mobilization. Elbadawi *et al.* (1996) used a cross-country approach and depicted that the effect of external debt on growth are mainly through 'current debt inflows as ratio of GDP, previous debt accumulation, and debt service ratio. The outcome was that debt accumulation incumbers growth while debt stock boosts growth. Ndung'u (1998) assessed the impact of debt on private investment and economic growth in Africa, positing that foreign debt challenge in Africa leads to investment gap and lower economic growth. The result was that if a nation gets onto the wrong side of the Laffer curve and the trend is not reversed, then the accumulated effects further affect economic growth. Iyoha (1999) used simulation technique to evaluate the consequence of external debt on growth in sub-Saharan Africa. The result showed that the outcome of debt overhang on growth was significant.

Were (2001) examined and indicated that external debt accumulation has inverse result on economic progress and private investment in Kenya, while growth is not affected adversely by debt servicing. Edo (2002) conducted a comparative study of Nigeria and Morocco with the objective of examining the external debt problem in Africa. The main conclusions comprise but are not limited to the fact that external debt has negative impact on investment, and that fiscal spending, balance of payments and global interest rate are the vital influences in clarifying the accretion of external debt in Nigeria and Morocco. Audu (2004) applied the Johansen co-integration and Vector Error correction methods to explore the effect of debt on economic growth and public investment in Nigeria. The conclusion was that debt service burden has a significant adverse effect on economic growth and public investment in Nigeria.

Dinneya (2006) analyzed democracy, external debt and economic growth in Nigeria; the outcome from this study was mixed because while debt contributed positively to economic growth in some period, the reverse was the case in some other period. Osinubi and Olaleru (2006) posited that the need for borrowing to finance budget deficit led to the accumulation of external debt. Scrutinizing how budget deficit resulted in debt build-up, their findings confirm the presence of debt Laffer curve and the nonlinear impacts of external debt on economic growth in Nigeria.

Adepoju *et al.* (2007) investigated the behaviour of donor agencies and they found that accumulation of external debt impairs economic growth in Nigeria. On the contrary, Ali and Mshelia (2007) found positive and negative relations between external debt and GDP for Nigeria. Adam (2007) studied the nexus between external debt and economic growth with focus on debt sustainability. The results indicated that the impact of external debt on economic growth is negative. Olu-Coris (2008) adopted a sectoral method (Agriculture, Transport/Communications, Health and Defence) to studying the association between external debt and economic growth in Nigeria. The result demonstrates that external debt reduced economic growth through the five sectors.

Adesola (2009) used debt payment to multilateral financial creditors, Paris club creditors and London club creditors and found that the gross domestic product (GDP) and gross fixed capital formation were negatively affected. Bakare (2010) measured the impact of debt relief on Nigeria's economic growth and the outcomes specify that despite the respite from Paris Club in 2006, growth was not positively affected. Dada (2012) used various statistical and econometric methods to examine the impact of debt on economic growth in Nigeria. The outcome was that no long-run relationship exists between debt and growth while the effect of external debt is negative and insignificant, that of local debt is positive but also not significant.

Hassan *et. al.* (2015) relied on the Dual-Gap theory and ordinary least squares method to assess the effect of external debt in Nigeria. The results indicate that the effect of debt on economic growth is insignificant, with external debt contributing only marginally. Seteolu and Aje (2018) relied on the dependency theory intuition and descriptive illustrations to argue that Nigeria's external debt predicament is the outcome of the location of its economy in the international capitalist system as a dependent, peripheral entity. They also noted that this challenge is magnified by the domestic flaws that characterize the national economy.

Ajayi and Edewusi (2020) studied the consequence of government debt on Nigeria's economic growth using time series data between 1998 and 2018. Applying descriptive statistics, unit root test, Johansen co-integration test and vector error correction model, the study found that external debt has a negative long run and short run effect on Nigeria's economic performance while domestic debt exerts positive long run and short run impact.

The reviewed studies provided the different outcomes concerning the connection between debt and economic growth. This study therefore contributes to the literature by applying a different estimation procedure to examine this issue. The estimation techniques are explained in the subsequent section.

III.   Methodology

Given the diverse approaches that have been used to examine the debt-growth relationship, this section briefly outlines the estimation technique and data type that are applied for the study.

Estimation technique

The Autoregressive Distributed Lag (ADL) model is a dynamic econometric tool that is applied in examining the long run relationship between and among economic variables. A key characteristic of the ADL model is that the regressors may include the lagged values of the dependent variable as well as the current and lagged values of the explanatory variables.

In its general form the ADL (1, 1) model is stated as follows:

$y_t = m + \alpha_1 y_{t-1} + \beta_0 x_t + \beta_1 x_{t-1} + u_t$ ……………………….………………1

Where y_t and x_t are stationary variables and u_t is a white noise.

To scrutinize the connection between external debt and economic growth in Nigeria, this study assumes the dynamic effect of external debt on the GDP by employing a variant of the ADL model (p, q) of the form stated in equation 2.

$\Delta Y_t = \alpha + \Phi_t + \beta Y_{t-1} + \mu \Delta Y_{t-1} + \ldots + \mu_{p-1} \Delta Y_{t-p+1} + \O X_t + \text{þ}_1 \Delta X_t + \text{þ}_{1-t} \Delta X_{t-1} \ldots + \text{þ}_q \Delta X_{t-q+1} + e_t$ 2

Where:

ΔY_t	=	first difference of the dependent variable
Y_{t-1}	=	lagged value of the dependent
ΔY_{t-1}	=	lagged value of the first difference of the dependent variable
X_t	=	explanatory variable
ΔX_t	=	first difference of the explanatory variable
ΔX_{t-1}	=	lagged value of the first difference of the explanatory variable
Φ_t	=	the deterministic time trend

An important benefit of applying the variant of the ADL model stated in equation 2 is that according to Koop (2009), the problem of multicollinearity is reduced to the barest minimum. Likewise, the marginal and long-run effects of the coefficients can be understood using the concept of the multiplier. So, the long-run effect of the explanatory variables on the dependent variable in equation 2 is determined by the ratio of the coefficients of the explanatory variables X_t and the lag of the dependent variable Y_{t-1}, that is (- $\O/ \beta$).

Equation 2 is modified to estimate the long-run effects of external debt and debt service on GDP as re-stated in equation 3 as follows:

$\Delta InGDP_t = \alpha + \Phi_t + \beta InGDP_{t-1} + \mu \Delta InGDP_{t-1} + \O EDS_t + \text{þ}_1 \Delta EDS_t + \text{þ}_{1-t} \Delta EDS_{t-1} + \Omega DSP_t + \psi_1 \Delta DSP_t + \chi_{1-t} \Delta DSP_{t-1} + e_t$ 3

Where

$\Delta InGDP_t$	=	first difference of the log of GDP
$InGDP_{t-1}$	=	lagged value of log of GDP
$\Delta InGDP_{t-1}$	=	lagged value of the first difference of log of GDP
EDS_t	=	external debt stock (% of GDP)
ΔEDS_t	=	first difference of external debt stock (% of GDP)
ΔEDS_{t-1}	=	lagged value of the first difference of external debt stock (% of GDP)
DSP_t	=	debt service payment
ΔDSP_t	=	first difference of debt service payment
ΔDSP_{t-1}	=	lagged value of the first difference of debt service payment
Φ_t	=	the deterministic time trend

Data type and source

The type of data required for the investigation herein is time series data which is defined as data collected on a given frequency, for example, daily, weekly, monthly, quarterly, and annually. The information was obtained from the World Bank's World Development Indicators (WDI) between 1976 and 2008. Although dated, the rationale for concentrating on this timeframe is to measure how foreign debt impacted the Nigerian economy in the years of huge debt accumulation and shortly after the Paris Club debt deal in 2006.

IV. Results

Unit Root Test

An important condition for estimating the Autoregressive Distributed Lag (ADL) model is that the variables must be stationary, thus the unit root test was performed using the Augmented Dickey-Fuller (ADF) test. Table 1 illustrates that the variables are stationary after the first difference, implying that they are integrated of order 1 and can be used in the ADL model.

Table no 1: shows Unit Root Test

	ADF t-statistic	Critical values			P-value*
		1%	5%	10%	
LGDP	-4.1250	-3.6616	-2.9604	-2.6191	0.0031
DSP	-8.0586	-3.6616	-2.9604	-2.6191	0.0000
EDS	-5.1323	-3.6616	-2.9604	-2.6191	0.0002

Source: Author's estimates
*MacKinnon (1996) one-sided p-values

Estimation outcomes

Model with External Debt Stock and Debt Service

Table 2 displays the outcomes of the first model which has both external debt stock and debt service as the explanatory variables. Given that our focus is on the long run effect, the long-run impacts are measured by the negative ratio of the coefficients of the explanatory variables X_t (EDSt and DSPt) and the lag of the dependent variable Y_{t-1}, (InGDPt-1). +

The estimated coefficient of EDSt is –0.0013, DSPt is -0.0045 and InGDPt-1 is -0.6181. Consequently, the long-run effect of external debt stock (EDSt) on GDP is -(-0.0013/-0.6181) which is equal to -0.002. This suggests that in the long-run, GDP will drop by about 0.002% if external debt increases by 1%. Also, the long-run effect of debt service payment on GDP is – (-0.0045/-0.6181) which is equal to -0.007, implying that GDP drops by 0.007% if external debt service payment increases by 1%. The inference is that in the long run the negative effect of serving the debt is higher that the impact of debt stock.

Table no 2: Estimated ADL Results 1

	Coeff.	Std. Error	t-ratio	p-value
const	15.8053	6.7757	2.3326	0.0297
Time	0.0214	0.0114	1.8722	0.0751
InGDPt-1	**-0.6181**	0.2676	-2.3097	0.0311
EDSt	**-0.0013**	0.0012	-1.0840	0.2906
ΔEDSt	-0.4792	0.0828	-5.7858	0.0000
ΔEDSt-1	0.1966	0.1649	1.1921	0.2465
DSPt	**-0.0045**	0.0057	-0.7869	0.4401
ΔDSPt	0.1896	0.0905	2.0944	0.4401
ΔDSPt-1	-0.0978	0.0529	-1.8472	0.0788
ΔInGDPt-1	0.0448	0.1298	0.3457	0.7330
R-squared	0.8391			
Adjusted R-squared	0.7702			

Source: Author's estimates

Model with only External Debt Stock

To determine the separate impacts of debt stock and debt service, the model is re-estimated with only EDS and lag of the dependent variable (GDP) as the explanatory variables as shown in equation 4:

ΔInGDPt= α + Φt+ βInGDPt-1+ μΔInGDPt-1 +ØEDSt + þ1ΔEDSt+ þ1-tΔEDSt-1

+ et 4

From the outcomes in Table 3, the estimated coefficient of EDSt is –0.003 whereas that of InGDPt-1 is -0.2824. So, the long-run multiplier result is stated as -(-0.003/-0.2824) which is equal to -0.012. This suggests that in the long-run GDP will decline by about 0.01% if debt increases by 1%.

Table no 3: Estimated ADL Result 2

	Coeff.	Std. Error	t-ratio	p-value
Const	6.9273	2.9783	2.3259	0.0289
Time	0.0128	0.0045	2.8057	0.0098
InGDPt-1	**-0.2824**	0.1215	-2.3243	0.0289
EDSt	**-0.0033**	0.0013	-2.6059	0.0155
ΔEDSt	-0.0045	0.0016	-2.8910	0.0080
ΔEDSt-1	0.0059	0.0019	3.1481	0.0044
ΔInGDPt-1	0.5404	0.1874	2.8836	0.0082
R-squared	0.7961			
Adjusted R-squared	0.7452			

Source: Author's estimates

Model with only Debt Service

The ADL model is further re-estimated with only DSP and the lag of GDP as the explanatory variables as shown in equation 5:

ΔInGDPt= α + Φt+ βInGDPt-1+ μΔInGDPt-1 +ØDSPt + þ1ΔDSPt+ þ1-tΔDSPt-1

+ et 5

The long-run effect of debt service on GDP is specified by the ratio of the coefficients of DSPt and InGDPt-1. Table 4 displays that the estimated coefficient of DSPt is –0.0113 whereas that of InGDPt-1 is -0.0991, thus, the long-run multiplier consequence is stated as -(-0.0113/-0.0991) which is equal to -0.114. This implies that in the long-run GDP will drop by about 0.11% if debt service increases by 1%.

Table no 4: Estimated ADL Results 3

	Coeff.	Std. Error	t-ratio	p-value
Const	2.5002	2.0024	1.2486	0.2239
Time	0.0081	0.0047	1.7330	0.0959
InGDPt-1	-0.0991	0.0824	-1.2036	0.2405
DSPt	-0.0113	0.0046	-2.4594	0.0215
ΔDSPt	0.0096	0.0056	1.7237	0.0976
ΔDSPt-1	0.0044	0.0051	0.8610	0.3978
ΔInGDPt-1	-0.0239	0.2060	-0.1158	0.9087
R-squared	0.3548			
Adjusted R-squared	0.1935			

Source: Author's estimates

Overall, the results from this study reinforce the findings of Adepoju *et al.* (2007), Adesola (2009), Dada (2012) and Ajayi and Edewusi (2020). These studies found that external debt affects the economy negatively.

Post estimation tests

Post estimation tests were conducted for the three estimated models and the results are shown in Table 5. The essence of these tests is to ensure that the results obtained are not spurious and misleading. The normality

tests for the three models show that the residuals are normally distributed as indicated by the p-values. Also, the models were well specified as explained by the Ramsey's RESET test for specification results, while the tests for heteroskedasticity using White's (1980) test show that the variances are homoscedastic. The models did not violate the serial independence assumption given the outcomes of the autocorrelation test.

Table no 5: Diagnosis Tests

	Model 1	Model 2	Model 3
Normality Test	0.7354	0.3068	0.2319
Ramsey's RESET Test	0.5210	0.1071	0.4299
White's Heteroskedasticity Test	0.5932	0.5343	0.3233
LM test (autocorrelation)	0.6737	0.3794	0.6878

Source: Author's estimates

V.   Summary and Conclusion

The study scrutinized the long run effect of external debt on the Nigerian economy. The justification for this re-examination is the continuous debate that is often associated with the country's borrowing plans. Applying a modified version of the autoregressive distributed lag model, this study found that the long run effects of both external debt stock and the associated service payments are adverse on Nigeria's economic growth. However, the negative consequence of debt service payment is higher when compared with debt stock. The results from this study support those of Adepoju *et al*. (2007), Adesola (2009), Dada (2012) and Ajayi and Edewusi (2020) that all found that the effect of external debt on economic growth is negative in Nigeria. The policy inference is that the government should be meticulous and focus on external financing that are concessionary. In addition, such external borrowings should be channeled to programmes and projects that will boost economic growth and development in the country.

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