

## **ECONOMETRIC ANALYSIS OF EXTERNAL DEBT, EXCHANGE RATE AND ECONOMIC GROWTH IN NIGERIA**

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### **ABSTRACT**

This study examined the effect of external debt and exchange rate on economic growth in Nigeria. The study employed Unit Root test, Descriptive statistics, Johansen-Juselius Cointegration test and Vector Error Correction model using E-Views computer software to analyse time series secondary data collected for the period 1981 to 2012. The findings revealed that external debt contributes positively to economic growth in Nigeria in the short run but had a statistically negative significant influence on economic growth in the long run. On the other hand, exchange rate had a positive influence on economic growth in Nigeria in the long run but had a statistically negative significant influence on economic growth in the short run. The results of the study as they stand, has important policy implications for the economic growth of Nigeria. The study therefore recommends that policy makers and the regulatory authorities adopt appropriate exchange rate regime for the country to achieve meaningful economic development. It is also recommended that the relevant authorities should be proactive in the management of the country's external debt portfolio and all external borrowings should be judiciously utilized to accelerate the desired economic growth in Nigeria.

**Keywords:** External debt, Exchange rate, Economic growth, Gross domestic product, Debt Management Office, Debt portfolio, External borrowings..

## **INTRODUCTION:**

In a study linking public debt to development, Udoka and Ogege (2012) stated that Nigeria has a long history of external indebtedness that dates back to the pre-independence period. But the magnitude of the debt was small until 1978, and the debts incurred before 1978 were mainly long-term loans from multilateral and official sources such as the World Bank and Nigeria's major trading partners. The impact of the debts on the economy was not much as the loans were obtained on soft terms. However, the huge revenue receipts from the oil sector especially during the oil boom of 1973 -1976 was enough to absorb any negative impact the debt burden would have on the economy (DMO, 2011).

Prior to the debt cancellation deal of the 18 billion US Dollars in 2005, Nigeria ranked the largest debtor nation in Sub-Saharan Africa. Available statistics has shown that the external debt stock of Nigeria has been on the increase after the debt cancellation deal in 2005. The country's external outstanding debt stood at N451,461.70 Million in 2006 and 1,026,904.00 Million in 2012 respectively (CBN, 2012). The outstanding external debt stock of Nigeria stood at USD9,711.45 Million at the end of December 2014, compared to USD8,821.55 Million at the end of the corresponding period in 2013 (CBN, 2014).

According to the Debt Management Office (DMO) 2014 annual report the increase was largely attributed to additional disbursement from existing and newly approved loans that became effective during the period, as well as net adverse cross exchange rate movements between the different currencies in the external loan portfolio. From the DMO annual report (2014), bilateral creditors comprised of loans contracted from China and France on semi concessional terms. The debt owed to bilateral creditors amounted to USD1,412.08 Million at the end of 2014 compared to USD1,025.70 Million at the end of 2013, and this was largely due to loans contracted from the Exim Bank of China during the referenced period. The multilateral loans accounted for USD6,799.36 Million or 70.01 per cent of the external debt portfolio in 2014. The trend analysis of the external debt stock between 2010 and 2014 revealed that the share of multilateral debt decreased marginally from 71.13 per cent in 2013 to 70.01 per cent in 2014.

Aluko and Arowolo (2010) observed that despite the fact that external debt has hardly expended, the management of the debt by way of servicing repayment, which usually is in foreign exchange, has affected the macroeconomic performance of the Nigerian economy. Also, Pattillo, Poirson and Ricci (2002) observed that large debt service is expected to have negative impact on economic performance because of the uncertainty regarding the portion of the debt that will be serviced with the country's own resources.

The main objective of this study is to examine the relationship between external debt, exchange rate and economic growth in Nigeria. Several researchers in the past have investigated the relationship between external debt, exchange rate and economic growth. But these studies have come out with diverse views without a consensus in their findings. This study is therefore designed to contribute to existing knowledge and find if an empirical consensus can be reached.

The rest of the paper is structured as follows: section two provides a brief review of related empirical literature followed by the methodology of the study in section three. The succeeding section presents the empirical results of the study and discussions while section five provides the conclusion of the study and the recommendations based on the study findings.

## **REVIEW OF EMPIRICAL LITERATURE:**

The issue of external debt and economic growth has been well documented in the body of literature in recent times with diverse views with no consensus conclusion by scholars and researchers. In addition, Nigeria experiences dynamism in exchange rate movement due to the fact that major currencies of the world are traded freely in the autonomous market. Therefore exchange rate fluctuations which may or may not have anything to do with undervaluation (or otherwise) also affect any outstanding external loan. This section provides a brief review of empirical literature related to the study.

Ejigayepai (2013) analyzed the effect of external debt on economic growth of eight selected heavily indebted African countries such as Benin, Ethiopia Mali, Madagascar, Mozambique, Senegal, Tanzania and Uganda for the period 1997 -2010 using OLS and found out that external debt affects economic growth through debt crowding out rather than debt overhang.

Highlighting, Ajayi and Oke (2012) investigated the effect of external debt on economic growth and development of Nigeria using OLS regression analysis and observed that external debt burden had an adverse effect on the nations per capital income. They also noted that the magnitude of the external outstanding debt mounted pressure on the economy since the eruption of the oil crisis in 1981, largely due to the rapid

accumulation of trade arrears in 1982.

Also, Azeez and Sulaiman (2012) examined the effect of external debt on economic growth in Nigeria for the period 1970-2012 using Ordinary Least Square (OLS) method. They found that external debt contributed positively to the growth of the Nigerian economy.

Similarly Ezeabasili and Mojekwu (2011) investigated the relationship between Nigeria's external debt and economic growth during the period 1975 -2006 applying econometric analysis. The results of their study indicated that external debt has a negative relationship with economic growth in Nigeria. Also, Ayadi and Ayadi (2008) studied the impact of the huge external debt with its servicing requirements on economic growth of the Nigerian and South African economies. They employed Ordinary Least Square (OLS) and Generalized Least Square (GLS) techniques of estimation in their study, and the results indicated that debt and its servicing requirements has a negative impact on the economic growth of Nigeria and south Africa.

Ogunmuyiwa (2011) examined whether external debt promotes economic growth in Nigeria, using time series data for the period 1970 – 2007. He used Vector Error Correction Model (VECM) approach and found out that there was no causal relationship between external debt and economic growth in Nigeria.

Shehu and Aliyu (2013) investigated the contribution of external debt to the economic growth of Nigeria for the period 1970 – 2010 using Ordinary Least Square (OLS) method. Their findings indicated that external debt contributes positively to the economic growth of Nigeria.

Egbetunde (2012) examined the causal nexus between public debt and economic growth in Nigeria between 1970 and 2010, using Vector Autoregressive (VAR) model. He found out that there is a bi-directional causality between public debt and economic growth in Nigeria. They concluded that public debt and economic growth have long run relationship and are positively related if government can be prudent and judicious with the management of the loans obtained for the development of the economy.

Basirat, Nasirpour and Jorjorzadeh (2014) in their study investigated the effect of exchange rate fluctuations on economic growth in selected developing countries from 1986 to 2010 and found that exchange rate fluctuation had significant negative effect on economic growth. Also, Khondker, Bidisha and Razzaque (2012) examined the effect of exchange rate on economic growth in Bangladesh. Their findings show that 10 per cent reduction in exchange rate lead to 3.2 per cent increase in GDP in the long run. While the short run effect was the reverse, that is, a 10 per cent reduction in exchange rate lead to 3.2 per cent decrease in GDP.

Rapetti, Skott and Razmi (2011) investigated the relationship between real exchange rate and economic growth under conditions of undervaluation in developing countries. They found that currency undervaluation had a large and more robust effect on GDP in developing countries. Also, Rodrik (2008) examined the effect of high real exchange rate (undervaluation of currency) on economic growth in developing countries. The study found that real exchange rate stimulates economic growth.

Akpan and Atan (2010) investigated the effect of exchange rate movements on GDP growth in Nigeria for the period 1986 to 2010. The study employed Simultaneous Equations Model (SEM) and Generalised Methods of Moments (GMM) techniques for data analysis. The results of their study suggest that exchange rate movements had no strong direct effect on GDP growth.

The review of empirical literature as shown above indicated that the findings of previous studies have divergent views. This shows the existence of a research gap. This study therefore seeks to fill the research gap and by doing so contribute to the existing literature.

## **METHODOLOGY:**

This section presents the methodology employed in this study. This study examined the relationship between external debt, exchange rate and economic growth in Nigeria. The study employed *ex-post facto* research design. This is because *ex-post facto* research design is one in which the researcher does not have the ability to manipulate the variables. Therefore, secondary time series data for a period of 32 years from 1981 to 2012 was collected. This period was considered based on the availability of data at the time of the study and with a view to determine the long run effect. All the quantitative data used for the study was collected from reliable sources; that is, from the Central Bank of Nigeria (CBN) and the National Bureau of Statistics (NBS).

## **DATA ANALYSIS:**

The three main variables identified for the study are economic growth (dependent), external debt and exchange rate (independent). Data collected for the study was analysed using econometric analytical tools such as ADF Unit Root test, Descriptive statistic, Johansen-Juselius Cointegration test, and Vector Error Correction Model (VECM). The analysis was conducted with the computer software E-Views 7.

**MODEL SPECIFICATION:**

A functional regression model of the following form was formulated to capture the relationship between external debt, exchange rate and economic growth in Nigeria;

$$RGDP = f (EXDEBT, EXRATE)$$

Explicitly, the above regression model is transformed into its logarithm form as given below:

$$\text{Log (RGDP)} = \beta_0 + \beta_1 \text{log (EXDEBT)} + \beta_2 \text{Log (EXRATE)} + U \text{ Equation 1}$$

Where;

RGDP = Real Gross Domestic Product as proxy for economic growth (the dependent variable).

EXDEBT = External Debt (one of the independent variables)

EXRATE = Exchange Rate (the second independent variable)

Log = Natural logarithm,

$\beta_0$  = is the intercept or constant value of the regression equation.

$\beta_1$  &  $\beta_2$  = Are the coefficients of the independent variables to be estimated.

U = Error term.

**EMPIRICAL FINDINGS AND DISCUSSION:**

**ADF UNIT ROOT TEST:**

First, the study commenced with the test for unit roots, using Augmented Dickey– Fuller (ADF) to ascertain whether the variables of interest are all stationary so as to completely avoid the estimation of spurious regression. Based on the above, the Augmented Dickey– Fuller (ADF) unit root test is presented below.

**Table 1: Augmented Dickey – Fuller (ADF) Unit Root Test Results**

Variables	ADF Test Statistics	5% Critical values	10% Critical values	Order of Integration	Remark
Log (RGDP)	- 3.706916	-3.568379	-3.218382	(1)	Stat at 1 <sup>st</sup> diff.
Log (EXDEBT)	- 4.475437	-3.568378	-3.218382	(1)	Stat at 1 <sup>st</sup> diff
Log (EXRATE)	- 5.156562	-3.368379	-3.218382	(1)	Stat at 1 <sup>st</sup> diff

Source: E-Views Output

From table 1 above the unit root test result showed that all the variables were integrated of same order of (1) and thus, stationary at first difference. The results indicate that the ADF test statistics were all greater than the critical values of 5% and 10% respectively.

**DESCRIPTIVE STATISTICS:**

The descriptive statistics results are hereby shown below on table 2.

**Table 2: Descriptive Statistics Result**

	Log (RGDP)	Log (EXDEBT)	Log (EXRATE)
Mean	12.75183	1279119	3.0551632
Median	12.60436	13.29325	3.085852
Maximum	13.69773	15.40276	5.059422
Minimum	12.12031	7.754138	-0.494296
Std. Dev	0.491569	1.964243	1.932164
Skewness	0.528304	-0.901652	-0.604176
Kartosis	1.959938	3.128507	2.027982
Jarque-Bera	2.930864	4.357892	3.206581
Probability	0.230978	0.113161	0.201233
Sum	408.0586	409.3181	97.65224
Sum sq. Dev.	7.490835	119.6058	115.7310
Observations	32	32	32

Source: E-Views Output

From table 2 above, the results of the descriptive statistics indicate that RGDP averages 12.75 and ranges from 12.12 to 13.70 with standard deviation of 0.49, while the skewness and the kurtosis stood at 0.52 and 1.96 respectively. External debt (EXDEBT) has a mean or average mean of 12.79 which ranges from 7.75 to 15.40 per cent with a standard deviation of 1.96 its skewness and kurtosis stood at -0.90 and 3.12 respectively. While on the other hand, the exchange Rate (EXRATE) has a mean of 3.05 and also varies from -0.49 to 5.06 respectively. The median values of the variables stood at 12.60, 13.29 and 3.06 respectively.

**JOHANSEN-JUSELIUS COINTEGRATION TEST RESULT:**

The Johansen-Juselius Cointegration test result indicates two co-integrating equation at the 0.05 level of significance of the variables such as RGDP, EXDEBT and EXRATE respectively. Thus, the null hypothesis of no co-integration is hereby rejected at the 0.05 per cent level of significance. This test therefore provides an evidence of a long run relationship between the variables of the study. Table 3 presents the test results of Johansen-Juselius Cointegration test result.

**Table 3: Johansen-Juselius Cointegration Test Result**

**Trend assumption:** Linear deterministic trend.

**Variables:** RGDP, EXDEBT, EXRATE

Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No of CE(S)	Eigen Value	Statistics	Critical Value	Prob**
None*	0.479828	36.64152	29.79707	0.0070
At Most 1*	0.424233	17.03368	15.49471	0.0291
Most 2	0.015613	0.472087	3.841465	0.4920

Trace test indicates 2 co-integrating equ(s) at the 0.05 level

\*\* Denotes rejection of the hypothesis at the 0.05 level.

\* Mackinon-Engle-Ljung (1999) p-values.

Source: E-Views Output

**REGRESSION ESTIMATION RESULTS:**

The regression estimation result of both the long-run and short-run dynamics are hereby presented below in table 4 and 5 respectively.

**Table 4: Long-run regression estimation result**

Constant/

Variables	Coefficient	Std.Error	T-statistic	Prob.
C	13.07636	0.773476	16.90596	0.0000
Log (EXDEBT)	-0.097196	0.076062	-1.27785	0.2114
Log (EXRATE)	0.286448	0.078085	3.668413	0.0010

Dependent variable: log (RGDP)

R<sup>2</sup> = 0.53, F-Statistic = 16.53, Prob. (F-Statistics) = 0.00, Durbin Watson Statistic = 1.87

Source: E-View Output

**Table 5: Error Correction Model (ECM)**

Constant /

Variables	Coefficient	Std.Error	T-statistic	Prob.
C	-0.024255	0.062474	-0.388247	0.7009
D/Log EXDEBT	0.349487	0.104367	3.348640	0.0024
D/Log EXRATE	-0.070911	0.174654	-0.406010	0.6879
ECM (-1)	-0.935189	0.153504	-6.092281	0.0000

Dependent variable: D/log (RGDP)

R<sup>2</sup> = 0.65, F-Statistic = 16.49, Prob. (F-Statistics) = 0.00, Durbin Watson Statistic = 2.04

Source: E-View Output

The results from table 4 indicates that external debt (EXDEBT) has a negative influence on economic growth but statistically insignificant. Meaning that 1 per cent increase in external debt will lead to 9.7 per cent decrease in economic growth in Nigeria in the long-run. However, in the short-run external debt (EXDEBT) has a positive and statistically significant influence on economic growth in Nigeria. Long run and short run are conceptual terms in microeconomics. However, this finding implies that external borrowings from a year-to-year basis would stimulate economic growth, whereas debt overhang for periods of 10 to 30 years coupled with unfavourable exchange rate movement would negatively affect economic growth. This result is consistent with the study findings of Azeez and Sulaiman (2012), and Shehu and Aliyu (2013); that external debt contributes positively to economic growth in Nigeria.

Furthermore, the results indicate that exchange rate (EXRATE) has a statistically significant positive influence on economic growth in Nigeria in the long-run. This finding in the long run is consistent with the study findings of Rapetti, Skott and Razmi (2011), and Rodrik (2008). But in the short-run, exchange rate (EXRATE) has a statistically significant negative influence on economic growth as shown in table 5 above. The short run effect aligns with the findings of Basirat, Nasirpour and Jorjorzadeh (2014).

The R<sup>2</sup> value of 0.53 and 0.65 from tables 4 and 5 respectively indicates that the regression model formulated is a good and proper fit in explaining causality relationship of the variables. Similarly, the short-run dynamic of the model possess the right sign and is statistically significant, indicating that the speed of adjustment to equilibrium is very high at 94%. The Durbin Watson statistics of 2.04 shows the absence of any autocorrelation in the model.

The F-Statistics value of 16.53 and 16.49 from tables 4 and 5 respectively indicates that the regression model formulated is adequate for the study and all the variables jointly are statistically significant. Also, the Prob. (F-Statistics) value of 0.00 from both tables 4 and 5 means that the regression model cannot be faulted and it is absolutely a good fit in the explanation of the causality relationship of external debt, exchange rate and economic growth. Therefore, the hypothesis that there exists significant relationship between external debt, exchange rate and economic growth cannot be rejected.

## CONCLUSION AND RECOMMENDATIONS:

This study investigated the relationship between external debt, exchange rate and economic growth in Nigeria for the period 1981 to 2012. The tests employed were ADF Unit Root test, Descriptive statistics, Johansen-Juselius Cointegration test and Vector Error Correction Model (VECM) to analyse secondary time series data obtained from the Central Bank of Nigeria. It was found that external debt had positive influence on economic growth in Nigeria in the short-run, but had a significantly negative influence on economic growth in the long-run. On the other hand, exchange rate had a significantly positive influence on economic growth in Nigeria in the long-run and a significantly negative influence on economic growth in the short-run.

These results as they stand have some policy implications for economic development in the country. For the country to achieve meaningful economic development appropriate exchange rate regime has to be adopted and the regulatory authorities should be proactive, prudent and judicious in the management of the external debt portfolio in order to accelerate economic growth in Nigeria.

Based on the findings of the study the following recommendations are made:

- That the Debt Management Office (DMO) should be proactive in managing the external debt portfolio by adequately keeping track record of debt repayment obligations in Nigeria.
- That government should try as much as possible to stop the accumulation of external debts in order not to crowd and muzzle out private investment.
- Monetary authorities should maintain a stable exchange rate to encourage investment and stimulate economic growth in Nigeria.
- Future studies should be conducted on this topic with up-to-date and current data relative to time of study in line with the dynamics of growth.

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