



IMPACT OF EXTERNAL DEBT ON ECONOMIC GROWTH IN NIGERIA: A VECM APPROACH

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ABSTRACT

Nigeria's expanding external debt has long been a source of anxiety for the citizens of the country, even though it has throughout time been one of the financing sources used by successive governments to pay the annual budget deficit. To this end, this paper attempts to investigate the impact of external debts on the economic growth of Nigeria using time series data for the periods of 1980 to 2021 sourced from the Central Bank of Nigeria and the Debt Management Office. The data was analyzed using the econometrics method of Johansen cointegration and vector error correction mechanism (VECM). Findings show that external debt stock (LEDS), external debt servicing (LEDP), and interest rate (INTR) have a positive significant relationship with economic growth (LGDP) while exchange rate (EXCR) revealed a negative significant relationship with economic growth on the average ceteris paribus in the long-run. However, the VECM result shows that the previous lag values of LGDP, LEDS, LEDP, and EXCR have a positive insignificant relationship with economic growth (LGDP), while the previous one-year value of INTR has a negative insignificant relationship with economic growth (LGDP) in the short-run. Therefore, this study among other things recommends that government should ensure external debt stock is productively invested in the value-added sectors of the economy to engender greater economic growth. If this is achieved, it will help further to transform the economy positively and provide adequate funds to cater to the economic needs of the country at large.

Keywords: External debt, Debt Service, Exchange Rate, Interest Rate, and Economic Growth

JEL Classifications: H63, 040

1.0 Introduction

The motive behind external debt is to boost the economic growth and development of any nation (Charles & Abimbola, 2018). In Nigeria, the inability to manage our resources well when there was windfall coupled with corruption and mismanagement compels Nigeria to have inadequate funds for growth and developmental projects such as roads, electricity, pipe borne water (Udeh, et.al. 2016). Borrowings to finance public and infrastructure development are key to fostering economic growth. However, borrowing without appropriate planning for investment may lead to a heavy debt burden and interest payment, which in turn may create several undesirable effects on the economy (Joy & Panda, 2020). Thus, external debt is incurred in the case of needing funds, when governments suffer from shortages of domestic savings and foreign currencies needed (Siddique et.al. 2015).

In Nigeria, like so many other developing countries, the external debt profile has recorded a continuous increase over time, especially, as the government assumes an active role in the development of the economy by trying to put in place the infrastructure and institutional superstructure necessary for economic growth and development. The likelihood of an increase in public expenditure can be attributed to factors like growing population and increasing urbanization, which require an increase in the sheer scale of state services and traditional functions, including defense particularly where the country faces one form of crisis or the other. For instance, the contemporary security threats (insecurity) bedeviling the six (6) geopolitical zones of Nigeria have forced the government to increase its spending on defense. Meanwhile, better quality services imply a higher cost. However, most less developed countries are characterized by a shortage of capital resources to meet the increasing public expenditures.

External debt, if properly utilized stimulates the economy but whenever a nation accumulates substantial debt, a reasonable proportion of public expenditure and foreign exchange earnings will be absorbed by debt servicing and repayment with heavy opportunity costs.

The genesis of Nigeria's debt service burden dates back to 1978 after a fall in world oil prices. Before this occurrence, Nigeria had incurred some minor debts from World Bank in 1958 with a loan of US\$28 million for railway construction and the Paris Club debtor nations in 1964 from the Italian government with a loan of US\$13.1 million for the construction of the Niger dam. The first major borrowing of US\$1 billion known as the "Jumbo loan" was in 1978 from the International Capital Market (ICM)

The fluctuations of oil prices compounded by poor economic policies, bad management, and unfavorable loan terms, made it externally difficult to service the mounting external debt obligation, particularly those due to the Paris Club. Hence despite the rescheduling in 1986, 1989, and 1991 arrears continued to amount, which further worsened the debt problem.

According to the International Monetary Fund (2000), Nigeria's debt service payment was estimated at approximately US\$1,854.82 million (₦189,376.71 million), which is about 107.9 percent of the country's external reserve. In 2005, it attained US\$8,870.8 million (about ₦1,172,719.23 million) or about 130.7 percent of Nigeria's external reserve. However, following the debt relief package received by the country, the country's debt service payment thus followed a decreasing trend as it fell to only US\$6,643.9 million (₦878,325.76 million), which is about 110.8 percent of the external reserve in 2006, and further decreased to US\$369.22 million (₦55,493.83 million) or 86.5 percent less of the external reserve in 2010, while in 2013 the total debt service payment was just US\$297.33 million (₦46,760.93 million). This huge external debt constitutes a major impediment to the revitalization of its shattered economy as well as the alleviation of increasing poverty.

Given the foregoing, the main objective of the study is therefore to empirically investigate the impact of external debts on the economic growth of Nigerian from 1990 to 2021 using vector error correction mechanism techniques. The rest of the paper is divided into the following sections; section two is the literature review which comprises conceptual literature, theoretical review, and empirical literature; section three is the methodology; section four unveils data analysis and results interpretation; and section five is the conclusion and policy recommendations.

2.0 Literature Review

2.1 Conceptual Review

Concepts such as external debt, debt servicing, exchange rate, and economic growth are empirically defined in this section.

2.1.1 External Debt

Focus Economics (2019) defined foreign debt or external debt as the portion of a country's overall debt that is borrowed from foreign lenders which include commercial banks, governments, or international financial institutions. The international financial institutions include the World Bank and the International Monetary Fund (IMF). Money borrowed from foreign lenders (usually European, North American, or Japanese) involves interest which must be paid in the same currency in which the loan is taken; therefore, the borrowing country may be required to export its goods to the lender countries to earn that currency. Reinhart and Rogoff (2010) define external debt as the total public and private debt owed by a country's residents to nonresidents, repayable in foreign currency, goods, or services.

2.1.2 Debt Servicing

Debt servicing refers to the process by which a debtor entity, such as a country or an organization fulfills its financial obligations and commitments related to its outstanding debt. It involves making timely payments of both principal and interest on the debt according to the agreed terms and conditions. According to Merriam-Webster (2019), debt service is the amount of interest and sinking fund payments due annually on long-term debt. It is the payment of principal and interest due on existing debt.

IMF (2003) also defines debt service as the payments required to be made in respect of both principal and interest for an existing loan. It seeks to highlight the difference between actual debt service and scheduled debt service.

2.1.3 Exchange Rate

According to Ngerebo-a and Ibe (2013), an exchange rate is the ratio of a unit of one currency to the amount of another currency for which that unit may be exchanged at a given moment. Jhingan (2003) also defined the exchange rate as the price at which one currency is exchanged for another. It is the value of one currency in terms of another. Mordi (2006) defined exchange rates as the price of one currency relative to another, as well as the number of units of one currency necessary to purchase another. An exchange rate is the value of one nation's currency versus the currency of another nation or economic zone. Typically, an exchange rate is quoted using an acronym for the national currency it represents. For example, the acronym USD represents the U.S. dollar, while EUR represents the euro. To quote the currency pair for the dollar and the euro, it would be EUR/USD. In the case of the Japanese yen, it's USD/JPY or dollar to yen. An exchange rate of 100 would mean that 1 dollar equals 100 yen.

2.1.4 Interest Rate

According to Babalola, et al. (2015), interest rate is the rate at which interest is paid by a borrower (debtor) for the use of money that they borrow from a lender. From Olusoji's (2013) point of view, interest is the payment made by the borrower to the lender of a money loan. It is usually expressed as an annual rate in terms of money and is calculated on the principal of the loan. To James et al. (2013), the interest rate is regarded as the return that is received on investment or the rate charged on lending. However, interest can also be defined as the return

or yield on equity or opportunity cost of deferring current consumption into the future (Uchendu, 2010).

According to Adebisi, (2002), interest rate is defined as the return or yield on equity or the opportunity cost of delaying present spending into the future. Saving rates, lending rates, and discount rates are all instances of interest rates. Through their effect on main macroeconomic indicators, interest rates play an important role in conveying monetary policy impulse to economic activities (Jelilov, 2016)

2.1.5 Economic Growth

Godwin (2007) defines economic growth as an increase in real gross domestic product (RGDP). That is, gross domestic product adjusted for inflation. The growth can either be positive or negative. Negative growth can be referred to by saying that the economy is shrinking, this is characterized by economic recession and economic depression. Unlike economic development, economic growth is an expansion of the national income, and it includes the investigation, particularly in quantitative terms with a focal point on the current relations between the endogenous variables; it simply entails the increase of the national income, gross national income, and gross domestic product.

2.2 Theoretical Review

2.2.1 Debt-cum-Growth Model

This model states that for debt accumulation to be sustainable, the growth rate of external debt must not be higher than that of domestic output, export, or tax revenues. This theory considers external debt as a substitute for domestic savings and investment and therefore domestic savings and investment are crowded out as a result (Krugman, 1988; Alesina and Tabellini, 1990) as cited in (Udoka and Ogege, 2012). This thinking is that the returns from investing in a country are seen as being subjected to a high marginal tax by creditors and this may discourage domestic and foreign investors.

2.2.2 Profligacy Theory

This theory attempts to correct the weakness of growth-cum-debt theory by focusing on the institutional arrangement under which a loan was contracted. This theory recognizes that the debt crises arose from weak institutions and policies that have wasted resources through unbridled official corruption and damaged living standards and development. These policies led to distortions in relative prices and encouraged capital flights as seen in substantial liquid funds of private citizens of debtor countries in foreign banks (Nyong, 2005) as cited in (Udoka and Ogege, 2012).

2.2.3 Debt - Laffer Curve Theory

The burden of external debt is the concern of debt -the Laffer curve theory otherwise known as the threshold school of thought which emphasizes the non-linear relationship between debt and growth (Calvo, 2002). It links debt and growth to the problem of capital flight where at high debt levels growth falls. According to the theory, the fall in growth is due to the higher distortionary tax burden on capital required to service the debt. It leads to a lower rate of return on capital, lower investment, and hence lower growth. It maintains that low debt regimes have higher growth rates and lower strand of thought in the debt growth nexus which sees external debt as capital inflow with a positive effect on domestic savings and investment

and thus on growth which leads to poverty reduction via appropriate targeting of domestic savings and investment (Calvo, 2002).

2.3 Empirical Literature

A considerable number of previous studies are reviewed in this study. Yusuf and Mohd (2021) investigated the effect of government debt on Nigeria's economic growth using annual data from 1980 to 2018 and the Autoregressive Distributed Lag technique. The empirical results showed that external debt constituted an impediment to long-term growth while its short-term effect was growth-enhancing. Domestic debt had a significant positive impact on long-term growth while its short-term effect was negative.

Ideh and Uzonwanne (2021) examined the impact of external debt on economic growth in Nigeria in the period, 1985 to 2019 by examining the causality between external debt stock and economic growth in Nigeria and identifying the impact of external debt servicing on economic growth in Nigeria. The study employed the Harrod Domar theory of economic growth and the Two-Gap model as a theoretical framework to explain the impact of external debt on economic growth in Nigeria. The study made use of secondary data sourced from the World Development Indicator 2019. The ordinary least square (OLS) technique was adopted for the regression analysis. The data were analyzed with the aid of e-view software (9th edition). The result showed that external debt has a negative and insignificant impact on economic growth in Nigeria.

Ekor et al (2021) assessed the impact of foreign debt on Nigeria's economy for the period 1980 to 2018 using Autoregressive Distributed Lag (ARDL). Findings revealed that in the long run, external debt accumulation and the associated service payments have negative effects on the economy.

Nzeh (2020) investigated the effect of Public Debt on Economic Growth in Nigeria using annual data spanning a period of 1981-2018 and under the framework of the Autoregressive Distributed Lag (ARDL) bounds technique, the results of findings revealed that public debt contributes to the growth of the economy both in the short-run and in the long-run. However, after a certain threshold level, public debt leads to declining growth in both time horizons. The study also found the optimal threshold level of debt to be 40.2% in both the long-run and short-run. However, further findings revealed that while trade openness contributes to GDP positively, both inflation and fiscal deficit adversely affect GDP.

Mhlaba et al (2019) employ the ARDL method and quarterly data from 2002 to 2016 to examine the long-run and short-run effects of public debt on economic growth in South Africa. The study modeled GDP as a function of gross and net debt, investment, inflation, and terms of trade. The empirical results indicated a significant negative impact of public debt on economic growth. The study was based on South African data and provided a basis to examine the impact of government debt on economic growth from a Nigerian-specific perspective

Odubuasi et al (2018) analyzed the effect of external debt on the economic growth of Nigeria from 1981 to 2017 using the Granger Causality and Johansen Co-integration estimation technique. The study revealed that external debt stock and government capital expenditure have a positive on Nigeria's economic growth while external debt service had no significant impact on economic growth.

Elwasila (2018) investigated the effect of external debt on the economic growth of Sudan from 1969 to 2015 using the Johansen cointegration method and the Vector Error Correction Method (VECM) estimation technique. Findings revealed that external debt had a positive impact on

the economic growth of Sudan whereas exchange rate and foreign direct investment had adverse effects on the economy.

Matuka and Asafo (2018) examined the impact of external debt on economic growth in Ghana using co-integration analysis and an error correction methodology. The study made use of annual time series data covering a period from 1970 to 2017. The findings indicated that external debt impacted positively on economic growth in Ghana, both in the long and short terms.

Ndubuisi (2017) examined the impact of external debt on the economic growth of Nigeria between 1985 and 2015 using Johansen Co-integration and error correction estimation techniques. The Findings showed that debt service payment had an adverse and insignificant impact on economic growth while external debt stock had a positive impact on economic growth, also, the causality test revealed that there is unidirectional causality running from external debt to GDP.

Afolabi et al. (2017) investigated the long and short-term association between external debt and economic growth in Nigeria. The study covered a period from 1980 to 2014 and applied the error correction model and Granger causality test to empirically establish the relationship existing among the variables. Thus, the findings showed that external debt had a negative relationship with economic growth in Nigeria.

Onakoya and Ogunade (2017) investigated the impact of external debt on economic growth in Nigeria between 1981 and 2014. The study used Autoregressive Distributed Lag (ARDL) and Ordinary Least Squares technique to analyze the effect of external debt on economic growth. The study revealed that external debt had a negative impact on economic growth.

Monogbe (2016) examined the long-term effect of external debt on Nigeria's economic performance from 1981 to 2014 using the co-integration test, granger causality test, and ordinary least squares method. The study found that external debt had a positive and significant relationship with economic growth.

Ijirshar et al. (2016) used a combination of descriptive statistics and econometric tools to examine the relationship between external debt and economic growth in Nigeria from 1981 to 2014. The result of the study indicated that external debt stock had a significant positive impact on economic growth both in the short and long run. On the contrary, external debt service negatively and significantly impacted on the economic growth of Nigeria.

Sulaiman and Azeez (2012), investigated the effect of external debt on the economic growth of Nigeria between 1970 and 2010 using the Johansen Co-integration estimation technique, the study revealed that there is a long-run relationship between the variables and external debt had a positive impact on economic growth.

Malik et.al.(2010) explored the relationship between external debt and economic growth in Pakistan for the period between 1972 - 2005 using time series econometric techniques. Their result shows that external debt is negatively and significantly related to economic growth suggesting that an increase in external debt leads to a decline in economic growth.

3.0 Methodology

3.1 Source of Data

The study used secondary annual time series data. The data for all the variables were obtained from the statistical bulletin of the Central Bank of Nigeria (CBN, 2021) and the Debt Management Office.

3.2 Variables and Measurement

The variables on which the data was collected from CBN are Gross Domestic Product (GDP), Exchange Rate (EXCR), and Interest Rate (INTR). Data on external debt stock (EDS) and debt repayment (EDP) were sourced from the Debt Management Office (DMO). Where GDP is the dependent variable on whose other variables are explained.

3.3 Model Specification

This study adapted the model of Elwasila (2018) who investigated the effect of external debt on the economic growth of Sudan from 1969 to 2015 using the Johansen cointegration method and the Vector Error Correction Method (VECM) estimation technique. The model is specified as follows:

$$GDP = f(EDX, EXR, FDI) \dots\dots\dots 1$$

Where: GDP stands as the dependent variable to measure economic growth, EDX is external debt represented by a ratio of external debt to export, EXR is the nominal official exchange rate and FDI is the foreign direct investment respectively. The multiple regression equation models to explore the public debt factors that influence economic growth in Sudan are stated as:

$$GDP = \beta_0 + \beta_1(EDX) + \beta_2 (EXR) + \beta_3 (FDI) + \nu_t \dots\dots\dots 2$$

Thus, the model in natural logarithm form becomes:

$$\text{Log}(GDP) = \beta_0 + \beta_1\text{log}(EDX) + \beta_2\text{log}(EXR) + \beta_3\text{log}(FDI) + \nu_t \dots\dots\dots 3$$

Where: β_0 = the intercept of the relationship in the model, β_1 - β_3 are the coefficients of EDX, EXR, and FDI respectively, and ν_t is the stochastic error term.

Therefore, this study adapted the model used by Elwasila (2018) by replacing FDI with EDP, and INTR respectively. Given the above, the model for this study is stated as:

$$GDP = f(EDS, EDP, EXCR, INTR) \dots\dots\dots 4$$

Where:

GDP is the GDP as a ratio of economic growth, EDS is the external debt stock, EDP is the external debt servicing, EXCR is the nominal exchange rate and in naira per US dollar (₦/\$) and INTR is the interest rate (lending rate) in percent (%).

This is expressed in an explicit econometric equation as:

$$\text{Log GDP} = \beta_0 + \beta_1\text{logEDS} + \beta_2\text{logEDP} + \beta_3 \text{EXCR} + \beta_4 \text{INTR} + \nu_t \dots\dots\dots 5$$

LEDP	0.638656	0.122784	0.178955**	0.101846**	I (1)
<u>C.V@5%</u>	(0.463000)	(0.146000)	(0.463000)	(0.146000)	
EXCR	0.699295	0.127018**	0.513630	0.125052**	I (1)
	(0.463000)	(0.146000)	(0.463000)	(0.146000)	
INTR	0.185591**	0.169167	0.151239**	0.155068	I (1)
<u>C.V@5%</u>	(0.463000)	(0.146000)	(0.463000)	(0.146000)	

Note: ** denotes stationarity order

C V mean critical value @ 5%

Source: Author's Computation Using E-views 10

The stationarity test was conducted using the KPSS Unit root test to determine the stationarity level of the time series variables. The test was conducted at a level and first difference with the test equation which includes intercept and trend and intercept. The result of the unit root test as shown in Table 1 shows that LGDP, LEDS, LEDP, EXCR, and INTR were all stationary at first difference. Since the result exhibits stationarity at first differencing, it is, therefore necessary to carry out a co-integration test to ascertain whether the variable has a long-run equilibrium relationship in the model using the Johansen co-integration test.

VAR Lag Order Selection Criteria

Table 2: Lag length criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-331.3795	NA	3774.549	22.42530	22.65883	22.50001
1	-181.0940	240.4568	0.914728	14.07293	15.47413*	14.52119*
2	-151.3251	37.70720*	0.774624*	13.75501*	16.32387	14.57681

Source: Author's Computation Using E-views 10

Two lag lengths were selected for this study as suggested by AIC information criteria.

Cointegration Test

The cointegration test is a method of modeling non-stationary series. Johansen's cointegration test shall be applied to this model.

Null Hypothesis

H_0 : No Cointegrating equation in the model

Decision Rule: Reject H_0 . If the value of Trace statistics and Max Eigen statistics is greater than the critical values at 5%. Otherwise, we fail to reject the null hypothesis (H_0) and conclude that there exists a long-run relationship among the variables of the study.

Table 3a

Johansen Unrestricted Cointegration Rank Test (Trace)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.743837	88.91482	69.81889	0.0007
At most 1 *	0.540827	49.41848	47.85613	0.0354
At most 2	0.371504	26.84697	29.79707	0.1054
At most 3	0.348673	13.37864	15.49471	0.1016
At most 4	0.032063	0.945063	3.841466	0.3310

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Source: Author's Computation Using E-views 10

Table 3b

Johansen Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized	Max-Eigen	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.743837	39.49633	33.87687	0.0096
At most 1	0.540827	22.57151	27.58434	0.1925
At most 2	0.371504	13.46833	21.13162	0.4101
At most 3	0.348673	12.43358	14.26460	0.0954
At most 4	0.032063	0.945063	3.841466	0.3310

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Source: Author's Computation Using E-views 10

Table 3a shows the result for the Johansen cointegration test result with trace statistic values of $88.91482 > 69.81889$ and $49.41848 > 47.85613$ at 5% critical values respectively, indicating that there are two cointegrating equation among the variables of the model while table 3b has a Max- Eigen statistic value of $39.49633 > 33.87687$ at 5% critical value, indicating that there exist at least one cointegrating equations among the variables. Therefore, it can be concluded that there is a significant long-run relationship between external debt variables and economic growth.

Table 4: Estimated Long-run relationship between external debt and economic growth in Nigeria

Variable	Coefficient	t-Statistic	Std. Error
LGDP	1.0000	-	-
LEDS	3.403548	4.8107	0.70750
LEDP	1.964337	6.1486	0.31948
EXCR	-0.044592	6.4908	0.00687
INTR	0.273803	2.7090	0.10107

Source: Author’s Computation Using E-views 10

Table 4 shows the estimated result for long-run coefficients of variables used in the study. The estimate was extracted from the normalized cointegrating coefficients with the minimum log-likelihood of -133.8744

$$LGDP = 3.404LEDS + 1.964LEDP - 0.045EXCR + 0.274INTR \dots\dots\dots 6$$

$$STD \quad (0.70750) \quad (0.31948) \quad (0.00687) \quad (0.10107)$$

STD: Standard Error Statistics

The result from Table 4 indicates that the estimated coefficients of external debt stock (LEDS), external debt servicing (LEDP), and interest rate (INTR) are positive and statistically significant while exchange rate revealed a negative significant relationship with economic growth on the average ceteris paribus in the long run. This implies that a percent increase in LEDS, LEDP, and INTR will increase LGDP by 3.404%, 1.964%, and 0.274% respectively while a percent rise in EXCR in the long run will decrease LGDP by 0.045%. Therefore, the null hypothesis of no cointegration is rejected.

Vector Error Correction Model (VECM)

Cointegration is a precondition for the application of the error correction mechanism. Since cointegration has been established at 1(1), it is appropriate to proceed to the VECM. From the unrestricted estimated VAR model, a lag of 2 is selected based on AIC suggestion as shown in table (2).

Table 5

Summary of VECM Results

Variable	Coefficient	Standard errors	t-statistics	p.
D (LGDP (-1))	0.425463	0.22971	1.85213	0.0666
D (LEDS (-1))	0.012246	0.01737	0.70509	0.4822
D (LEDP (-1))	0.007507	0.00471	1.59265	0.1140
D (EXTR (-1))	0.000173	0.00033	0.52587	0.6000
D (INTR (-1))	-0.001007	0.00140	-0.71745	0.4745
ECM _{t-1}	-0.005892	0.00295	-1.99904	0.0480
C	0.020220	0.01283	1.57655	0.1176

R-squared 0.57; Adj. R-squared 0.46; SSR 0.02; SEE 0.03; F-statistic 5.1629; LL 69.893; AIC - 4.1929; SC -3.8659; Mean Dependent 0.04052; S.D. dependent 0.0367; DW 2.07

Source: Author’s Computation Using E-views 10

$$d(LGDP) = 0.426(LGDP_{t-1}) + 0.0123(LEDSt_{-1}) + 0.008(EDP_{t-1}) + 0.0002(EXCR_{t-1}) - 0.001(INTR_{t-1}) - 0.006(ECM_{t-1}) + 0.020 \dots\dots\dots 7$$

Where d is the difference operator and L stands for natural logarithm. All coefficients are the elasticities of GDP to the respected regressors as the estimation is carried out on the natural logarithm of variables. The VECM equation shows that the previous lag values of LGDP, LEDS, LEDP, and EXCR have a positive insignificant relationship with economic growth (LGDP), while the previous one-year value of INTR has a negative insignificant relationship with economic growth (LGDP) in the short-run. This implies that a percentage change in the previous one year's values of LGDP, LEDS, LEDP, and EXCR are associated with 0.426%, 0.0123%, 0.008%, and 0.0002% increase in economic growth on the average ceteris paribus respectively in the short-run. While a percentage change in the previous lag value of INTR is associated with a 0.001% decrease in economic growth on the average ceteris paribus in the short run.

The coefficient of VECM is significant with the appropriate negative sign and it means that the present value in GDP adjusts to an equilibrium position at a speed of 0.6 percent each year. The adjusted R² of the VECM is reasonable showing that that the exogenous variables in the VECM equation explain 46% of total variation or changes in GDP. Also, the F-Statistic value of 5.1629 concludes that the overall result of the VECM is statistically significant. Furthermore, the reliability of the estimated VECM is tested and the diagnosis test results are presented in Tables 6, 7 and 8

Table 6
VEC Residual Serial Correlation LM Tests
Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	Df	Prob.
1	21.14155	25	0.6847	0.799623	(25, 31.2)	0.7146
2	24.96142	25	0.4645	0.991223	(25, 31.2)	0.5036

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	Df	Prob.
1	21.14155	25	0.6847	0.799623	(25, 31.2)	0.7146
2	56.91233	50	0.2334	1.023113	(50, 17.0)	0.5033

*Edgeworth expansion corrected likelihood ratio statistic.

Source: Author’s Computation Using E-views 10

Table 7

VEC Residual Normality Tests

Component	Jarque-Bera	Df	Prob.
1	13.37380	2	0.0012
2	101.8177	2	0.0000
3	1.114858	2	0.5727
4	0.962186	2	0.6181
5	1.159724	2	0.5600
Joint	118.4283	10	0.0000

*Approximate p-values do not account for coefficient estimation

Table 8

VEC Residual Heteroskedasticity Tests (Levels and Squares)

Joint test:

Chi-sq	Df	Prob.
333.9359	330	0.4292

Source: Author's Computation Using E-views 10

The results from Tables 6, 7, and 8 indicated that some variables of the model are free from serial correlation while some indicated the presence of serial correlation but the joint equation indicated the presence of serial correlation. In the same vein, the result of the Jarque Bera normality indicated three of the variables are normally distributed while two are not normally distributed and lastly, the joint result of the heteroscedasticity test conducted indicated that the model is free from heteroscedasticity.

5.0 Conclusion and Policy Recommendations

The study examined the impact of external debt on economic growth in Nigeria from 1990 to 2021 using vector error correction mechanism techniques. The study employed the VECM model approach adapted from the work of Elwasila (2018) to analyze the impact of external debt variables such as external debt stock, external debt repayment, exchange rate and interest rate on economic growth. The result shows that external debt stock, external debt repayment, and interest rate have a positive significant impact on economic growth (GDP) in the long run. The short-run result also pointed in the same direction except for the previous year's value of the interest rate which is negative as against the result obtained in the long run. Generally, the findings suggest that external borrowing has been beneficial and plays an important role in the growth process. This result conformed to the a priori expectation. The result also supports the findings of Nzeh (2020), Odubuasi, et al (2018), Elwasila (2018), Matuka and Asafo (2018), Ndubuisi (2017), Monogbe (2016) and Ijirshar et al (2016) and disagreed with the findings of Mhlaba et al (2019), Odubuasi et al (2018), Afolabi et al (2017), Onakoya and Ogunade (2017) and Malik et al (2010). Therefore, the result fulfills the broad objectives of the study.

The coefficient of VECM is significant with the appropriate negative sign and it means that the present value in GDP adjusts to an equilibrium position at a speed of 0.6 percent each year. The adjusted R² of the VECM is reasonable showing that the exogenous variables in the VECM equation explain 46% of total variation or changes in GDP. Also, the F-Statistic values of 5.1629 conclude that the overall result of the VECM is statistically significant.

Based on these findings, it can be affirmed that external debt within the period of study has an impact on economic growth in Nigeria both in the long run and short run. Therefore, the study made the following recommendations:

The government should ensure that external debt stock is productively invested in the value-added sectors of the economy to engender greater economic growth. If this is achieved, it will help further to transform the economy positively and provide adequate funds to cater to the economic needs of the country at large thereby making debt repayment a less burden on the economy.

The government should ensure adequate and effective implementation of macroeconomic policies that would enhance stable exchange rates, as effective and prudent management of exchange rate policies will significantly ensure the stability of the country's exchange rate (naira) and further enhance economic growth. In addition, the government should fully negotiate for a lower and sustaining interest rate when borrowing so that it does not become a burden on the local economy.

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