

## Effect of External Debt on Economic Growth of Nigeria

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### Abstract

The study examines the effect of external debt on the economic growth of Nigeria. The model built for the study proxy gross domestic product as the endogenous variable measuring economic growth as a function of external debt, ratio of external debt to export, inflation, and exchange rate proxy as the exogenous variables. Annual time series data was gathered from the Central Bank of Nigeria Statistical bulletin and Debt Management Office from 1970 to 2010. The econometric techniques of Ordinary Least Square (OLS), Augmented Dickey-Fuller (ADF) Unit Root test, Johansen Co-integration test and Error Correction Method (ECM) are employed in the empirical analysis. The co-integration test shows that long-run equilibrium relationship exist among the variables. The findings from the error correction method show that external debt has contributed positively to the Nigerian economy. The study recommends that government should ensure economic and political stability and external debt should be acquired largely for economic reasons rather than social or political reasons.

**Keywords:** External Debt, Economic Growth, Gross Domestic Product, Error Correction Method.

### 1. Introduction

No government is an island on its own; it would require aid so as to perform efficiently and effectively. One major source of aid is foreign borrowing or external debt. The motive behind external debt is due to the fact that countries especially the developing ones lack sufficient internal financial resources and this calls for the need for foreign aid.

The dual-gap analysis provides the framework which shows that the development of a nation is a function of investment and that such investment which require domestic savings is not sufficient to ensure that development take place (Oloyede, 2002). Hence, the importance of external debt on the growth process of a nation cannot be overemphasized. Hameed, Ashraf, and Chaudhary (2008) stated that external borrowing is ought to accelerate economic growth especially when domestic financial resources are inadequate and need to be supplemented with funds abroad.

External debt is a major source of public receipts. The accumulation of external debt should not signify slow economic growth. It is a country's inability to meet its debt obligation compounded by the lack of information on the nature, structure and magnitude of external debt (Were, 2001). Soludo (2003) opined that countries borrow for two broad categories; macroeconomic reasons to either finance higher investment or higher consumption and to circumvent hard budget constraint. This implies that an economy borrow to boost economic growth and alleviate poverty. He argued that when debt reaches a certain level, it becomes to have adverse effect, debt servicing becomes a huge burden and countries find themselves on the wrong side of the debt-laffer curve, with debt crowding out investment and growth. The debt service burden has militated against Nigeria's rapid economic development and worsened the social problems (Audu, 2004).

According to Omoleye, Sharma, Ngussam, and Ezeonu (2006), Nigeria is the largest debtor nation in the Sub-Saharan Africa. The genesis of Nigeria's external debt can be traced to 1958 when 28 million US dollars was contracted from the World Bank for railway construction. Between 1958 and 1977, the need for external debt was on the low side. However, due to the fall in oil prices in 1978 which exerted a negative influence on government finances, it became necessary to borrow to correct balance of payment difficulties and finance projects. The first

major borrowing of 1 billion US dollars referred to as Jumbo loan was contracted from the international capital market (ICM) in 1978 increasing the total to 2.2 billion U.S dollars (Adesola, 2009). The spate of borrowing increased thereafter with the entry of the state government into external loan contractual obligation. According to the Debt Management Office (DMO), Nigeria's external debt outstanding stood at N17.3 billion. In 1986, Nigeria had to adopt a World Bank/International Monetary Fund (IMF) sponsored Structural Adjustment Programme (SAP), with a view to revamping the economy making the country better-able to service her debt (Ayadi and Ayadi, 2008).

The increasing fiscal deficits driven by the higher level of external debt servicing is a major threat to growth of the nation. The resultant effect of large accumulation of debt exposes the nation to high debt burden. Nigeria is about the richest on the continent of Africa, yet due to the numerous macro-economic problems, such as inflation, unemployment, sole dependency on crude oil as a major source of revenue, corruption and mounting external debt and debt service payment, majority of her citizen fall below the poverty line. Therefore, the study seeks to thoroughly and empirically investigate the consequential effect of Nigeria's external debt on her economy and arrive at a logical conclusion. The findings from the study will be of utmost importance because policy recommendations will be given on the basis of its findings. The next section reviews various literatures, section three deals with the methodology, section four presents the data analysis and interpretation while the last section provides the conclusion and recommendations.

## **2. Literature Review**

Countries experiencing fiscal deficits, especially the developing ones borrow to improve their economic growth. Government borrows in principle to finance public goods that increase welfare and promote economic growth (Ogunmuyiwa, 2011). Due to the fact that the domestic financial resources are not adequate, borrowing is acquired from foreign sources. The amount of fund provided by these foreign sources constitutes the external debt of a nation. In Nigeria, external debt is sourced from Multilateral agencies, Paris club creditors, London club creditors, Promissory Note holders and other creditors. External debt is one of the sources of financing capital formation in any country (Ayadi and Ayadi, 2008).

External debt is acquired to contribute meaningfully to the economy but the future debt service payment poses a threat to economic growth. A number of researchers have examined the effect of external debt on economic growth since the beginning of the new millennium.

Ayadi and Ayadi (2008) examined the impact of the huge external debt, with its servicing requirements on economic growth of the Nigerian and South African economies. The Neoclassical growth model which incorporates external debt, debt indicators, and some macroeconomic variables was employed and analyzed using both Ordinary Least Square (OLS) and Generalized Least Square (GLS) methods. Their finding revealed negative impact of debt and its servicing requirement on the economic growth of Nigeria and South Africa. Ogunmuyiwa (2011) examined whether external debt promotes economic growth in Nigeria using time-series data from 1970-2007. The regression equation was estimated using econometric techniques such as Augmented Dickey-Fuller test, Granger causality test, Johansen co-integration test and Vector Error Correction Method (VECM). The results revealed that causality does not exist between external debt and economic growth in Nigeria.

Adesola (2009) empirically investigated the effect of external debt service payment practices on the economic growth of Nigeria. Ordinary Least Square method of multiple regression was used to examine how debt payment to multilateral financial creditors, Paris club creditors, London club creditors, Promissory Notes holders and other creditors relates to gross domestic product (GDP) and gross fixed capital formation (GFCF) using data from 1981 to 2004. The study provides evidence that debt payment to Paris club creditors and Promissory Notes holders are positively related to GDP and GFCF while debt payment to London club creditors and other creditors show a negative significant relation to GDP and GFCF. Audu (2004) examined the impact of external debt on economic growth and public investment in Nigeria from 1970-2002. The empirical investigation was done using the Co-integration test and Error Correction Method. The study shows that debt servicing pressure in the country has had a significant adverse effect on the growth process and past debt accumulation negatively affect public investment.

Adepoju, Salau and Obayelu (2007) analyzed the effects of external debt management on the economic growth of Nigeria for a period between 1962 to 2006 using time-series data of the various bilateral and multi lateral arrangements. Their study concluded that accumulation of external debt adversely affected Nigeria's economic growth.

Empirical studies not related to Nigeria are also reviewed to show evidence from other countries. Choong, Lau, Liew, and Pua (2010) examined the effect of different types of debts on the economic growth in Malaysia during the period 1970 – 2006. Using Co-integration test, the findings suggest that all components of debts have a negative effect on long run economic growth. The Granger causality test reveals the existence of a short-run causality linkage between all debt measures and economic growth in the short-run. Abdelmawla and Mohammed (2005) investigated the impact of external debt on economic growth of Sudan from a period spanning 1978 – 2001. The study showed that export earnings have a significant positive impact while external debt and inflation had negative impact on Sudan's economic growth.

Karogol (2002) investigated both the short-run and long-run relationships between economic growth and external debt service for Turkey during 1956 – 1996. The study employed a standard production function model analyzed using multivariate co-integration techniques. The Vector Autoregression estimates showed that there exists one Co-integration equation. It also revealed that debt service is negatively related to economic growth in the long-run. The causality test showed uni-directional causality between debt service and economic growth. Clements, Bhattacharya, and Nguyen (2003) examined the channels through which external debt affects growth in low income countries. Their results suggest that the substantial reduction in the stock of external debt projected for highly indebted poor countries (HIPC) would directly increase per capita income growth by about 1 percentage point per annum. Reductions in external debt service could also provide an indirect boost to growth through their effects on public investment.

Malik, Hayat, and Hayat (2010) explored the relationship between external debt and economic growth in Pakistan for the period between 1972 – 2005, using time series econometric technique. Their result shows that external debt is negatively and significantly related to economic growth. The evidence suggests that increase in external debt will lead to decline in economic growth. Previous study by Hameed *et al.* (2008) on Pakistan analyzed the long run and short run relationships between external debt and economic growth. Annual time series data from 1970 to 2003 was obtained to examine the dynamic effect of GDP, debt service, capital stock and labour force on her economic growth. The study concludes that debt servicing burden has a negative effect on the productivity of labor and capital, thereby adversely affecting economic growth.

### 3. METHODOLOGY

#### 3.1 Data Sources and Method of Analysis

The study employed data that are secondary in nature. The annual time series data was obtained from the Central Bank of Nigeria Statistical Bulletin and Debt Management Office from 1970-2010. The methods of analysis or estimation techniques include Ordinary Least Square (OLS) method, Augmented Dickey-Fuller (ADF) Unit Root test, Johansen Co-integration test and Error Correction Method (ECM). The estimation technique follows a three-step modeling procedure;

- i. The stationarity of data must be established and the order of integration determined.  
This is done employing the Augmented Dickey-Fuller (ADF) unit root test. Time series data are assumed to be non-stationary; therefore it is necessary to carry out the unit root test because of the problem of non-stationary data producing spurious results.
- ii. After establishing the stationarity of data, Johansen co-integration test is applied. The Co-integration test determines whether a long run equilibrium relationship exist among the variables.
- iii. When the variables are found to be co-integrated, an over-parameterized model. (ECM1) is developed which involves leading and logging of the variables, after which a parsimonious model (ECM2) is built which introduces short run dynamism into the model.

#### 3.2 Model Specification

The study hypothesized that external debt does not have a significant effect on the economic growth of Nigeria. The model proxied Gross Domestic Product (GDP) as the endogenous variable to measure economic growth while External Debt (EXD), Ratio of External debt to Exports (EXD/X), Inflation (INF) and Exchange Rate (EXR) represent the exogenous variables. The a priori expectation for the coefficients in the model are  $B_1, B_2, > 0$  while  $B_3, B_4, < 0$

The econometric form of the model is specified as;  $GDP = f(EXD, EXD/X, INF, EXR)$

The econometric equation becomes;

$$GDP = B_0 + B_1EXD + B_2 EXD/X + B_3INF + B_4EXR + e..... (i)$$

Where;

$B_0$  = Intercept of relationship in the model/constant

$B_1 - B_4$  = coefficient of each exogenous variable

e = stochastic or error term

Stating the error correction model (ECM) from equation (i), the model becomes;

$$\Delta \text{Log } EXR_{t-1} = B_0 + B_1 \Sigma \text{Log } EXD_{t-1} + B_2 \Sigma \text{Log } EXD/X_{t-1} + B_3 \Sigma \text{Log } INF_{t-1} + B_4 \Sigma \text{Log } EXR_{t-1} + \Sigma ECM_{t-1} + \Sigma_t$$

.....(ii)

Where;

$\Sigma ECM$  = Error Correction Term

t-1 = Variable lagged by one period

$\Sigma_t$  = White noise residual.

The hypothesis for the co-integration test is stated thus;

Null hypothesis ( $H_0$ ):  $B_1 = B_2 = B_3 = B_4 = 0$  (No Co-integration)

Alternative hypothesis ( $H_1$ ):  $B_1 \neq B_2 \neq B_3 \neq B_4 \neq 0$  (Co-integration exists)

#### 4. Data Analysis and Interpretation of Results

This section deals with the analysis of data and interpretation of findings. The method of data analysis employed the Ordinary Least Square (OLS) method, Augmented Dickey-Fuller (ADF) Unit Root Test, Johansen Co-integration Test and the Error Correction Method. The logarithms of the variables were obtained so as to bring the time-series data on the variables to the same base.

##### 4.1 Interpretation of Results

Ordinary Least Square (OLS) Result

The table below presents the summary of the OLS results

**Table 1**  
**Summary of OLS Results**

Endogenous Variable	Exogenous Variables					R2	Adj. R <sup>2</sup>	F-Stat
	C	EXD	EXD/X	INF	EXR			
GDP	2.950372* (0.0140)	0.876129* (0.0000)	-0.865923* (0.0000)	-0.130776 (0.2485)	0.105435 (0.5735)	0.966973	0.963303	263.5010* (0.000000)

Note: Probability value are stated in parenthesis and \* means significant at 5% level of significance

Source: Author's computation

From the above result, the intercept or constant parameter has a positive relationship with GDP and it is statistically significant. EXD has a significant positive relationship with GDP while EXD/X exerts a significant negative influence on GDP. INF is not statistically significant but demonstrates a negative relationship with GDP while EXR also not statistically significant is positively related to GDP. The coefficient of multiple determination ( $R^2$ ) with a value of 0.966973 implies that approximately 97% of total variation in GDP is explained by EXD, EXD/X, INF, and

EXR while the remaining 3% is accounted for by factors not specified in the model. F-statistics value of 263.5010 shows that the model is significant i.e. it sufficiently captures the effect of external debt on economic growth and this is further justified by the probability value of 0.000000.

The OLS results is short run oriented in nature and because of the problem of non-stationarity of data, spurious regression is likely to occur. Hence, the stationarity of data is established using the Augmented Dickey-Fuller (ADF) Unit Root Test.

#### 4.2 Augmented Dickey-Fuller (ADF) Unit Root Test

Time series data are assumed to be non stationary and this implies that the results obtained from the OLS method may be misleading. In this vein, it is cognizant that stationarity test should be conducted. The stationarity test is carried out using the Augmented Dickey-Fuller (ADF) Unit Root Test. The stationarity of data is essential for the Johansen co-integration test. The decision rule for the ADF Unit root test states that the ADF Test statistic value must be greater than the Mackinnon Critical Value ( $\alpha$ ) 5% at absolute term for stationarity to be established at level and if otherwise, differencing occurs using the same decision rule.

Table 2 shows the results of the stationarity test in summary and the order of integration.

**Table 2**  
**ADF Unit Root Test and Order of Integration**

Variables	ADF Test Statistic Value	5% Mackinnon Critical Value	Remark	Order of Integration
GDP	-6.782049	-2.9399	Stationary	I(1)
EXD	-3.661568	-2.9399	Stationary	I(1)
EXD/X	-3.819740	-2.9399	Stationary	I(1)
INF	-4.631006	-2.9378	Stationary	I(0)
EXR	-3.713246	-2.9399	Stationary	I(1)

*Source: Author's Computation*

From Table 2, it could be deduced that all the variables were stationary at first difference i.e. I(1) series with the exception of only INF which was stationary at level i.e. I(0) because its respective ADF statistic value is greater than the Mackinnon Critical Value @ 5% at absolute term before differencing.

#### 4.3 Johansen Co-Integration Test

The co-integration test establishes whether a long-run equilibrium relationship exist among the variables. To establish co-integration, the likelihood ratio must be greater than the Mackinnon Critical Value @ 1% and 5% levels of significance and the co-integrating equation is chosen from the normalized co-integrating coefficient with the lowest log likelihood.

**Table 3**  
**Result of Johansen Co-integration Test**

Maximum Eigen Value	Trace Statistics	5% Critical Value	1% Critical Value	Hypothesized No. CE(S)
0.56869	88.62387	68.52	76.07	$r = 0^{**}$
0.419972	55.83862	47.21	54.46	$r \leq 1^{**}$
0.338079	34.59616	29.68	35.65	$r \leq 2^*$
0.259585	18.50439	15.41	20.04	$r \leq 3^*$
0.159642	6.783171	3.76	6.65	$r \leq 4^{**}$

\*denotes rejection of the hypothesis at 5% significance level and \*\*denotes rejection of the hypothesis at both 5% and 1% significance levels.

**Source: Author's Computation.**

Using the trace statistics, it indicates five co-integrating equations at 5% significance level which implies that long run relationship exists among the variables. This led to the rejection of the hypothesis of no co-integration. The co-integrating equation chosen from the Normalized co-integrating coefficients is;

$$GDP = -1.390662_{EXD} + 1.200221_{EXD/X} + 0.607099_{INF} + 0.617005_{EXR}$$

(0.15249)      (0.11566)      (0.14304)      (0.20466)

Note: Standard Error statistics are stated in parenthesis

From the co-integrating equation, all the exogenous variables except EXD has a positive relationship with GDP in the long run. In the long run, a unit increase in EXD/X, INF, and EXR leads to a rise in GDP by 1.200221, 0.607099, and 0.617005 units respectively while an increase (decrease) in EXD will cause GDP to decrease (increase) by 1.390662 units.

**4.4 Error Correction Model (ECM)**

Co-integration is a prerequisite for the error correction mechanism. Since co-integration has been established, it is pertinent to proceed to the error correction model. The first step in ECM is developing an over-parameterized model (ECM) and then the parsimonious model (ECM 2).

**Table 4**  
**Result of the Over-Parameterized Model (ECM 1)**  
**Dependent Variable=D (GDP,2)**

Variable	Coefficient	Standard Error	t-statistics	Probability Value
C	0.010782	0.084977	0.126883	0.9000
D(GDP(-1),2)	-0.439236	0.091472	-4.801865	0.0001
D(EXD,2)	0.228185	0.297134	0.767953	0.4492
D(EXD(-1),2)	0.167533	0.270624	0.619064	0.5411
D(EXD/X, 2)	-0.592905	0.184776	-3208772	0.0037
D(EXD/X(-1),2)	-0.306498	0.181236	-1.691159	0.1023
D(INF,2)	-0.137498	0.078974	-1741051	0.0931
D(INF(-1),2)	0.023443	0.075412	0.310864	0.7583
D(EXR,2)	1.390977	0.343919	4.044489	0.0004
D(EXR(-1),2)	0.363580	3.399493	0.910104	0.3708
ECM(-1)	-1.358918	0.223326	-6.084906	0.0000
<b>R<sup>2</sup> = 0.886812</b>	<b>Adj R<sup>2</sup> = 0.844890</b>	<b>f-statistics = 21.15411</b>	<b>Prob (F-Statistics) = 0.000000</b>	

Source: Author's Computation

The results of the over-parameterized model presented in Table 4 show that the error correction term i.e. ECM(-1) is negative and significant. Its coefficient implies that the speed of adjustment is high. The R<sup>2</sup> signifies that all the explanatory variables in the model accounts for 88.7% total variation in GDP while the remaining 11.3% is attributed

to the white noise residual. The F-Statistic value of 21.15411 with a probability value of 0.000000 shows that the whole model is significant.

However, there is need to simplify the error correction model by estimating a parsimonious model (ECM 2) developed from the over-parameterized model (ECM 1).

**Table 5**  
**Result of the Parsimonious Model (ECM 2)**  
**Dependent Variable = D(GDP, 2)**

Variable	Coefficient	Standard Error	t-statistics	Probability Value
C	0.008932	0.085676	0.104251	0.9176
D(GDP(-1),2)	-0.381009	0.075703	-5.032969	0.0000
D(EXD,2)	0.094117	0.253013	0.371983	0.7124
D(EXD/X, 2)	-0.469663	0.156157	-3.007630	0.0052
D(INF,2)	-0.131075	0.071231	-1.840133	0.0753
D(EXR,2)	1.187700	0.317559	3.740091	0.0007
ECM(-1)	-1.315995	0.220994	-5.954882	0.0000
<b>R<sup>2</sup> = 0.867613</b>	<b>Adj R<sup>2</sup> = 0.841989</b>	<b>f-statistics = 33.86025</b>	<b>Prob (F-Statistics) = 0.000000</b>	

*Source: Author's Computation*

From the table 5, the ECM equation is stated thus;

$$GDP_t = 0.008932 + 0.094117EXD_{t-1} - 0.469663EXD/X_{t-1} - 0.131075INF_{t-1} + 1.187700EXR_{t-1} - 1.315995ECM_{t-1}$$

Note: \* denotes that the parameter is statistically significant.

The ECM equation shows that EXD has a positive but not significant relationship with GDP. The positively signed coefficient of EXD is in conformity with the a priori expectation. A unit increase in EXD consequently means that GDP rises by 0.094117 units. The findings suggest that external borrowing is beneficial to Nigeria but it does not play much of an important role in the growth process of Nigeria. This could be attributed to the fact that the external borrowing have not been channeled to highly productive activities that would increase the overall output of the economy instead debt have been contracted for capital projects such as construction of roads etc. EXD/X exerts a significant negative pressure on GDP. This goes against the a priori expectation. A unit increase in the ratio of external debt to exports leads to a decline in GDP by 0.469663 units. This implies that external debt has crowded out the positive impact of exports on the economy. This is due to fact that export earnings have not been adequate to pay debts and that the nation is highly dependent on imports. INF in conformity with the a priori expectation is negatively related to GDP and it is statistically significant. A unit increase in INF leads to 0.131075units decrease in GDP. This implies that the external borrowing has made government expenditure to rise thereby increasing the inflation rate in the economy and major bulk of the external debt is expended on activities that provide social and political benefits rather than economic benefits. EXR has a positive relationship with GDP, thus contradicting the a priori expectation and it is significant on GDP. The implication of EXR connotes that the rate at which Naira is being converted to a key currency (US dollar) allowed the nation to service its debt properly without deteriorating economic growth, hence, Nigeria did not suffer heavy debt burden because the Naira competed well in global market. The coefficient of ECM(-1) is significant with the appropriate negative sign. Its coefficient of -1.315995 means that the present value in GDP adjusts rapidly to previous changes in EXD, EXD/X, INF, and EXR.

The  $R^2$  in the parsimonious model shows that the exogenous variables in the ECM equation explains 87% of total variation or changes in GDP and the remaining 13% is accounted for by factors outside the model. Also, the F-Statistic of 33.86025 in ECM 2 with its probability value of 0.000000 provides basis to logically conclude that the overall result obtainable in ECM 2 is statistically significant.

## 5. CONCLUSION AND RECOMMENDATIONS

External debt plays a crucial role in an economy. The optimal utilization of external debt by the government would avoid debt overhang and crowding out of investments. The bane of the study has been to examine the effect of external debt on the economic growth of Nigeria. The study employed the Johansen co-integration test and Error Correction Method. The co-integration test shows the existence of long run equilibrium relationship among the variables. The error correction method reveals that the lagged error correction term in the over-parameterized and parsimonious models is significant judging from its negatively signed coefficient.

The high coefficient of multiple determination ( $R^2$ ) in the over-parameterized model (88.7%) and the parsimonious model (87%) led to the overwhelming rejection of the null hypothesis which states that external debt does not have a significant effect on the economic growth of Nigeria. Also, the F-statistics shows that the time to time behaviour of external debt, ratio of external debt, inflation, and exchange rate all put together cause a significant change on the Nigerian economy.

Based of the findings in the study, recommendations were made. Firstly, the government should ensure economic and political stability in order to enjoy the benefits of external debt and make the debt burden minimal. Secondly, government should acquire external debt largely for economic reasons rather than social or political reasons. This would increase the productivity of the nation. Thirdly, government should diversify the nation's export base so as to increase export earnings and promote industrialization in order to reduce import dependency. Also, the government through its monetary authorities should put measures in place to curtail the inflationary trend in the economy. Furthermore, stability in the exchange rate should be pursued and depreciation in the Naira should be avoided by the government. Lastly, government should press for permanent debt relief so as to avert debt overhang problem.

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