EXCHANGE RATE, EXTERNAL DEBT BURDEN AND ECONOMIC GROWTH IN NIGERIA

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ABSTRACT

The introduction of the Structural Adjustment Programme in Nigeria in 1986 was a pivotal moment that contributed to the country's excessive reliance on foreign debt to bridge the gap between savings and investment. Given that this obvious problem emanated from the humongous accumulation of debt and the likely effect of the exchange rate on it, this study examined exchange rate and the relationship between external debt burden and economic growth in Nigeria. To achieve this, the study employed the Autoregressive Distributive Lag Model (ARDL) for its analysis. The result indicated that interacting exchange rate with the external debt burden (ratio of external debt burden to oil revenue) hurts the economic growth of the country. Hence, it was suggested as a way forward the need for the government to fully diversify the economy from the oil sector to the non-oil sector through policy implementation so that the country's economy can gain extensively from the revenue generation in the non-oil sector.

Keywords: *Exchange Rate, Economic Growth, External Debt Burden and ARDL.*

1. Introduction

The growing amount of foreign debt, the strain of servicing the debt, and the accumulation of debt are causes for concern and anxiety in many African countries, Nigeria included. As of 2020, Nigeria's external debt was US$81.274 billion (25 trillion naira). For the nation to advance significantly towards achieving sustainable development goals, immediate attention must be given to this intricate problem. With the decline in oil prices and fluctuations in exchange rates among other factors, the rise in external debt in emerging nations is becoming a global concern. It has been argued that a nation's ability to thrive and flourish economically is hampered by

rising debt levels (Obademi, 2012).
In the meantime, the relationship between the external debt burden and other macroeconomic factors cannot be overstated in Nigeria, where significant economic growth during the 1970s was primarily a result of external debt due to the nation's persistent current account deficit, which forced the nation to take on massive international debt to fill payment gaps (Ayadi & Ayadi, 2008). Nigeria has struggled greatly over the last few decades with issues related to its external debt. The ineffective use and management of borrowed funds, poor investment returns, a lackluster framework for managing debt, changes in interest rates, trade agreements and legislation, and corruption on a global scale were the root causes of these issues. However, the key indicators that could support the usage and repayment of external debt in the domestic economy are the stability of macroeconomic factors like the inflation and exchange rates (Fagbola et al., 2020).

The introduction of the Structural Adjustment Program in Nigeria in 1986 was a pivotal moment that contributed to the country's excessive reliance on foreign debt to bridge the gap between savings and investment (Aderemi et al.2019). Over the post-SAP era, there has been evidence of fluctuations in the value of the Nigerian Naira about the US dollar, with varying degrees of appreciation and depreciation (CBN, 2012). Fagbola et al., (2020) and Aderemi et al., (2019) amongst others have recently debated the exchange rate difficulties and their effects on Nigeria's numerous economic performance indicators. Hence, it has been a primary concerned to all and sundry about the idea that external debt is the primary source of the country's exchange rate changes. Consequently, an attempt to provide empirical evidence to validate the above assertion by past studies has generated several arguments, which makes the literature to be inconclusive about this subject matter (See Kouladoum,2018; Saheed, Sani & Idakwoji, 2015; Aderemi, 2019; Aderemi et al.,2019).

Therefore, these studies were unable to examine the influence of exchange rate on the relationship between economic growth and external debt burden but rather just the direct relationship among the concerned variables were delved into. For instance, Adidigba (2019) examined External Debt, Exchange Rate, Foreign Investments and Economic Growth Inter-Relationships. However, it failed to interact with the exchange rate on each of the variables to be able to compare the influence of the exchange rate on each of the variables. It has then become pertinent to interact with the exchange rate on economic growth and external debt to evaluate the likely impact of the exchange rate on each of the variables. So, this research paper seeks to provide an answer to this question: How does the exchange rate influence the relationship between external debt burden and economic growth in Nigeria from 1980 to 2021.

The subsequent sections of this study are further divided as follows: section two provided the overview of the extant theories and literature relevant to this study while section three provided the methodology upon which the model is specified. Section four dealt with the data presentation and discussion of results, and section five put forward the conclusion from the study and possible recommendations.

2. Literature Review

2.1 Theoretical Review

Economic theory has traditionally supported the removal of obstacles that will speed up growth and emphasized the role that foreign investment plays in fostering economic expansion. Similarly, trade liberalization, or the removal or reduction of trade barriers, emphasizes the need for new and updated technology to be acquired for domestic and international markets to compete with one another and create job opportunities that spur economic growth. Thus, the dependency theory and the Harrod Domar growth theory are reviewed in this part.

Dependency theory

Inside the framework of international economic relations, dependency theory provides illuminating viewpoints on debt, economic growth, and exchange rates. Dependency theorists contend that because developing nations depend heavily on the export of primary commodities, they frequently face unfavourable terms of trade. This emphasizes unequal exchange, which is a crucial component of their theory. Consequently, these countries often face currency devaluation, intensifying their reliance on imports and impeding economic expansion even more (Emmanuel, 1972).

Dependency theorists also draw attention to how financial institutions and multinational firms contribute to developing nations' continued reliance on debt. These countries frequently incur large debt servicing obligations as a result of taking on large amounts of debt to fund infrastructure projects or balance of payments deficits (Dos Santos, 1970). International financial institutions frequently set the conditions of these loans, putting the interests of creditors ahead of the developing nations' needs.

Dependency theory emphasizes the structural limitations of the global capitalist system that impede economic growth and sustain dependency in this particular context. Reforms that challenge the power dynamics inherent in international finance, prioritize domestic development strategies, and advance fair-trade relations are necessary to address these issues. According to this notion, multinational corporations and foreign investors do not exist in emerging nations. Multinational corporations' involvement eventually skews development in the host nation. Additionally, Anyanwu (1993) and Aremu (2005) noted that proponents of foreign direct investment (FDI) exhibit exploitative behavior and bias when it comes to paying wages to the local labor force. To achieve their commercial goals, they dump obsolete technology on the recipient nation and influence important economic sectors.

Harrod Domar Growth Theory

The Harrodian and Domar models underscored the dual structure and function of investment, giving them top priority to study the interrupted functioning of an economy. The first role of investment is to increase capital stock, and the second is to create additional income. The latter helps to enhance capacity in the form of production, while the former aids in income enhancement through profits from wise investment decisions. There are two important prerequisites for this. Firstly, real income and capital stock, or output in the form of goods and services, will always grow as long as investment continues in any economy. This is because the investment will be used to expand production, which is a co-determinant of real income growth. This will support the preservation of full employment because idle capacity utilization will result in a drop in national income the instant any one of them is slightly altered without also affecting the relationship between real income and capital stock, or output in the form of goods and services.

The second prerequisite for the Harrod-Domar growth theory is the maintenance of full employment. In the context of the theory, full employment refers to the utilization of all available resources, including labor, capital, and productive capacity, to their maximum potential. This means that there are no idle resources in the economy.

According to the theory, sustained economic growth is only possible when there is full employment because idle resources represent unused potential for production. When all resources are fully utilized, increased investment leads directly to an expansion of output and income, as described in the first prerequisite. However, if there is unemployment or underutilization of resources, additional investment may not result in increased production and income

2.2 Empirical Review

To understand the ongoing debate on the relationship between exchange rate, economic growth, and external debt burden in Nigeria, this section x-rays the extant literature in this area to reveal the research gaps. Therefore, the reviewed literature is as presented below:

Aderemi, Fagbola, Sokunbi, and Ebere (2020) conducted a study investigating external debt and exchange rate fluctuations in Nigeria from 1981 to 2018. The study employed ARDL estimation techniques and the result indicates that external debt, debt service payment, and foreign reserves have a significant positive impact on exchange rate fluctuations in the short run in Nigeria. However, it was recommended that external debt as a means of financing budget deficit should be minimized if not discouraged in Nigeria because its servicing in particular and repayment put pressure on the foreign exchange market in the short run and thereby lead to exchange rate fluctuations in terms of depreciation of the naira in the country.

Furthermore, examining external debt burden and economic growth in Africa, Epaphra and Mesite (2021) used a panel approach covering 45 African countries from 1990 to 2017. The outcome of the study indicates that low levels of external debt-to-GDP ratio have a positive effect on economic growth and public investment in Africa. However, considerably high levels of external debt are likely to hamper both economic growth and public investment. Similarly, the debt service-to-export ratio tends to have a deleterious effect on public investment, which consequently results in lower economic growth. The implication of this is that the burden of external debt and debt payments has been a remarkable cause of insufficient funds for public investments and growth, thus African countries need to expedite effective and efficient external debt management strategies that will favor timely repayment.

In another study that set out to examine the relationship between external debt and economic growth in Nigeria, Anderu, and Adeleke (2019) employed ARDL on secondary data spanning from 1980 to 2016. The results show that external debt does not spur economic growth in the Nigerian context. This is however contrary to the expectation of external debt having a positive influence on economic growth.

Djalo, Yusuf, and Pudjowati (2023) investigated the impact of foreign debt on export and import values, the rupiah exchange rate, and the inflation rate in Indonesia. This study used time series data ranging from 1998 to 2021. The study employed multiple Linear regression econometric technique and found that exports, imports and exchange rate and inflation have no influence on foreign debt in the country.

Moazzzm (2022) empirically examined the mechanism that connects debt accumulation to exchange rate volatility through the lens of important macroeconomic variables in South Asian Countries. One of the most influential explanatory factors behind exchange rate volatility is deemed as the flow of external debt for these countries. Using data from the World Development Indicators for the period 1980–2020, it is shown that external debt increases exchange rate volatility, significantly. The model is identified via panel Granger tests for relevant variables, estimated for a wide range of covariates, and tested for all possible sources of endogeneity via subsequent robustness analyses.

Similarly, Alagoa, Ifionu, and Ogunbiyi (2023) in their study examined the debt burden and economic stability in Nigeria. The study employed secondary data from 1981 to 2020 and established that foreign loan stock significantly contributed to economic stability in Nigeria. Inversely, domestic debt stock does not seem to significantly contribute to economic stability in Nigeria, and External debt servicing cost does not seem to significantly promote economic stability in Nigeria. Domestic debt servicing costs do not seem to significantly contribute to economic stability in Nigeria. Consequently, the need for monitoring of external borrowing to avoid diversion, it should be invested in productive capital investment across the nation which is capable of yielding profitable investment returns.

Furthermore, employing Autoregressive Distributive Lag (ARDL) techniques, nexus between external debt and economic growth was evaluated by Ohiomu (2020) and the outcome suggested that the debt overhang variable and crowding-out effect variable depress the level of investment. This adversely affects economic growth in Nigeria. The study therefore recommends that Nigeria should embark on strict debt management policy, pursue effective debt reduction strategies, and improve investment drives for economic expansion and sustainable development.

In another major study in Nigeria which examined External Debt, Exchange Rate, Foreign Investments and Economic Growth Inter-Relationships Using ARDL, Adidigba (2019) established that foreign investment to total exports ratio has a positive and an insignificant relationship with external debt to total exports ratio. The result agreed with the earlier anticipated apriori expectation, but the insignificant relationship arises as a result of instability identified between naira to other foreign currency. It also arises as a result of the increase identified with prices of goods and services in the country.

Taking a critical look at the Impact of Exchange Rate, and Foreign Direct Investment on External Debt, evidence from Pakistan Using ARDL Cointegration Approach, Zahra, Nasir, Rahman, and Idrees (2023) employed ARDL econometric technique on secondary data spanning from 1973 to 2021 and found that there exists a positive relationship among foreign direct investment, exchange rate, economic growth, and external debt in the long run while it indicates a negative relationship between the exchange rate and fiscal deficit and external debt. Although, economic growth is positively related to external debt.

Where:
RGDP= real gross domestic product
EXTG= Ratio of External debt burden to real gross domestic product
EXTO= Ratio of external debt burden to Oil revenue
EXTN= Ratio of External debt burden to non-Oil revenue.
EXCR= Exchange rate
INFR= Inflation rate
CI= Corruption Index
Hence, to establish a comparative analysis between the model with exchange rate as an interacting variable and the model with exchange rate as an independent variable, equation 1 was re-specified into an econometric form:

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Hence, to establish a comparative analysis between the model with exchange rate as an interacting variable and the model with exchange rate as an independent variable, equation 1 was re-specified into an econometric form:

$$lnRGDP_t = \beta_0 + \beta_1 lnEXTG_t + \beta_2 lnEXTN_t + \beta_3 lnEXTO_t + \beta_4 lnEXCR_t + \beta_5 INFR_t + \beta_6 CI_t + \varepsilon_t \quad \cdots 2$$

$\beta_1 - \beta_6 = Parameters\ of\ the\ model\ to\ be\ estimated$
β_0 = slope of the model
$\varepsilon_t = Error\ term$
Ln= Natural Logarithmic function
A priori expectation: $\beta_1 \beta_2$ *and* $\beta_3 > 0$; β_4, β_5 *and* $\beta_6 < 0$
Therefore, equation 2 is then specified following ARDL model:

$$\Delta lnRGDP_t = \delta_o + \delta_1 lnRGDP_{t-1} + \delta_2 lnEXTG_{t-1} + \delta_3 lnEXTN_{t-1} + \delta_4 lnEXTO_{t-1} + \delta_5 lnEXCR_{t-1} + \delta_6 INFR_{t-1} + \delta_7 CI_{t-1} + \sum_{i=0}^{q} \varphi_1 \Delta lnRGDP_{t-1} + \sum_{i=0}^{q} \varphi_2 \Delta lnEXTG_{t-1} + \sum_{i=0}^{q} \varphi_3 \Delta lnEXTN_{t-1} + \sum_{i=0}^{q} \varphi_4 \Delta lnEXTO_{t-1} + \sum_{i=0}^{q} \varphi_5 \Delta lnEXCR_{t-1} + \sum_{i=0}^{q} \varphi_6 \Delta lnINFR_{t-1} + \sum_{i=0}^{q} \varphi_7 \Delta lnCI_{t-1} + \lambda ECT_{t-1} + \varepsilon_t \quad \cdots 3$$

Thereafter, to show the influence of exchange rate on the relationship between external debt burden and economic growth, an interaction term will be introduced to the external debt burden indicators which led to a new model as shown in equation 4:

$$lnRGDP_t = \beta_0 + \beta_1 lnEXTG * EXCR_t + \beta_2 lnEXTN * EXCR_t + \beta_3 lnEXTO * EXCR_t + + \beta_4 INFR_t + \beta_5 CI_t + \varepsilon_t \quad \cdots 4$$

Where:
RGDP= real gross domestic product
EXTG*EXCR= The interaction of exchange rate to ratio of external debt burden to real gross domestic product

domestic product

EXTO*EXCR= The interaction of exchange rate to ratio of external debt burden to Oil revenue

EXTN*EXCR= The interaction of exchange rate to ratio of external debt burden to non-Oil revenue.

INFR= Inflation rate

CI= Corruption Perception Index

$\beta_1 - \beta_5 = Parameters\ of\ the\ model\ to\ be\ estimated$

β_0 = slope of the model

$\varepsilon_t = Error\ term$

Ln= Natural Logarithmic function

Apriori expectation, β_1, β_2 *and* $\beta_3 > 0$; β_4 *and* $\beta_{5,} < 0$

Therefore, equation 4 will be re-specify following ARDL model:

$$\Delta lnRGDP_t = \delta_0 + \delta_1 lnRGDP_{t-1} + \delta_2 lnEXTG * EXCR_{t-1} + \delta_3 lnEXTN * EXCR_{t-1} + \delta_4 lnEXTO * EXCR_{t-1} + \delta_5 INFR_{t-1} + \delta_6 CI_{t-1} + \sum_{i=0}^{q} \varphi_1 \Delta lnRGDP_{t-1} + \sum_{i=0}^{q} \varphi_2 \Delta lnEXTG * EXCR_{t-1} + \sum_{i=0}^{q} \varphi_3 \Delta lnEXTN * EXCR_{t-1} + \sum_{i=0}^{q} \varphi_4 \Delta lnEXTO * EXCR_{t-1} + \sum_{i=0}^{q} \varphi_5 \Delta lnINFR_{t-1} + \sum_{i=0}^{q} \varphi_6 \Delta lnCI_{t-1} + \lambda ECT_{t-1} + \varepsilon_t \quad \cdots 5$$

Consequently, time series variables such as Real gross domestic product (RGDP); Ration of external debt to gross domestic product (EXTG); Ratio of external debt to non-oil revenue (Extn); Ratio of external debt to oil revenue (EXTO); Exchange rate (EXCR) and Inflation rate (INFR) was sourced from Central bank of Nigeria Statistical Bulletin (CBN) while corruption perception index (CPI) was sourced from Transparency International. The time frame for the study spans from 1980 to 2021.

4. Results and Discussion

This section presents the results with a view to have a robust discussion on the influence of exchange rate on the relationship between economic growth and external debt burden in Nigeria.

4.1 Descriptive Statistics

Table 1 summarizes the basic statistical features of the data under consideration including the mean, the minimum and maximum values, standard deviation, skewness, kurtosis and the Jarque-Bera test for the data. These descriptive statistics provide a historical background for the behavior of our data. There seems to be evidence of significant variations as shown by the huge difference between the minimum and maximum values for the variables under consideration. The skewness of the data series indicates both symmetric and an asymmetric or normal data and non-normal data distribution as the series maintains normality with positive skewness (lnRGDP; CPI; EXCR and INFR) and also relatively deviates from normality maintaining negative skewness (lnEXTG; lnEXTN and lnEXTO). The kurtosis statistic equally shows that lnRGDP and lnEXCR are platykurtic in nature while lnEXTG; lnEXTN; lnEXTO; Cpi and lnFR on the other hand are leptokurtic as their values inches above 3. The Jarque-Bera test is a test of normality. The null hypothesis for the test is that the series under consideration is normally distributed. Based on our results using the P-values associated with the Jarque-Bera statistics, the lnRGDP and lnEXCR are normally distributed while the lnEXTG; lnEXTN; lnEXTO; Cpi and lnFR are not. However, it should be noted here that the multivariate framework does not require the normality assumption. However, the likelihood ratio function in the Johansen Cointegration test relies on the assumption.

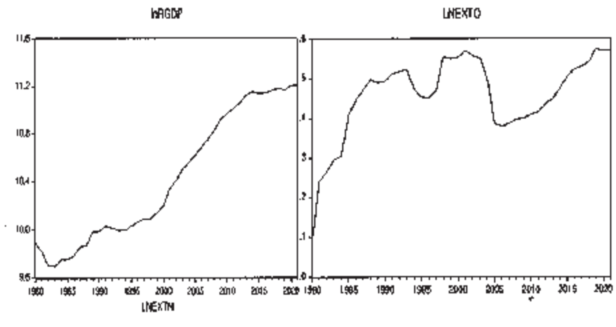
Table 1: Descriptive Statistics

	Lnrgdp	Lnextg	Lnextn	Lnexto	Cpi	Excr	infr
Mean	10.427	0.621	0.476	0.457	2.045	111.919	23.748
Median	10.273	0.640	0.495	0.474	1.800	115.255	18.084
Maximum	11.203	0.863	0.592	0.575	29.000	358.810	90.761
Minimum	9.693	0.086	0.089	0.091	0.000	0.610	-3.806
Std. Dev.	0.542	0.186	0.108	0.103	4.406	110.410	20.366
Skewness	0.222	-1.047	-1.533	-1.423	5.615	0.809	1.817
Kurtosis	1.457	3.699	5.595	5.376	35.014	2.626	6.455
Jarque-Bera	4.514(0.105)	8.536(0.014)	28.241(0.000)	24.043(0.000)	2014.316(0.000)	4.837(0.089)	44.001(0.0
Observation	42	42	42	42	42	42	42

Source: Authors' Computation (2024).

Graphical Representation

Figure 1 shows the trend analysis of the variable under consideration. The graphs depict an upward trending of all the variables during the study period which may be accounted for by different interrelated economic factors in the country.



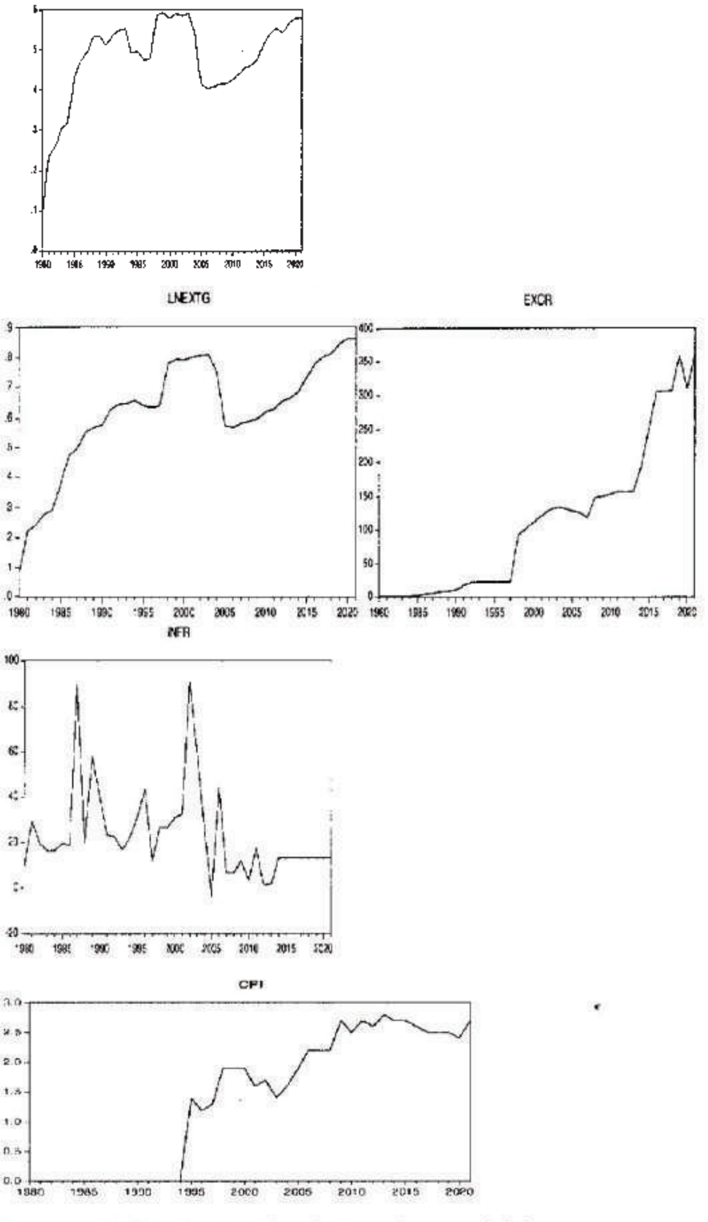


Figure 1: Trend Analysis of the various variables.

4.2 Correlation Result

The result shown in Table is a correlation matrix to show the direction and strength of the correlation between the variables. The matrix also shows a positive relationship between lnRGDP, lnEXTG, lnEXTN, lnEXTO,CPi and EXCR while a negative relationship with lnFR.

Table 2: Correlation Matrix

	Lnrgdp	Lnextg	lnextn	lnexto	Cpi	Excr	Infr
Lnrgdp	1.000000						
Lnextg	0.620288	1.000000					
Lnextn	0.299757	0.905151	1.000000				
Lnexto	0.349764	0.920225	0.992847	1.000000			
Cpi	0.123342	0.181479	0.108507	0.083721	1.000000		
Excr	0.918485	0.682202	0.404029	0.467389	0.089478	1.000000	
Infr	-0.360031	0.073808	0.265113	0.233671	-0.025629	-0.287445	1.000000

Source: Source: Authors' Computation (2024).

4.3 Unit Root Test

The null hypothesis for ADF is that an observable time series is not stationary (that is, it has unit root) while that of KPSS tests for the null hypothesis is that the series is trend stationary. Hence, the result in Table 3 suggest that the stationarity of the variable is mixture that is, at level I (0) and after first differencing I (1). Similarly, the result from the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test aim to complement the Augmented Dickey-Fuller (ADF) test. Consequently, the result show that the subsequent pre-test is Autoregressive Bounds test to ascertain the cointegration pattern of the model under consideration.

Table 3: Summary of Unit Root Results

	Lnrgdp	*I(d)*	*Lnextg*	*I(d)*	*Lnextn*	*I(d)*	*lnexto*	*I(d)*	*Cpi*	*I(d)*	*Infr*	*I(d)*	*Excr*	*I(*
ADF	-4.004^{b**}	I(1)	-4.913^{b**}	I(1)	-5.533^{b**}	I(1)	-5.579^{b**}	I(1)	-7.436^{b**}	I(1)	-4.819^{a**}	I(0)	-6.547^{b**}	I(1
KPSS	0.241^{b**}	I(1)	0.309^{b**}	I(1)	0.337^{b**}	I(1)	0.345^{b**}	I(1)	0.093^{b**}	I(1)	0.352^{a**}	I(0)	0.750^{b**}	I(1

Source: Authors' Computation (2024).

Note: *, ** and *** imply statistical significance at 10%, 5% and 1% levels respectively.

Source: Authors' Computation (2024).
Note: *, ** and *** imply statistical significance at 10%, 5% and 1% levels respectively.
Also, a denotes model with level, and *b* is model with first differencing.

4.4 ARDL Bound Test Cointegration

The ARDL co-integration approach could be used when the underlying variables are *I (0)*, *I (1)* or fractionally integrated. In each case, the lower bound is based on the assumption that all of the variables are I (0), and the upper bound is based on the assumption that all of the variables are I (1). However, If the computed test-statistic falls below the lower bound, it implies that the variables are I (0) and therefore, there is no cointegration. If the test statistic exceeds the upper bound, then, there is cointegration. However, if the test statistic falls between the bounds, the test is inconclusive. Hence, the result from Table 4 suggests that there exist a cointegration among the variables as the f-statistics value (3.315) is greater that the upper bound (3.28) at 5% level of significance.

Based on the computed statistics and critical values provided, we can conclude that there is cointegration. Hence, we may consider both long run and short run models. This then, justify estimating an ARDL model to examine the nexus between exchange rate, economic growth and debt burden in Nigeria.

Table 4: Bound Test Results

Test-statistic	Conclusion		Critical Value	
			Lower Bound	Upper Bound
		1%	2.88	3.99
3.314683	Cointegration	5%	2.27	3.28
		10%	1.99	2.94

Source: Authors' Computation (2024).

Table 5: Summary of Unit Root Results for the interactive variables

	I(d)	*Excr*lnextg*	*I(d)*	*Excr*lnextn*	*I(d)*	*Cpi*	*I(d)*	*Infr*	*I(d)*	*lnrgdp*	*I(d)*
ADF	I(1)	-5.8134	I(1)	-6.2678	I(1)	-6.370	I(0)	-4.819	I(0)	-4.004	I(1)
KPSS	I(1)	0.7043	I(1)	0.7085	I(1)	0.182	I(0)	0.352	I(0)	0.2414	I(1)

Source: Authors' Computation (2024).

The above result from Table 5 indicates that the variables are stationary at level and after first difference. This then necessitates using ARDL bounds test to examine whether cointegration exist among the variables.

Table 6: Bound Test Results for the Interactive Variables

Test-statistic	Conclusion		Critical Value	
			Lower Bound	Upper Bound
		1%	3.06	4.15
15.13072	Cointegration	5%	2.39	3.38
		10%	2.08	3

Source: Authors' Computation (2024).

Also, the result in Table 6 above suggests that there is long run relationship among the variables in the model as the value of the test-statistic is greater than both the lower and upper bounds. Hence, the need to also test whether there is multicollinearity among the variables of interest or not.

Table 7: Multicollinearity Test for the Interactive variables

Variable	Centered VIF
EXCR*LNEXTO	8.97250
EXCR*LNEXTN	5.650172
EXCR*LNEXTG	5.366873
CPI	1.010221
INFR	1.246928

Source: Authors' Computation (2024).

Therefore, the result from Table 7 above table indicates the result for multicollinearity test. The Variance Inflation Factor (VIF) indicates the absence of multicollinearity among the variables included in the model as independent variable given that the value is less than 10.

Table 5 shows the result of the short run and long run of the ARDL model. In order to examine the influence of exchange rate on the relationship between economic growth and external debt burden without the inclusion of interactive variable, the short run result indicated that the relationship between the ratio of external debt to oil revenue(lnEXTO) and economic growth (lnRGDP) is positive while both ratio of external debt to non-oil revenue(lnEXTN) and ratio of external debt to gross domestic product(lnEXTG) have negative relationship with economic growth in the short run. Similarly, inflation rate (lnFR)and exchange rate (EXCR) indicate a negative relationship with economic growth while corruption perception index (CPI) exhibits a positive relationship with economic growth in the short run. In addition, the error correction term (ECT) shows the speed of adjustment from short run disequilibrium to long run equilibrium. The coefficient of the error correction term is expected to be between -1 and 0 and the probability value must be significant. The negative sign indicates the degree of correction. In a single equation error correction model, the coefficient on the error correction mechanism must be between -1 and 0. Otherwise, the error correction term is explosive. A negative and statistically significant coefficient on the error-correction term implies that roughly 35 percent of the disequilibrium in the previous years is corrected within one year. Hence, it shows the speed of adjustment to long-run equilibrium.

For the long run model, the variables are correctly signed and statistically significant. The ratio of external debt to gross domestic product (lnEXTG) is negative and statistically significant at 5 percent significant level. This shows that the higher the ratio of external debt to gross domestic product, the higher the economic growth. It suggests, therefore, that as the amount of funds expended from the economy to finance the external debt increase, it tends to retard economic growth and development in the country as the money used in servicing the debt could be channeled to other advantageous sources for the economy. It then means that a percentage increase in lnEXTG will on average bring about a 4.13 percent decrease in economic growth. This finding is in line with the result of Djalo, Yusuf and Pudjowati (2023).

In the same vein, the coefficient of inflation rate (inFR) is negative and statistically significant at a 5 percent significance level. This indicates that as the rate of inflation rises, economic growth declines. It then implies that when there is astronomic rise in the general price level in an economy, it erodes the purchasing power of individuals, private sector and the government and therefore, bring about a negative growth of the economy. So, a percentage increase in the inflation rate will lead to reduction in economic growth by about 0.04 percent. This result corroborates with similar findings of Adidigba (2019) and Djalo, Yusuf and Pudjowati (2023).

Similarly, the coefficient of corruption perception index is negative and statistically significant at 5 percent significance level. This means that as the corruption perception index rises, economic growth is lowered. It suggests that corruption has the tendency of inhibiting the economic growth and development of any country. Therefore, corruption is indeed inimical to progress of any country as it seems to bring the economy of such a country to its knee. Consequently, a percentage increase in the corruption perception index will lead to decline in economic growth by about 8 percent. This outcome follows the work of Olarinde and Jonathan (2021) and Alagoa, Ifionu, and Ogunbiyi (2023). More so, the coefficient of exchange rate(excr) is positive and statistically significant at 5 percent significant level. This connotes that as exchange rate increases, economic growth also increases. It means that exchange rate appreciation is a vital yardstick for economic growth and development as it tends to open up the economy for the potential investors and thereby enhancing economic growth. Hence, a naira change in exchange rate will lead to economic growth of about 0.07 percent which is in line with the findings of Adidigba (2019).

Table 8: Short-run and Long-run Model
Dependent Variable: lnRgdp

	Short-run Model (Model 1)	
Variable	Coefficient	Prob.
D(lnrgdp)	0.3370	0.0061**
D(lnexto)	2.5869	0.0049**
D(lnextn)	-2.6372	0.0031**
D(lnextg)	-0.0882	0.6088
D(infr)	-0.0004	0.0629*
D(Cpi)	0.0861	0.0015**
D(Excr)	-0.0011	0.0004**
ECT	-0.3486	0.0005**
	Long-run Model (Model 1)	
Lnexto	8.9144	0.2871
Lnextn	-2.9325	0.6588
Lnextg	-4.1270	0.0148**
Infr	-0.0073	0.0509**
Cpi	-0.5563	0.0050**
Excr	0.0007	0.3546**
C	9.7911	0.0000

Source: Authors' Computation (2024).

Note: *, ** and *** imply statistical significance at 10%, 5% and 1% levels respectively.

Table 8 presents the second model where we introduce the interactive variable into the equation. From the short run model, the result indicates that when we interact exchange rate with both ratio of external debt to non-oil revenue (lnEXTN) and ratio of external debt to oil revenue (lnEXTO), non-Oil revenue is statistically significant while Oil revenue is not statistically significant. Also, after interacting exchange rate with the ratio of external debt to gross domestic product (inEXTG) is positive, and statistically significant. Inflation rate is positive and corruption perception index is negative and statistically significant respectively.

However, the error correction term indicates that it will take about 10 percent for the short run disequilibrium to be restore back to equilibrium in the long run, justifying estimating long run model.

From the long run model, only four variables are statistically significant. The coefficient of EXCR_ lnEXTG is positive and statistically significance at 5 percent significant level. This shows that the higher the EXCR_lnEXTG, the higher the lnRGDP. It implies that after interacting exchange rate with the ratio of external debt to gross domestic product (lnEXCR_lnEXTG), it becomes statistically significant and also the magnitude improves. Also, it becomes positive suggesting the influence of exchange rate on the variables. It then tells us that exchange rate is a very germane determinant of this variable given its importance in the economy. Therefore, a percentage increase in EXCR_lnEXTG, will lead to rise in lnRGDP by about 1.46 percent.

Furthermore, the coefficient of EXCR_lnEXTO is negative and statistically significant at 5 percent significance level. This indicates that the higher the EXCR_lnEXTO, the greater increase in lnRGDP. It means that after interacting exchange rate with the ratio of external debt to oil revenue, it becomes statistically significant and it affects the economic growth negatively. In addition, this implies that the increase in oil revenue does not have much effect on the economic growth as against what is expected but rather retard economic growth in the country. This can be true since the country relied heavily on the oil sector to the detriment of the non-oil sector. This being the case, as the country prioritized the oil revenue over non-oil revenue, the expected contribution from the oil revenue is not forthcoming owing to its volatile nature and financial misappropriation experienced in large scale in the country. However, this shows the effect of the exchange rate on the variable as it is very crucial factor in the oil revenue component of the country. Hence, a percentage increase in EXCR_inEXTO, will bring about 1.71 percent decline in economic growth.

Table 9: Short-run and Long-run Model
Dependent Variable: lnrgdp

	Short-run Model (Model 2)	
Variable	**Coefficient**	**Prob.**
D(lnrgdp)	-0.3013	0.0039**
D(Excr_lnextg)	0.0146	0.0006**
D(Excr_lnextn)	-0.0171	0.0001**
D(Excr_lnexto)	-0.0057	0.1364
D(infr)	0.0007	0.0001**
D(Cpi)	-0.0422	0.0004**
ECT	-0.1044	0.0000**
	Long-run Model (Model 2)	
Excr_lnextg	0.1905	0.0246**
Excr_lnextn	0.1728	0.2357
Excr_lnexto	-0.4648	0.0784*
Cpi	-0.6616	0.0004**
Infr	-0.0221	0.0143**
C	9.6937	0.0000

Source: Authors' Findings

Note: *, ** and *** imply statistical significance at 10%, 5% and 1% levels respectively.

In the same vein, the diagnostic test is presented in Table 10

All the post-estimation result suggest that the model is normally distributed, there is no presence of serial correlation, the model is not suffering from heteroskedasticity and finally, the model is stable.

Table 10: Diagnostic Test Result

Test	Prob.	Decision
Normality Test	0.5523	The model is normally distributed
Breusch-Godfrey LM test	0.5023	There is no presence of serial correlation in the model.
Heteroskedasticity Test:	0.8443	The model is not suffering from heteroskedasticity

Source: Authors' Findings.

The result from figure 2 shows that the plot of CUSUM for the model under consideration is within the five per cent critical bound. This by implication suggests that the parameters of the model do not suffer from any structural instability over the period of study. That is, all the coefficients in the error correction model are stable.

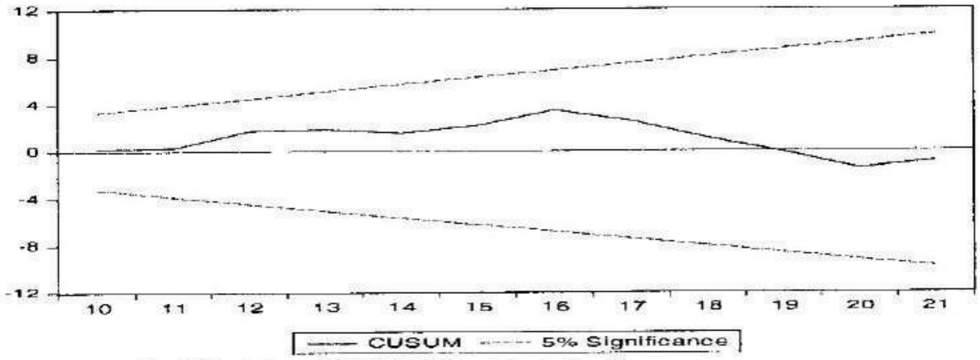


Figure 2: Stability Test (CUSUM Residual Test)

5. Conclusion and Recommendations

This paper examined the influence of exchange rate on the relationship between external debt burden indicators (ratio of external debt burden to gross domestic product; ration of external debt to oil revenue and ratio of external debt to non-oil revenue) and economic growth in Nigeria. The study employed Autoregressive Distributive Lag model (ARDL) with the data spanning from 1980 to 2021. The result indicates that interacting exchange rate with the external debt burden (ratio of external debt burden to oil revenue) has a negative impact on the economic growth of the country. Additionally, both corruption perception index and inflation rate also have a negative effect on the economic growth.

The major contribution of this paper is that it establishes that exchange rate has more influence on the external debt burden when it is being used as interactive variable as against when it is being dropped. As a result, to the best knowledge of the researchers, none of the extant literature consulted actually employed this method which is the research gap for this study. At this juncture, it can be posited that the outcome indicates that exchange rate has a tremendous influence on the indicators of external debt in Nigeria**.** Consequent upon the findings, the study puts forward the following recommendations aimed at enhancing and facilitating an improved economy in Nigeria:

i. The need for the government to fully diversify the economy from the oil sector to non-oil sector through policy implementation so that the country's economy can gain extensively from the revenue generation in the non-oil sector.
ii. The need to ensure proper coordination between the fiscal and monetary authority via economic policy coordination and implementation in order to fully benefit from the influence of exchange rate on the economy.

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