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External Debt Management and Macroeconomic Variables Performance in Nigeria

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ABSTRACT

The study focused on the relationship between external debt management and basic macroeconomic variables performance in Nigeria. The variables for the study which spans the period 1986-2018 where external debt as dependent variable while balance of payment, inflation, unemployment exchange rate and real gross domestic product as independent variables. The study employs cointegration and Vector Error Correction Mechanism (VECM) methods. The findings revealed that balance of payment, inflation and unemployment were the most important determinants of external debt in the long run in Nigeria. The study concluded with empirical evidences that trends in macroeconomic variables can be used to predict movement of external debt to a great extent in Nigeria. The study therefore recommended that external borrowing should not be used for purposes that could deflate the economy but should be channeled towards the provision of goods that would increase the level of economic activities.

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1. Introduction

Nigeria experienced a period of shock in the mid-1980s. At this period, two incidents demonstrated external borrowing. First, there was the emergence of import-oriented consumption patterns, which prompted governments to borrow externally. Second, funds realized from these credits were invested on unproductive ventures. Towards the end of 1970, the level of external debt of Nigeria increased rapidly and the services of the debt in terms of payment of interest and principal presented serious weight on the balance of payments (BOP) of the country.

Like most developing countries of the world, Nigeria develops considerably on external funds for financing its development ventures to which such funding typically appears as external loans. In the early periods of independence, the size of such loans was little, the rate of interest concessionary, the maturity was long-term, and the source was usually bilateral in nature. Nigeria's external debt in 1960 was about $150 million; however, beginning in the year 1978, the situation changed. Nigeria, at the lure of the international financial centers, began to acquire huge sums from private sources at floating rates and with shorter-term maturities. The 1978 "*jumbo loan*" alone was estimated at $1 billion. By 1982, the estimation of Nigeria's external indebtedness was $18.631 billion, which represented over 160% of Nigeria's gross domestic product (GDP) for that year. The situation precipitated a debt-crisis that progressively worsened over time. By 1986, Nigeria had to adopt a World Bank/International Monetary Fund (IMF) sponsored Structural Adjustment Program (SAP), with the goal of patching the economy and improving the country ready to support her debt (Essien et al., 2016).

Despite the fact that there are numerous studies on external debt in the literature, most of the studies carried out so far in this area have tended to focused on the impact of external debt on economic growth both in the developed and developing economy. We are therefore not aware of any study that has investigated the impact of external debt on

other basic indicators of economic performance such as inflation, balance of payment, exchange rate and unemployment rate in Nigeria.

The thrust of this study is to investigate the relationship between external debt management and selected macroeconomic variables performance in Nigeria. The rest of the paper is organized as follows: Section 2 provides review of literature. Section 3 describes the analytical framework and methodology adopted in the paper. Section 4 presents the empirical results and section 5 concludes the paper.

2. Literature Review

External debt is the term that describes the financial obligation that ties ones party (debtor country) to another (lender country). It usually refers to incurred debt that is payable in currencies other than that of the debtor country. In principle, external debt includes short-term debts, such as trade debts which mature between one and two years or whose payment would be settled within a fiscal year in which the transaction is conducted. External debt may be incurred through a number of transactions such as trade, contractor-finance, supplies credit, private investment and public borrowing. Source of loan that make up external debt include banks, international financial market (euro money and capital markets) international organization e.g. IMF and the World Bank international loans and multilateral private loans (Udoka and Anyimgang, 2010).

The origin of Nigeria's external debts dates back to 1958 when a sum of $28 million was contracted for railway construction. Between 1958 and 1977, the level of foreign debt was minimal, as debt contracted during the period were the confessionals debts from bilateral and multilateral sources with longer repayment periods and lower interest rates constituting about 78.5 percent of the total debt stock. From 1978, following the collapse of oil prices, which exerted considerable pressure on government finances, it became necessary to borrow for balance of payments support and project financing. This led to the promulgation of Decree No 30 of 1978 limiting the external

loans the federal Government could raise to 5 Billion Naira. The first major borrowing of $1 billion referred to as jumbo loan was contracted from the international capital market (ICM) in 1978 increasing the total debt to $2.2billion (Udoka and Anyimgang, 2010).

Mustapha and Prizzon (2015) expressed their view that the sustainability of debts of countries focuses on how new loans or other financing sources are being used. They also noted that the use of loans in debt to support spending and other non-productive practices continues to threaten potential debt sustainability. Debt is described as sustainable by Ekpo and Udo (2013), if a debtor is forced to continue to maintain its obligations without unrealistically significant adjustment in consumption and investment.

Following the debt relief in 2006, the Nigerian government set out to ensure that the country did not relapse into debt unsustainability. As a result of this program, annual National Debt Sustainability Assessments is started. The IMF's debt sustainability methodology was used to conduct the debt sustainability analysis (DSA) (Nwankwo, 2014). The government passed the 3 percent Fiscal Responsibility Act, which prohibits foreign debt accumulation above a 3 percent debt sustainability threshold. Nigeria has paid its debts on time without defaulting, earning the IMF's classification as low-middle income economy, implying that the country will borrow from external sources above the debt sustainability threshold of 40%.

2.1 Theoretical Review

The reason for opting for external finance, as a means of ensuring sustained growth as against domestic borrowing is answered by the ‘dual gap’ analysis. This theory postulates that investment is a function of savings and investment that requires domestic savings is not sufficient to ensure economic growth, thereby necessitating complementary external goods and services. To address the question of why external debt tends to increase rapidly, there is need to recall the two-gap model described by Chenery and Strout (1966). In their

model, net external borrowing is known as basic transfer which is the difference between net capital inflow or the rate of increase in total external debt and total annual interest rate payments.

Basic transfer indicates gain if the percentage rate of increase in total debt is greater than average annual interest rate and loss otherwise. Generally, if borrowing is linked with productive use when rates of return exceed average annual interest rate and basic transfer is positive; increasing the external debt will not hamper the economy of the recipient country in the long run.

An improvement in a country's productivity combined with reductions in consumption, domestic investment, and government spending will decrease the debt size over time. A debt crisis would occur if a country fails to conduct a period-to-period flow review and achieve a level where the amount of production, demand, domestic investment, and government expenditure is less than the simple transfer (Abdul, 2017).

Chenery and Stout (1966) identified a three-phase growth trend in which economic advancement occurs at a rate that is acceptable for the scarcest resources: savings, skill, and foreign exchange. Growth in the early stages of development is likely to be expenditure restricted, as is the case in the majority of developed countries. It is expected that external technologies and skills will result in a reduction in the skill gap. Similarly, an increase in investment leads to a decrease in savings and foreign exchange gaps.

The labor demand gap was replaced by a savings gap and a foreign currency gap as a result of the assessment that, in order to achieve a given growth goal, domestic savings are insufficient to fund the necessary expenditure (savings gap) and foreign exchange inflows are insufficient to finance the necessary capital goods imports (foreign currency gap). Both gaps, according to the Two Gap Model, can be supplemented by foreign aid or net capital imports, respectively, making it relatively simple to measure the amount of aid or net capital

imports required to meet a pre-determined growth target for a given country.

2.2 Empirical Literature

The concept of external debt management and its relationship to macroeconomic variables has generated a growing body of evidence. Any of the empirical studies identified in the literature are concerned with the effect of external debt on specific macroeconomic variables.

Karagol (2002) examines the interaction among economic growth, external debt service and capital inflow using time series data for Turkey and a simultaneous equations model. The results showed that the debt servicing ratio adversely affects economic growth whereas the decrease in the rate of growth reduces the ability of an economy to service its debt. Mbanga and Sikod (2001) found that there exist a debt overhang and crowding out effects on private and public investments respectively in Cameron. Were (2001) also examined the impact of external debt on economic growth and private investments in Kenya used an error correction formulation and the estimation result showed a debt overhang problem in both the growth and investment equation.

In another attempt to study the impact of external debt management on macro-economic performance in Nigeria, Ezike and Mojekwu (2011) applied the OLS technique on real GDP, total external debt stock and debt service ratio. Their results revealed that foreign capital inflow was positive as expected while debt service/export ratio was negative as expected. This was because debt capital adds to capital formation and positively impacted on economic growth. On the other hand, debt-service ratio reflects capital outflow and consequently deteriorates the performance of a country and thus reduces real GDP. It also confirms the theoretical expectations that debt service/export ratio diverts resources away from the debtor country. Since total debt stock depicts a positive relationship in the results instead of a negative relationship and statistically significant at all the levels, they therefore

concluded that total debt stock, less debt service, still leaves a robust positive balance, to enhance capital accumulation that positively impacts economic growth.

Mukolu and Ogodor (2012) scrutinized the relationship between external debt and macroeconomic performance in Nigeria for the period 1975 to 2005. Two macroeconomic variables of gross domestic product and interest rate were expressed each as a function of external debt and debt servicing, while the ordinary least square technique (OLS) was used to estimate the two models. The results showed that external debt has a significant and positive impact on the Nigeria Gross Domestic Product while the debt charges paid on this debt, as well as the debt serviced by the government have a negative effect on the growth of the Nigerian economy.

Muhammad et al. (2015) determined the macroeconomic factors of external debt in Nigeria by constructing a framework which connects the dual gap theory that domestic saving is not enough to sustain economic growth activities in Nigeria. Their study indicate that external debt stock accumulation in Nigeria is determined by the macroeconomic components of interest rate, national low savings and weak exchange rate and persistent budget deficits.

Monogbe (2016) empirically investigate the intergeneration effect of foreign borrowed fund on performance of Nigeria economy from 1981 to 2014 by using a adopting a methodology similar to Egbetunde (2012). Monogbe (2016) formulated the model which reveals the nexus between foreign borrowed fund and the Nigeria economic performance.

3. Methodology

3.1 Estimation Framework

To achieve the core objective of this study, this section adopted a Vector Error Correction Model to investigate the relationship between external debt and key macroeconomic variables. The adoption of the VAR framework was informed by the main objective of the study.

According to Mordi (2013), a VAR model is an n-equation, n-variable linear model in which each variable is in turn explained by its own lagged values, (plus current, depending on the variant of the VAR) and past values of the remaining n-1 variables.

It is a simple framework that provides a systematic way to capture rich dynamics in multiple time series, while its statistical toolkit is easy to use and interpret.

$$Z_t = \sum_{i=1}^{k} A_i Z_{t-i} + \mu_t$$

where,

$$Z_t = \begin{pmatrix} \text{EXD} \\ RGDP \\ INFL \\ BOP \\ EXR \\ UMP \end{pmatrix}, \mu_t = \begin{pmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \\ \mu_{4t} \\ \mu_{5t} \\ \mu_{6t} \end{pmatrix}$$

Ai (i = 1,…,k) is a 6x6 matrix and k is the maximum lag length to be determined;

Each of the variables in the VAR model depends on all the other variables, with exactly the same lag structure applied to each variable in all the equations. For the purpose of this study, no zero-restrictions were imposed, thus all the aij and bij parameters were non-zero.

3.2 Model Specification

This study is an impact assessment of the model of Abdul (2017). The model is specified in its functional form as:

$$ED_{it} = \propto_o + \propto_1 GDP_{it} + \propto_2 CAB_{it} + \propto_3 GGR_{it} + \propto_4 GGE_{it} + \propto_5 INF_{it} + \propto_6 POIL_{it} + \propto_7 RES_{it} + \propto_8 INV_{it} + \mu_{it} \quad (1)$$

The model is modified to achieve the objective of the study. The model is used to verify the relationship between external debt and economic growth together with some other macro variables like exchange rate, balance of payment and unemployment as control variables. The inclusion of EXR is vital since any change in the exchange rate of the local currency against the US$ affect the real value of external debt. The modified model for this study will be in the form of:

$$EXD = f(RGDP, BOP, UNM, EXR, INFL) \quad (2)$$

In linear form, equation (ii) becomes:

$$EXD = \alpha + \beta_1 RGDP + \beta_2 BOP + \beta_3 UMP + \beta_4 EXR + \beta_5 INFL + \mu \quad (3)$$

The logarithmic conversion of the equation above yields the structural form as:

$$\text{Log}EXD = \alpha + \beta_1 logRGDP + \beta_2 BOP + \beta_3 UMP + \beta_4 logEXR + \beta_5 INFL + \mu \quad (4)$$

EXR = External Debt; RGDP = Real Gross Domestic Product; BOP = Balance of Payment; EXR = Exchange Rate; INFL= Inflation; UMP = Unemployment Rate.

α = constant; μ = white noise error term

On the a priori, the parameters are concordant with the hypothesis that $\alpha > 0$, $\beta_1 \leq 0$, $\beta_2 > 0$, $\beta_3 < 0$, $\beta_4 < 0$, $\beta_5 < 0$.

3.3 Measurement of Variables

EXTDB = External debt represents annual external debt as a percentage of gross domestic product in percent.

EXCHR = Exchange rate is annual exchange rate (naira/US dollar) valued in rate and the dependent variable.

BOP = Balance of payment represents the annual balance of payment as a percentage of gross domestic product.

INFLR = Inflation rate represents annual inflation rate in percent.

Data were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and Annual Report & Statement of Accounts.

4. Results

4.1 Pre Estimation Diagnostic Test

The time series properties of the variables incorporated in the model is examined using the Augmented Dickey-Fuller unit root test in order to determine the long-run convergence of each series to its true mean. The test involves the estimation of equations with drift and trends as proposed Dickey and Fuller (1988). The test equations are expressed as:

$$\Delta Z_t = \eta_1 Z_{t-1} + \sum_{i=0}^{n} \pi i \Delta Z_{t-1} + V_t \quad (5)$$

$$\Delta Z_t = \eta_o + \eta_1 Z_{t-1} + \sum_{i=0}^{n} \pi i \Delta Z_{t-1} + V_t \quad (6)$$

$$\Delta Z_t = \eta_o + \eta_1 Z_{t-1} + \eta_1 t + \sum_{i=0}^{n} \pi i \Delta Z_{t-1} + V_t \quad (7)$$

The time series variable is represented by Z, t and Vt as time and residual respectively. The equation (v) states the possibility when no trend found in the data, equation (vi) states the possibility when data has intercept only and equation (vii) states the possibility when data has both intercept and linear trend respectively. Deterministic elements η_o and $\eta_1 t$ differentiate the above three equations from each other.

The concept of co-integration will be employed to investigate the long run equilibrium between the variables in the multivariate models. The analysis will base on the following equations:

$$\Delta lnY_t = a_o + \sum \beta_i \Delta lnY_t + \sum \chi_j \Delta lnX_t + \varepsilon_t \quad (8)$$

$$\Delta lnX_t = \gamma_o + \sum \sigma_i \Delta lnX_t + \sum \tau_j \Delta lnY_t + \varepsilon_t \quad (9)$$

Where (Y_t, X_t) are dependent and independent variables respectively; Δ is a difference operator, ε_t is a random error term with mean zero, α_0 and γ_0 are drift terms, β_i, χ_j, σi, and τ_j are coefficient estimates for independent variables. To perform the co-integration test, we have created the null hypothesis as there is no co-integration ($r = 0$) among variables. This would mean that, co-integration exists between two variables (Y_t, X_t). Therefore, the null and alternative hypothesis of unit root tests can be written as follows:

H_0: ($r = 0$, or no co-integration exists between Y_t, and X_t).

H_1: ($r \neq 0$, or co-integration exists between Y_t, and X_t).

The result of the co-integration test will be sensitive to the lag chosen. For this co-integration test, we used the Johansen and Juselius (2000) co-integration test and determined the proper lag profile on the basis of the SIC procedure.

Table 1. Descriptive Analysis

	LEXD	BOP	LRGDP	LEXR	INFL	UNM
Mean	13.50089	0.773333	12.95557	4.159628	20.69967	10.66000
Median	13.37068	-0.550000	12.74492	4.797682	12.72000	6.150000
Maximum	15.40276	10.70000	13.93781	5.298317	72.80000	24.00000
Minimum	10.63230	-3.300000	12.22982	1.198940	5.410000	1.800000

	LEXD	BOP	LRGDP	LEXR	INFL	UNM
Std. Dev.	1.117882	3.539427	0.529929	1.278239	19.15304	8.173869
Skewness	-0.277729	1.269696	0.358143	-1.199967	1.517670	0.473978
Kurtosis	3.210473	3.846012	1.736552	2.935604	3.863083	1.608578
Jarque-Bera	0.441041	8.955304	2.636708	7.204790	12.44776	3.543346
Probability	0.802101	0.011360	0.267575	0.027258	0.001982	0.170048
Observations	33	33	33	33	33	33

Source: Research finding.

The table above presents a descriptive statistics on all the variables of interest. Apart from the first moment statistics of the series, the results of other statistics are also evident from the table. For instance, Jarque-Bera which measures whether the series is normally distributed or not also rejects the null hypotheses of normal distribution for EXR, RGDP and UNM while accepts for that of BOP, EXR and INFL. Kurtosis measures the peakedness or flatness of the distribution of the series. The statistics show BOP and INF are leptokurtic, since the distribution is peaked relative to the normal while EXR and EXR are mesokurtic and other variables like RGDP and UNM are platykurtic, suggesting that the distribution is flat relative to the normal. Lastly, skewness is a measure of asymmetry of the distribution of the series around the mean. The statistic for skewness shows that all the variables except for EXD and EXR are positively skewed, implying that these distributions have long right tails.

Table 2. Correlation Matrix

	LEXD	BOP	LRGDP	LEXR	INFL	UNM
LEXD	1.000000					
BOP	0.349157	1.000000				
LRGDP	0.398166	-0.341404	1.000000			
LEXR	0.775472	0.057621	0.751891	1.000000		
INFL	-0.475237	-0.094251	-0.199977	-0.337996	1.000000	
UNM	0.732263	0.470240	0.210758	0.577257	-0.474852	1.000000

Source: Research finding.

To observe the relationship among the variables of interest, correlation analysis was carried out to preclude the possibility of multicollinearity among the variables in our model. It can be deduced

that there was no evidence of multicollinearity among the variables used in the model.

Table 3. Augmented Dickey Fuller (ADF) Test

Variables	Level			First Difference			Order of Integration
	None	Constant	Constant, Trend	None	Constant	Constant, Trend	
Log(EXD)	0.9096	-2.2680	-2.0044	-4.0389	-4.0030	4.0590	I(1)
BOP	-2.8408	-2.8442	-2.9029	-6.8889	-6.7693	-6.6400	I(1)
Log(RGDP)	3.7564	-0.1254	-1.9849	-3.3169	-4.6053	-4.5050	I(1)
Log(EXR)	0.4389	-4.5789	-4.5156	-4.6436	-4.5422	-5.1506	I(1)
INFL	-0.8119	-3.9275	-3.1221	-2.1386	-2.5225	-2.9174	I(1)
UNM	0.4042	-0.6209	-2.2120	-5.6681	-5.7523	-5.7524	I(1)

Source: Research finding.

The result of the Augmented Dickey-Fuller Unit Root Test for stationarity described to the variables under study showed a unit root without significant deterministic trend coefficient at level. However, stationarity was observed after first difference for each of the variables.

Table 4. Unrestricted Cointegration Rank Test (Trace)

Hypothesized		**Trace**	**0.05**	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None *	0.843522	131.8794	95.75366	0.0000
At most 1 *	0.645750	79.94394	69.81889	0.0062
At most 2 *	0.606784	50.88685	47.85613	0.0252
At most 3	0.401429	24.75177	29.79707	0.1705
At most 4	0.175564	10.38187	15.49471	0.2525
At most 5 *	0.162827	4.976300	3.841466	0.0257
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		**Max-Eigen**	**0.05**	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None *	0.843522	51.93544	40.07757	0.0015
At most 1	0.645750	29.05709	33.87687	0.1689
At most 2	0.606784	26.13508	27.58434	0.0757
At most 3	0.401429	14.36990	21.13162	0.3354
At most 4	0.175564	5.405566	14.26460	0.6900
At most 5 *	0.162827	4.976300	3.841466	0.0257

Source: Research finding.

Johansen co-integration test was employed to test whether the linear combinations of the variables could result in a long-run relationship among the variables. The co-integration result presented shows that

the null hypothesis of co-integrating vector is accepted at "at most 2" and "at most 1" co-integrating vector at 5% significance level for Trace and Maximum Eigen test respectively denoting two and one co-integrating vectors. The implication of our cointegration test is that explanatory variables converge to economic growth in the long-run.

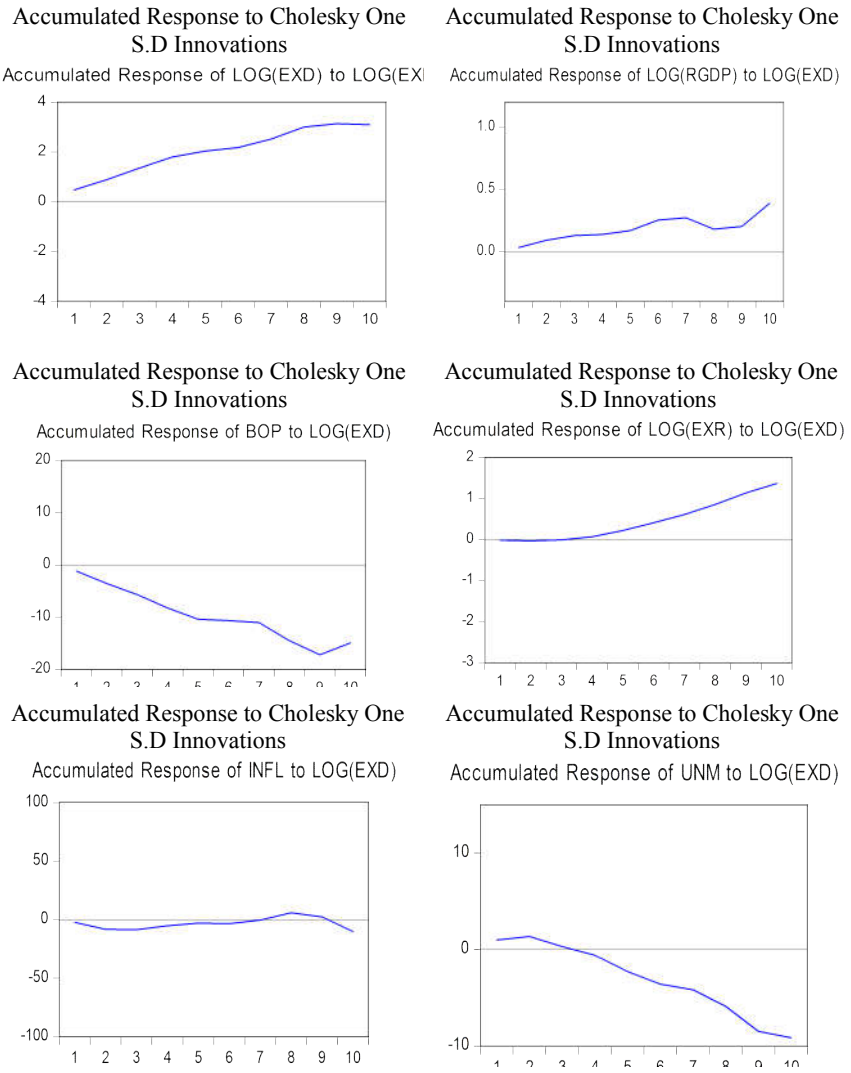

Figure 1. Impulse Response Functions
Source: Research finding.

The Table above displays the impulse response functions corresponding to the VECM model. Inspection of the table indicates that the response of external debt to own shock has been positive. This increase continues into the tenth quarter and thereafter a marginal increase is expected. On the innovations occasioned by inflation and exchange rate, the response of external debt will be positive all through the forecast period while the response to shock in unemployment and balance of payment is expected to be slightly negative.

Table 4. Variance Decomposition Analysis

Period	LEXD	BOP	LEXR	INFL	LRGDP	UNM
1	0.474693	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.881840	-0.195968	-0.078692	-0.054347	-0.023789	-0.025320
3	1.350973	-0.469696	-0.158240	-0.176503	0.211315	-0.038837
4	1.794401	-0.729793	-0.232503	-0.260869	0.267781	-0.066858
5	2.035888	-1.059760	-0.340389	-0.138259	-0.106943	-0.142544
6	2.176866	-1.366534	-0.726516	0.145806	-0.393873	-0.365886
7	2.514581	-1.373369	-1.249664	0.200039	-0.176939	-0.607318
8	3.003069	-1.434361	-1.230396	0.071102	-0.153984	-0.583783
9	3.134452	-2.164016	-0.798283	0.377577	-0.938579	-0.526228
10	3.098233	-2.919774	-1.174938	0.850700	-1.251193	-0.895019

Source: Research finding.

The variance decomposition (VD) for 1-year to 10-year forecast horizons will be applied in this study. The VD concerns to the extent to which variables are dependent on each other, and it provides information about the relative importance of each random innovation in affecting the variables in the model during the forecast horizon. In other words, The VD indicates the amount of information each variable contributes to the other variables in the autoregression. It determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables. The forecast error variance decompositions of the variables in the model are given in the table above.

Variance decomposition in table above reveals that at 5 period, 2.04% of the variance in external debt are explained by their own

shocks while Inflation (INF), Real Exchange Rate (EXR), Unemployment (UNEMP) and Balance of Payment (BOP) jointly explains negative variation in external debt growth. Specifically, Inflation (INF) contributes -0.14%, Exchange Rate (EXR)-0.34%, Unemployment (UNEMP) -0.14% and Balance of Payment (BOP) -1.06%.

5. Conclusion

The main objective of this study is to examine the relationship between external debt management and a set of macroeconomic variables: inflation, real exchange rate, unemployment and balance of payment in Nigeria.

The ADF unit root test, Johansen cointegration test, impulse response functions (IRF), and variance decomposition (VD) analysis were used in this study. The ADF test results indicate all variables are I(1). The Johansen cointegration test showed that variables have significant long-run relationship. Furthermore, the impulse response functions (IRFs) indicated that when there is a shock to external debt, RGDP will respond positively in the following years. The variance decomposition (VD) analysis showed that at a ten-year forecasting horizon, the level of external had no significant impact on economic growth and inflation; they influenced the level of exchange rate prevailing in Nigeria within the study horizon.

The external debt variable does not contribute significantly to macroeconomic variables. Following this finding, the study recommends that government external borrowing should not be used for purposes that could inflate the economy but should be channeled towards the provision of goods that would increase the level of economic activities.

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Appendix

Table I

YEAR	EXD	RGDP	BOP	UMP	EXR	INFL
1986	22215776000	69,147.00	9.135846	5.3	1.754523	5.717151
1987	29024888000	105,222.80	19.49534	7.00	4.016037	11.29032
1988	29624122000	139,085.30	16.94061	5.30	4.536967	54.51122
1989	30121999000	216,797.50	34.18262	4.00	7.364735	50.46669
1990	33438924000	267,550	30.92474	4	8.038285	7.3644
1991	33527205000	312,139.70	37.0216	3.10	9.909492	13.00697
1992	29018714000	532,613.80	38.22739	3.40	17.29843	44.58884
1993	30735623000	683,869.80	33.71975	2.70	22.0654	57.16525
1994	33092286000	899,863.20	23.05924	2.00	21.996	57.03171
1995	34094442000	1,933,211.60	39.52838	1.80	21.89526	72.8355
1996	31414751000	2,702,719.10	40.25773	3.80	21.88443	29.26829
1997	28467541000	2,801,972.60	51.46101	3.20	21.88605	8.529874
1998	30313711000	2,708,430.90	39.27861	3.20	21.886	9.996378
1999	29368025000	3,194,015.00	34.45783	8.20	92.3381	6.618373
2000	31581804000	4,582,127.30	48.9956	13.10	101.6973	6.933292
2001	30031742000	4,725,086	49.6805	14	111.2313	18.87365
2002	29918232000	9,912,381.30	40.03517	12.60	120.5782	12.87658
2003	34136659000	8,487,031.60	49.33496	14.80	129.2224	14.03178
2004	36689358000	11,411,066.90	31.89587	13.40	132.888	14.99803
2005	20475927000	14,572,239.10	33.05946	11.90	131.2743	17.86349
2006	4065417000	18,564,594.70	42.56657	12.30	128.6517	8.239527
2007	3862818000	20,657,317.70	39.33693	12.70	125.8081	5.382224
2008	4143915000	23,842,170.70	40.79684	14.90	118.546	11.57798
2009	6847795000	25,783,677.80	36.05871	19.70	148.9017	11.53767
2010	7271144000	39,279,684.60	43.32076	21.40	150.298	13.7202
2011	9008773000	25,625,489.10	53.27796	23.90	154.7403	10.84003
2012	10076546000	27,037,667.98	44.53237	27.40	156.8097	12.21778
2013	7469634600	28,313,738.04	31.04886	24.70	145.8591	8.475827
2014	8134778520	29,208,051.50	30.88519	23.42	151.3218	8.062486
2015	8392175224	29,892,926.24	21.44693	24.16	151.8058	9.009387
2016	8616381469	28,015,574.57	20.72252	24.72	152.1073	15.67534
2017	8537903163	28,493,591.67	26.3476	24.88	151.5807	16.52354
2018	8230174595	28,784,776.40	26.09022	24.38	150.535	12.09473

Table II. Vector Error Correction Mechanism (VECM)

CointegratingEq:	CointEq1					
LOG(EXD(-1))	1.000000					
BOP(-1)	0.540720 (0.02429) [22.2654]					
LOG(EXR(-1))	0.097700 (0.14747) [0.66251]					
INFL(-1)	0.048380 (0.00637) [7.59034]					
LOG(RGDP(-1))	4.189165 (0.94288) [4.44295]					
UNM(-1)	-0.392413 (0.04563) [-8.59896]					
C	-65.78063					
Error Correction:	**D(LOG(EXD(BOP) D))**		**D(LOG(EX R))**	**D(INFL)**	**D(LOG(RG DP))**	**D(UNM)**
CointEq1	-0.079844 (0.13736) [-0.58127]	-1.309431 (0.55465) [-2.36084]	-0.079788 (0.02049) [-3.89481]	-3.429744 (3.58730) [-0.95608]	-0.003438 (0.01999) [-0.17198]	1.524581 (0.62310) [2.44678]
D(LOG(EXD(-1)))	0.368256 (0.27830) [1.32325]	-2.978455 (1.12371) [-2.65055]	0.082826 (0.04150) [1.99560]	1.059715 (7.26787) [0.14581]	-0.004015 (0.04050) [-0.09914]	-1.268326 (1.26240) [-1.00470]
D(LOG(EXD(-2)))	-0.170874 (0.35003) [-0.48817]	-2.351107 (1.41337) [-1.66348]	0.059932 (0.05220) [1.14806]	0.748416 (9.14128) [0.08187]	0.005949 (0.05094) [0.11678]	-2.783239 (1.58780) [-1.75289]
D(BOP(-1))	0.025546 (0.07491) [0.34100]	-0.039907 (0.30249) [-0.13193]	0.033559 (0.01117) [3.00382]	1.251177 (1.95640) [0.63953]	0.003858 (0.01090) [0.35384]	-0.702685 (0.33982) [-2.06783]
D(BOP(-2))	0.002389 (0.04970) [0.04807]	-0.004049 (0.20068) [-0.02017]	0.017529 (0.00741) [2.36498]	0.124486 (1.29794) [0.09591]	-0.003825 (0.00723) [-0.52881]	-0.341869 (0.22545) [-1.51641]
D(LOG(EXR(-1)))	0.688733 (1.48505) [0.46378]	-3.068487 (5.99637) [-0.51172]	0.691836 (0.22147) [3.12377]	62.41330 (38.7829) [1.60930]	0.133702 (0.21613) [0.61862]	4.261790 (6.73642) [0.63265]
D(LOG(EXR(-2)))	-0.324154 (1.40755) [-0.23030]	6.234769 (5.68343) [1.09701]	0.181128 (0.20992) [0.86286]	-32.01344 (36.7589) [-0.87090]	-0.248024 (0.20485) [-1.21075]	-8.870297 (6.38486) [-1.38927]
D(INFL(-1))	-0.001564 (0.00780) [-0.20057]	0.052831 (0.03149) [1.67763]	0.000793 (0.00116) [0.68144]	-0.084723 (0.20368) [-0.41596]	-0.000357 (0.00114) [-0.31433]	0.016448 (0.03538) [0.46492]
D(INFL(-2))	-0.005418 (0.00765) [-0.70813]	-0.001432 (0.03089) [-0.04637]	-0.000882 (0.00114) [-0.77298]	-0.426889 (0.19980) [-2.13655]	0.000755 (0.00111) [0.67837]	-0.022204 (0.03470) [-0.63979]

	0.155610	12.31360	-0.413602	-2.184470	0.172556	13.56029
D(LOG(RGDP(-1)))	(1.77124)	(7.15193)	(0.26416)	(46.2568)	(0.25778)	(8.03460)
	[0.08785]	[1.72172]	[-1.56575]	[-0.04722]	[0.66939]	[1.68774]
	-3.708114	-32.22531	-0.048097	25.87856	-0.817676	-10.21104
D(LOG(RGDP(-2)))	(2.84538)	(11.4891)	(0.42435)	(74.3086)	(0.41411)	(12.9071)
	[-1.30321]	[-2.80486]	[-0.11334]	[0.34826]	[-1.97455]	[-0.79112]
	-0.018763	-0.344241	-0.009178	1.082255	0.002349	-0.074885
D(UNM(-1))	(0.05509)	(0.22245)	(0.00822)	(1.43876)	(0.00802)	(0.24991)
	[-0.34057]	[-1.54749]	[-1.11705]	[0.75221]	[0.29294]	[-0.29965]
	0.046746	0.225240	-0.006762	0.355357	0.010202	-0.086979
D(UNM(-2))	(0.04859)	(0.19620)	(0.00725)	(1.26900)	(0.00707)	(0.22042)
	[0.96201]	[1.14799]	[-0.93304]	[0.28003]	[1.44259]	[-0.39461]
	0.220032	1.320727	0.036390	-8.323934	0.105381	1.667184
C	(0.28805)	(1.16308)	(0.04296)	(7.52247)	(0.04192)	(1.30662)
	[0.76388]	[1.13555]	[0.84710]	[-1.10654]	[2.51378]	[1.27595]
R-squared	0.298941	0.783734	0.872289	0.459757	0.366218	0.537231
Adj. R-squared	-0.402118	0.567467	0.744577	-0.080485	-0.267564	0.074462
Sum sq. resids	4.501309	73.38924	0.100116	3069.988	0.095342	92.62205
S.E. equation	0.588434	2.375989	0.087757	15.36727	0.085639	2.669227
F-statistic	0.426414	3.623929	6.830154	0.851020	0.577830	1.160904
Log likelihood	-14.12652	-51.81054	37.25169	-102.2148	37.91126	-54.95266
Akaike AIC	2.083446	4.874855	-1.722347	8.608506	-1.771205	5.107605
Schwarz SC	2.755361	5.546770	-1.050432	9.280422	-1.099289	5.779520
Mean dependent	0.070312	-0.111111	0.134099	-1.948148	0.053351	0.551852
S.D. dependent	0.496942	3.612727	0.173640	14.78384	0.076065	2.774523

Determinant resid covariance (dof adj.)	0.006088
Determinant resid covariance	7.58E-05
Log likelihood	-101.7965
Akaike information criterion	14.20715
Schwarz criterion	18.52661