



CURRENCY DEPRECIATION SHOCKS AND SOVEREIGN DEBT SUSTAINABILITY: EMPIRICAL INSIGHTS FROM NIGERIA

Ifeanyi Shedrack¹ and Mamudu Zebedee Udo (Ph.D.)².

¹University of Delta Agbor, Agbor, Delta, Nigeria.

Email: shedrack.ifeanyi@unidel.edu.ng

²Department of Economics, Faculty of Social Sciences, Ambrose Alli University, Ekpoma, Edo State, Nigeria.

Email: mamuduzebedee@aauekpoma.edu.ng

Cite this article:

Ifeanyi Shedrack, Mamudu Zebedee Udo (2026), Currency Depreciation Shocks and Sovereign Debt Sustainability: Empirical Insights from Nigeria. African Journal of Economics and Sustainable Development 9(4), 1-18. DOI: 10.52589/AJESD-JKGINQHC

Manuscript History

Received: 19 Jun 2026

Accepted: 14 Jul 2026

Published: 24 Jul 2026

Copyright © 2026 The Author(s).

This is an Open Access article distributed under the terms of Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0), which permits anyone to share, use, reproduce and redistribute in any medium, provided the original author and source are credited.

ABSTRACT: *Nigeria's external debt over the years has been relatively high, and there has not been a favorable exchange rate recently. This study examined the impact of the exchange rate on sovereign debt sustainability in Nigeria using the Autoregressive Distributed Lag (ARDL) estimation technique. Time series data on an annual basis were used on selected variables: exchange rate, external debt, government expenditure, foreign reserve, external debt servicing, interest rate, and inflation. The results from the long-run and short-run estimation revealed that the exchange rate and government expenditure had a direct and significant impact on external debt in Nigeria. Also, the inflation rate had a negative and significant impact on external debt in Nigeria during the period of study. The result of the correct ECM revealed the adjustment speed in the face of disequilibrium within the period. The study therefore advocates for strict economic policies with emphasis on stabilization of the naira vis-à-vis major trading partners' currencies. This is because the increase in the country's exchange rate consequently increases external debt accumulation and its burden.*

KEYWORDS: Sovereign debt sustainability, Exchange rate, ARDL, Shocks.

JEL Classification Codes: C22, F31, H63, H83



INTRODUCTION

The analysis of exchange rates and their impact on the various aspects of the economy have been a perennial topic in international monetary economies. Obadan (2006) reported that one of the vital macroeconomic variables in making economic policy is the exchange rate, which is of utmost consideration by government. Meanwhile, one of the strategic huddles facing developing economies, including Nigeria in the last few decades, is the crisis of debt and rising exchange rates (Blessy & Lakshmi, 2020).

Exchange rates and external debts are two macroeconomic issues that affect every economy irrespective of their status; developed, developing, and underdeveloped respectively. Apart from foreign trade, external debts also arise due to the necessity for a country to borrow internationally for national development. The spillover is further external debt build up and an unfavorable exchange rate which became detrimental to growth prospects (Francis, 2019). External debt is a challenge when payback is difficult, and this is the major problem facing most developing countries in the world, Nigeria inclusive, where they have to use a high percentage of their income to service such debts each year. Poorly structured debt in giving their maturity, type of currency, or composition of interest rate, large and unfunded contingent liabilities are important factors propagating economic crises in many developing countries (Ogbeifun, 2007).

Orthodox economics theories of the Marshall-Lerner condition suggest that the depreciation of exchange rates has an expansionary effect on the economy. This is believed to induce export-led growth. However, recent theories on balance sheet effects have explained the ill effects of depreciation (Augustine, 2019). Amongst the various consequences of exchange rate fluctuation is the humungous impact on the degree of a country's external indebtedness. This negative impact becomes particularly obvious for countries with high foreign currency-denominated external debt. Countries with high external debts are expected to suffer the most from balance sheet effects, as foreign currency borrowing makes loan repayment costlier in the presence of a depreciating currency (Boris et al., 2021).

One major obstacle affecting Nigeria's economic growth and development over the last two decades was external debt challenges. Over the years, a sizeable amount of the nation's hard-earned revenue (foreign earnings) has been expended on debt servicing which has caused some setbacks in the nation's economy (Ajayi & Oke, 2012). External debt has been steadily on the rise in Nigeria. For instance, the Debt Management Office DMO (2022) put Nigeria's external debt in 2019 at \$77,708,890,975 representing a 16.74% increase from 2018. In 2020, it rose to \$82,833,305,939 representing a 6.59% increase from 2019 while in 2021, 2022, 2023 and 2024, it increased to \$90,887,068,294 and \$98,335,333,958 representing 9.72%, and 8.2% annual increases respectively. This rose to \$102.46billion (about a 4.1% increase from 2022) (WDI, 2025).

Exchange rate has also been fluctuating over the years in Nigeria. As noted by the Central Bank of Nigeria (2022), Naira to Dollar, which exchanged for N0.89 (89 kobo) in 1985, shortly before the Structural Adjustment Programme (SAP), suddenly rose to N17.29 in 1992. It further rose to N102 in 2000. Between 2010 and 2021 which are decades later, it rose to N160 and N411 respectively. By the end of 2023 and 2024, the exchange rate of the naira to the US dollar peaked at N812 and N1,535 respectively (CBN, 2025). This continued increase in the exchange rate of naira to N1,535 affected virtually all sectors and segments of



the Nigerian economy. The external debt, in particular, is worse hit given the volume of Nigeria external debts and the annual cost of servicing (interest rate) the loans. This has resulted into a decline in Nigeria's external reserve and also had a ripple effect on household income, foreign direct investment, government expenditure, and national income (Francis, 2021).

Arising from the above, the current study empirically examines the impact of exchange rate on external debt in Nigeria from 1981 to 2023. Therefore, we raised the following research questions: of what impact does exchange rate have on Nigeria's sovereign debt sustainability? Does the interest rate greatly impact on sovereign debt sustainability in Nigeria? How does external debt servicing impact on sovereign debt sustainability in Nigeria? To what extent does government expenditure impact on sovereign debt sustainability in Nigeria? How does foreign reserve impact sovereign debt sustainability in Nigeria? Thus, the study seeks to examine the impact of exchange rate on external debt in Nigeria, interest rate on external debt in Nigeria, external debt servicing on external debt in Nigeria, government expenditure on external debt in Nigeria, and foreign reserve on external debt in Nigeria

The outcome of this study serves as an important policy paper for fiscal and monetary policy drivers of the government and researchers, as well as the debt management agencies in Nigeria. The relevance of this study rests on the fact that most emerging and developing economies, including Nigeria are faced with continuous currency depreciation and as well as rising external debt. Recognizing that currency composition can incite financial crisis has increased the relevance of this study. Following the introduction is the literature review in section 2. Section 3 is concerned with the methodology of the study; section 4 is the interpretation of the results while the conclusion and recommendation are in section 5.

REVIEW OF LITERATURE

Theoretical Literature Review

Ricardo's Theory of Public Debt

This theory of public debt was propounded by David Ricardo in 1819. It suggested that public expenditure financing could be productively done by acquiring funds from sectors and communities where there are surplus economic resources for the reduction of inequality (Terry, 2003). As supported by Okoye, Modebe, Erin and Evbuomwan (2013), there are necessities that requires internally productive debts to improve economic growth. The relevance of this theory to this study rest on the expected help in the determination of whether the government expenditures in Nigeria have impacted external debt favourably or not over the years.

The Keynesian's Theory of Public Debt

This theory was developed in part given the Great Depression economic crisis of the 1930s. The theory posited that a nation's financial stability is affected by constant unbalanced budgets and a rapid increase in public debt. But Keynes noted that huge public debt is a national asset more than it is a liability. As a result of this, deficit spending is very vital for



the growth of nations, as it leads to full employment. The theory further postulated that the economy moves to equilibrium when it is at full employment. This was an attack on the classical theory of budgeting and public finance. The implication of Keynes's theory is that in the face of unemployed resources from the private sector, they can be used through an unbalanced budget.

Hence, Keynes holds that a rise in public debt and public borrowing to fund deficit budget or for all purposes will increase the economy's effective demand, improve/increase production, result in an increase in employment, and thereafter raise National income (Andleeb et al., 2023). The relevance of this theory to this study is that it would help to ascertain whether public expenditure in Nigeria over the years has impacted the economy positively toward achieving external debt sustainability, promoting economic growth and development, or retarding it.

Fundamental Equilibrium Exchange Rates Theory (FEER)

The concept of fundamental equilibrium exchange rate (FEER) was developed by Williamson (1983) to analyze that level of the exchange rate that generates a trade surplus or deficit equal to the underlying flow of capital. This is based on the economic conditions of external and internal balance. Internal balance is the situation of high employment and a low inflation rate while the external balance, on the other hand is a situation where there is a sustainable wanted net flow of resources between countries given that they are internally balanced. This theory holds that an effective exchange rate must be regular with macroeconomic balance. This means that the economy is operating at full employment, low inflation, and a current account that is sustainable. This theory is relevant to this study because it will serve as a guide in evaluating the performance of Nigeria's exchange rate over the years and its impact on the macroeconomic variables like external debt.

The Theory of Debt Overhang

The theory of debt overhang was put forward by Howard in 1972. It is rooted on the fact that a high national debt which is more than the repayment ability given some probability in the future will result in the situation where the output will lack the capability of supporting the expected debt services. In other words, the theory suggests that when a country or entity carries a debt burden that it cannot repay, it can hinder long-term economic growth and investment. It provides a linkage between debt and growth of the country to the challenges of capital flight that results in the fall of growth at high debt levels. In summary, debt overhang occurs when a nation's debt exceeds its ability to repay, leading to debt service crowding out private investments and distorting economic growth. This theory is very important to this investigation because the slow economic growth in Nigeria and high external debts could be the effect of external debt services and rising exchange rates.

Empirical Literature

Many researchers, both within and outside Nigeria, have focused their research on debt and exchange rates. Fatima-Ezzahra and Mostafa (2025) investigated the gap between public external debt sustainability and volatility of exchange rate in the face of limited access to international markets as well as unavailability of foreign reserves in lower-middle-income countries (LMICs) in Africa. The Vector Error Correction Model (VECM) method was



adopted on the panel of five countries (Morocco, Egypt, Tunisia, Benin, and Senegal) over the period 2000 to 2021. Public external debt was found to experience short-term fluctuations which, by using fiscal and monetary policies, tends to be stabilized in the long-term. Furthermore, foreign reserves substantially impact on the debt positions. Exchange rate arrangements that were adopted by Morocco, Egypt, and Tunisia were found to reduce the risk of depreciation of currency depreciation, while the general currency limited debt sustainability in Benin and Senegal. A complex dynamic of public external debt sustainability in LMICs was found, and the important function of foreign reserves in the mitigation of external shocks given careful fiscal policies and regional cooperation to reduce vulnerabilities, was revealed by the study.

Odionye, Odo, Orji, Agoh, Ihezukwu, Ojike, and Okpara (2024) investigated the impact of threshold-based devaluation of currency on the external debt sustainability (EDS) in selected Sub-Saharan African (SSA) countries. The smooth transition regression (STR) and multiple thresholds nonlinear ARDL (MTNARDL) were employed in the estimation on the sign-based and magnitude-based asymmetric impact of devaluation of currency on EDS. The findings revealed that an average devaluation of currency threshold of 21.1% is compatible with EDS. Also, the external debt–GDP ratio was substantially reduced by the devaluation of currency but in the face of high currency devaluation, the problem of EDS is made worsened. In addition to the above, the regime of currency devaluation has a higher detrimental impact on the burden of external debt while very large alterations in exchange rate (be it positive or negative) major negatively affect the countries' external debt sustainability which is higher in the face of depreciation than appreciation.

The United Nations Economic Commission for Africa (2024) examined the relationship between exchange rate devaluations and external debt management in Africa using a balanced panel of quarterly data for 51 African countries from 2000 to 2022. The panel autoregressive distributed lag model was employed for the estimation to assess both the short- and long-term effects of exchange rate on external debt. The findings revealed that for countries that have relatively fixed exchange rate regimes, the devaluation of currency is more likely to reduce the burden of external debt burden. On the other hand, devaluation by countries that operate flexible exchange rate regimes, has the probability of enhancing the impact of exports on external debt reduction.

Andleeb, Nadia, Saif, and Sadia (2023) investigated the impact of exchange rate and foreign direct investment on external debt in Pakistan, using annual time series data from 1973 to 2021. The autoregressive distributed lag (ARDL) technique was used in the study to look into the cointegration analysis of the variables. The upshot revealed a positive and substantial relationship among exchange rate, foreign direct investment, and external debt in Pakistan. However, in the short run, the real effective exchange rate and fiscal deficit were negatively related to the external debt, whereas the economic growth was positively related to the external debt. The study recommended that a stable exchange rate should be maintained to reduce the volume of external debt burden in Pakistan.

In a study on Nigeria, Imoagwu, Ezenekwe, and Nwogwugwu (2023) investigated the impact of external debt on the exchange rate in Nigeria using annual data from 1980 to 2021 employing the Autoregressive Distributed Lag (ARDL) estimation technique. The upshot showed a negative but inconsequential impact of external debt on the exchange rate. External



debt on the other hand had a positive and substantial impact on the inflation rate. The study therefore concluded that borrowed funds should be effectively channeled into developmental projects with returns to servicing the debts and payment of the debt at maturity.

Boris, Menbere, and David (2021) applied a heterogenous panel cointegration method to explore the long-term effect of depreciation of domestic currency on external debt making use of a panel of 41 emerging economies over the period 1999-2019. The result shows an increase in external debt to GDP ratio with the depreciation of domestic currency over the long term which reduces the sustainability of external debt.

Sri Sukma, Said, and Nazamuddin (2019) empirically examined whether exchange rate determined foreign debt in Indonesia using a quarterly data from 2010. - 2017.Q4. The autoregressive distributed lag (ARDL) technique was used in the study to examine the cointegration analysis of the variables. The result of the investigation revealed a positive and substantial impact of exchange rates on foreign debt. Foreign exchange reserves and exchange rates were also found to have positive and significant impacts on short-run foreign debt.

The impact of depreciation of exchange rate on external debt was investigated by Blessy (2019) using a panel data from 2004 to 2017 and samples from emerging economies. The panel autoregressive distributed lag (PARDL) technique was used for the investigation. The results revealed the existence of a long-run relationship between exchange rate and external debt for most countries. For most of the countries, exchange rate depreciation was revealed to significantly increase external indebtedness leading to financial distress.

Staveley-O'Carroll (2018) made use of a two-country productivity shock. The effectiveness of foreign debt in the achievement of three economic objectives of the Central Bank (smoothing rate fluctuations, exchange rate flexibility, and low terms-of-trade externality) was investigated by employing the dynamic stochastic general equilibrium (DSGE) Model and the moments and impulse response functions. A panel of eleven (11) Central and Eastern European Countries (CEECs) was used over the period between 1980Q1 and 2011Q3. The size of the foreign debt of a country was revealed to increase closer to its GDP. On the other hand, with an improvement in local productivity, there will be a fall in the exchange rate given the effect of the valuation debt resulting in lower consumers' welfare.

The relationship between external debt and exchange rate fluctuations in Nigeria for the period between 1980 and 2016 was further investigated by Odior and Arinze (2017). The exploratory data analysis (EDA) which is non-parametric approach was employed along with the vector error correction model and Granger-causality estimation technique. In the short run, a positive and substantial relationship was found between external debt and exchange rate, while in the long run, it was not significant.

Kola, Somoye, and Sheriffdeen (2015) studied the relationship between exchange rate and external debt problems in Nigeria using annual time series data from 1980 to 2010. The data was estimated using the ordinary least squares method. The results showed that there was a negative and substantial impact of exchange rates on external debt in Nigeria. Saheed, Sani, and Idakwoji (2015) examined the impact of public external debt on exchange rate in Nigeria from 1981 to 2013, employing the ordinary least square method. Findings revealed that,



external debt, debt servicing and foreign reserves are statistically substantial in explaining the fluctuations in exchange rate.

Gap in Literature

Studies on the impact of exchange rates on external debt have revealed conflicting results over the years. This could be due to the period covered in the study, the country or region of study, the research skill of the investigator, as well as the methodology adopted. While in the Nigeria economy, some studies have been carried out on the relationship between exchange rate and external debt, most of these studies concentrated on the effect of external debts on exchange rate. The emphasis of this current study is on the impact of exchange rates on external debt. There is also need for a more recent study on how exchange rate can impact external debt in Nigeria. Hence, this study tends to bridge the gaps observed in previous studies examined given the level of external indebtedness of Nigeria and the current rate of depreciation of its currency.

RESEARCH METHODS

Theoretical Framework

The Fundamental Equilibrium Exchange Rate Theory (FEER)

The study is based on the fundamental equilibrium exchange rate theory (FEER) that was developed by Williamson (1983). The theory, which was based on the balances of the economy (external and internal balance), emphasizes that the level of the exchange rate, which generates a trade surplus or deficit, is equal to the underlying flow of capital. Thus, an effective exchange rate must be consistent with macroeconomic balances (external debt inclusive), where the economy is operating at full employment, low inflation, and a current account that is sustainable.

This is mathematically represented in equation (3.1)

$$\text{RER} = f(\text{CAB}, \text{PRD}, \text{NFA}) \quad (3.1)$$

Where;

RER = Real Exchange Rate

CAB = Current Account Balance

PRD = Level of Productivity

NFA = Net foreign Assets

The fundamental equilibrium exchange rate (FEER) theory believed that to sustain internal and external balance, there must be an increase in the current account balance, level of productivity and net foreign assets. Hence, increasing external borrowing is justifiable if it brings about a rise in technology and infrastructural development which are vital to the



growth and healthiness of every economy. Hence, the impact of Nigeria's exchange rate on the macroeconomic variables like external debt can easily be evaluated. It is against this background that the fundamental equilibrium exchange rate (FEER) theory was adopted, considering the fact that external debt, if borrowed to finance health, education, technology, and infrastructure development, it is referred to as being productive, which can contribute positively to the attainment and sustainability of exchange rate stability, hence, economic growth. In summary, the theoretical framework highlights how exchange rate fluctuations can amplify the impact of external debt, potentially leading to a cycle of debt accumulation, economic instability, and reduced growth.

Model Specifications

In determining the impact of exchange rates on external debt in Nigeria, the current study adopted the model of Mohammed and Rajah (2016). The model of Mohammed and Rajah (2016) was based on the determinant of external debt in Nigeria with the following specifications;

$$EXD = f(OIP, EXR, EDS) \quad (3.2)$$

Where:

EXD = External debt to GDP as a measure for sovereign debt sustainability

OIP = The oil price

EXR = Official exchange rate of the Nigeria naira against the US dollar.

EDS = External debt service to export ration

The linear form of equation (3.2) is presented as equation (3.3)

$$EXD_t = \beta_0 + \beta_1 OIP + \beta_2 EXR + \beta_3 EDS + \mu_t \quad (3.3)$$

The current study modified equation (3.3) to include government expenditure, interest rate, inflation, foreign direct investment, foreign reserve, and external debt servicing. The reason for this modification is to empirically capture their impacts on external debt in Nigeria. Debt service to export ratio was replaced with total external debt services since external debt services is not mainly for international trade activities only, while oil prices were removed from the model because this study is not looking at the activities of oil with respect to external debt.

In line with our assumed linear relationship among the variables, this study employed the Autoregressive Distributed lag model (ARDL). External debt is found to be persistent over time particularly for developing country like Nigeria. ARDL have also been found to give a better efficient and unbiased estimate either in the large or small sample size (Pesaran & Pesaran, 1997). It also assists in the correction of serial correlation and endogeneity of some independent variables (Ekeocha et al, 2020). Furthermore, when the variables in the model are integrated of a combination of order 0 and 1, ARDL is better for the determination.



The basic ARDL model is given as:

$$Y_t = \alpha_0 + \alpha_1 \sum_{i=1}^p \Delta Y_{t-i} + \alpha_2 \sum_{j=1}^q \Delta X_{t-j} + \mu_t \quad (3.4)$$

Where;

Y_t = Dependent variable

Y_{t-1} = Lag of dependent variable

X_t = All other explanatory variables.

$i, j, j-k, j-1$ = Unknown order of lags of the model

μ_t = error term

Considering the long-run and short-run effects, we have the basic form of an ARDL regression cointegration model specified as thus:

$$\Delta y_t = \alpha_0 + \beta_i y_{t-1} + \lambda_k \sum_{k=1}^k \Delta SR_{k,t-1} + \sigma_k \sum_{k=1}^k LR_{k,t-1} + \mu_t \quad (3.5)$$

Δ is the first difference of variable, μ_t stands for the error term, and y_t is the dependent variable. SR is the short-run dynamics of explanatory variables, while LR is the long-run dynamics of the explanatory variables. β, λ and σ are the parameters to be estimated; α_0 is the constant parameter.

To explore the impact of exchange rate along with other variables on external debt, the model for the study is given as

$$\Delta EXD_t = \alpha_0 + \beta_{1i} EXD_{t-1} + \beta_{2i} \sum_{k=1}^k \Delta EXD_{t-1} + \sum_{i=1}^k \Delta X_i + \lambda_k \sum_{k=1}^k \Delta SR_{k,t-1} + \sigma_k \sum_{k=1}^k LR_{k,t-1} + \mu_t \quad (3.6)$$

Where EXD is the dependent variable, following some studies (Boris, Menbere, and David (2021) and X is the independent variable. Stating the functional form of the model with the variables of the study, we have;

$$EXDG = f(EXR, FRS, XDS, FDI, INT, GEX, INF) \quad (3.7)$$

Where;

$EXDG$ = external debt to GDP ratio as a measure of sovereign debt sustainability

EXR = Exchange rate

FRS = Foreign reserve



XDS= External Debt Servicing

FDI= Foreign direct investment

GEX=Government total expenditure

INT=Interest rate

INF= Inflation rate

Thus, equation 3.7 in its reduced form with all the variables included in the long run is given as:

$$EXDG_t = \alpha_0 + \alpha_1 EXDG_{t-1} + \alpha_2 EXR_t + \alpha_3 FRS_t + \alpha_4 XDS_t + \alpha_5 FDI_t + \alpha_6 GEX_t + \alpha_7 INT_t + \alpha_8 INF_t + \sum \quad (3.8)$$

With the establishment of the co-integration among the variables, we estimated the short-run dynamics (ARDL-ECM) as:

$$\begin{aligned} \Delta EXD = & \alpha_0 + \sum_{i=1}^n \alpha_2 \Delta EXD_{t-1} + \sum_{i=1}^n \alpha_2 \Delta EXR_{t-1} + \sum_{i=1}^n \alpha_3 \Delta FRS_{t-1} \\ & + \sum_{i=1}^n \alpha_4 \Delta XDS_{t-1} + \sum_{i=1}^n \alpha_5 \Delta FDI_{t-1} + \sum_{i=1}^n \alpha_6 \Delta GEX_{t-1} + \sum_{i=1}^n \alpha_7 \Delta INT_{t-1} \\ & + \sum_{i=1}^n \alpha_8 \Delta INF_{t-1} + \partial ECM \\ & + \varepsilon t1 \end{aligned} \quad (3.9)$$

Where the ECM is the error term.

Sources of Data

The study used secondary data from 1981 to 2023 sourced from World Bank, World Development Indicators (WDI) for 2024 and various issues of CBN Statistical Bulletins. Data for exchange rate, inflation, government expenditure, foreign direct investment, and foreign reserve were obtained from the CBN Statistical Bulletin, various issues while data for external debt and services were obtained from the World Development Indicator respectively

Methods of Data Analysis

The method used to analyse the data collected for this study is basically the Autoregressive Distributed Lag Methodology (ARDL). Prior to the estimation of the error correction mechanism, the under listed test statistics were examined:

(a) Unit Root Test: The unit root test statistics for the selected variables were conducted using the Augmented Dickey-Fuller (ADF) test. This is vital to avoid spurious or misleading results.

(b) ARDL Bounds Test for Co-Integration: From the outcome of the unit root test with the variables having different orders of integration, the ARDL bounds test was used in the



determination of the cointegration and the existence of a long-run relationship among the variables in the model.

(c) Correlation matrix: Perfect Multicollinearity test was carried out using the correlation matrix to ascertain the existence or otherwise of the presence of serial correlation.

(d) Error Correction Mechanism (ECM): We proceed by examining the short-run dynamics of the model using the Error Correction Mechanism (ECM) to determine the speed of adjustment and the short-run relationship among the variables in the model.

(e) Diagnostic Statistics: Diagnostic statistics were carried out to ascertain the robustness of the model.

(f) Stability Test: Finally, after the diagnostic statistics, we went further to test for the stability of the model overtime using cumulative sum (CUSUM).

ANALYSIS AND DISCUSSION OF RESULTS

Data Analysis and discussion of Results

Unit Root Test: A stationarity test for the variables was carried out using the Augmented Dickey-Fuller test. The result of the unit root as presented in Table 4.1 showed that EXDG, EXR, GEX, FDI, FRS and INT were, integrated of order one while XDS and INF were integrated of order zero. Given this result, there is justification for co-integration.

Table 1: Unit root test result.

VARIABLE					
	Level	Pro	1 st Diff	Pro	Remark
EXDG	-1.676704	0.4354	-4.385329	0.0012	I(1)
EXR	4.136567	1.0000	-5.328062	0.0001	I(1)
XDS	-4.257905	0.0017			I(0)
FRS	-1.636422	0.4553	-4.602374	0.0006	I(1)
GEX	9.651271	1.0000	-7.177864	0.0000	I(1)
FDI	-1.976187	0.2958	-8.958611	0.0000	I(1)
INT	-2.931556	0.0502	-7.189001	0.0000	I(1)
INF	-3.335803	0.0194			I(0)

Source: Author's compilation using E-view 10.0

Bounds Test for Cointegration

Since the variables were integrated of different orders (order 1 and 0), the ARDL bound test is the appropriate method to determine the presence of long-run relationship among the variables. As presented in Table 2, the result showed the presence of cointegration among the variables, given the F-sat of 5.284556 which is greater than the lower and upper bounds of 2.17 and 3.21 respectively at 5% level of significance, as shown in Table 2.

**Table 2: ARDL Bound Test for Co-integration Analysis**

Test statistic	Computed F-statistic	Significance level	Bound Critical values	
			Lower Bounds	Upper Bounds
F-statistic	5.284556		I(0)	I(1)
		10%	1.92	2.89
		5%	2.17	3.21
		2.5%	2.43	3.51
		1%	2.73	3.9

Source: Author's compilation using E-view 10.0

Lag Length Criteria

The determination of lag was carried out to ascertain the correct lag length for the estimation of the long-run relationship. The results of the different lags as presented in Table 3 shows that lag 1 is the appropriate lag.

Table 3: VAR Lag Order Selection Criteria

Endogenous variables: EXDG, XDS, GEX, FRS, EXR, FDI, INT, INF

Exogenous variables: C

Date: 04/03/25 Time: 22:30

Sample: 1981 2023

Included observations: 41

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2595.572	NA	1.98e+45	127.0035	127.3379	127.1253
1	-2358.543	369.9964*	4.54e+41*	118.5631	121.5723*	119.6589*
2	-2287.873	82.73604	4.73e+41	118.2377*	123.9218	120.3075

* Indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

ARDL Estimation Long-Run Regression

The result of the long-run relationship between external debt and exchange rate using the ARDL method is as depicted in Table 4. It showed that the model is well fitted with an R^2 and adjusted R^2 of 0.928889 and 0.902815 respectively. The explanatory variables were found to account for 90% of the changes in external debt. The Durbin Watson Statistic of 1.892410 which is approximately 2.0 shows the absence of autocorrelation.

**Table 4: ARDL Estimation Long run Results**

Long-run relationship Dependent variable= EXDG			
Explanatory variables	Coefficient	t-Statistic	Prob.*
EXDG(-1)	0.868781	9.364604	0.0000
EXR	0.082746	2.525452	0.0171
EXR(-1)	-0.071522	-1.544191	0.1330
LOG(XDS)	-3.173143	-1.787214	0.0840
LOG(FRS)	-0.306988	-0.126108	0.9005
LOG(GEX)	12.39103	2.066404	0.0475
LOG(GEX(-1))	-15.40581	-2.719964	0.0108
INT	0.267932	0.830112	0.4130
FDI	0.000513	0.683493	0.4995
INF	-0.073587	-1.006398	0.3223
INF(-1)	-0.207846	-2.836817	0.0081
C	66.08896	2.599420	0.0143
$R^2 = 0.928889$			
$R^2_{(adj)} = .902815$			
$F_{sat} = 35.62489$			
$F_{sat\ pro} = 0.000000$			
DW= 1.892410			

Source: Author's compilation using E-view 10.0

In the analysis of the relationship and impact of exchange rate on external debt, the result showed that the previous levels of external debt have a positive and significant impact on the current levels of external debt given the t-statistics and probability of 9.364604 and 0.0000 respectively. The current value of exchange rate was found to have a positive and significant impact on external debt, while the previous value showed a negative and insignificant impact on external debt. Specifically, a N1 increase in exchange rate leads to about 0.08% increase in external debt as a percentage of RGDP. This is in agreement with the study of Mijiyawa and Oloufade (2023), Andleeb, Nadia, Saif, and Sadia (2023) in a study on Pakistan and Boris, Menbere, and David (2021) using panel of emerging countries. following this is also the study of Blessy (2019) for emerging economies who found that for most countries, exchange rate depreciation increases the external indebtedness.

External debt servicing and reserves were found to have a negative and insignificant impact on external debt in Nigeria. specifically, 1% increase in debt servicing and reserve leads to a 3% and 0.3% fall in debt to RGDP ratio. The result of the outcome revealed that external debt was however contrary to the study of Sri Sukma, Said, and Nazamuddin (2019) who found a positive impact of reserve on foreign debt in Indonesia. The result further revealed that total government expenditure had a positive substantial impact on external debt which was the greatest magnitude and in line with theoretical expectation. The result was also common for many developing countries, including Nigeria, which funds most of their government expenditure by borrowing. A 1% increase in government total expenditure leads to a 12% increase in external debt to RGDP ratio.



Interest rate and foreign direct investment were found to have a positive and insignificant impact on external debt. In line with expectation, as interest rates increases, external debt increases. A 1% increase in interest rate leads to 0.26% increase in external debt in Nigeria. Finally, inflation which was used to capture the stability of the economy showed a negative relationship with external debt both in the previous year and in the current year but only had a significant impact in the previous year. Specifically, 1% increase in inflation reduced external debt by 0,07% in the current year. Thus, inflation tends to increase government revenue more than expenditure, thereby reducing the accumulation of debt in Nigeria. This is in confirmation with the study of Odior and Arinze (2017).

Short Run Estimation

The outcome of the co-integration among the variables required for the estimation of the short-run dynamics. Using the general framework as provided in the model, the error correction model of external debt is presented in Table 5

Table 5: ARDL Estimation Short run Results

Dependent variable= EXDG			
Explanatory variables	Coefficient	t-Statistic	Prob.*
D(EXDG)(-1))	1.202480	5.888919	0.0000
D(EXR)	0.060559	2.659478	0.0137
D(LOG(XDS))	-3.668985	-2.070580	0.0493
D(FDI)	0.000126	0.171850	0.8650
D(LOG(GEX))	14.53951	2.477086	0.0207
D(LOG(GEX(-1)))	-16.78708	-3.055549	0.0054
D(LOG(FRS))	-2.334976	-0.828804	0.4154
D(LOG(FRS(-1)))	1.105866	0.399627	0.6930
D(LOG(FRS(-2)))	3.503593	1.435394	0.1641
D(INT)	0.110178	0.383023	0.7051
D(INT(-1))	-0.041464	-0.147256	0.8842
D(INT(-2))	0.257703	1.021182	0.3174
D(INF)	-0.189352	-2.525773	0.0186
D(INF(-1))	-0.181936	-2.783431	0.0103
ECM(-1)	-1.440480	-5.135843	0.0000
C	-0.517690	-0.293862	0.7714
$R^2 = 0.795345$ $R^2_{(adj)} = 0.667436$ $F_{sat} = 6.218042$ $F_{sat\ pro} = 0.000000$ $DW = 2.022639$			

Source: Author's compilation using E-view 10.0



The outcome revealed that short-term changes in current exchange rates and external debt services have a substantial impact on external debt. Following the same trend as the long-run analysis, current exchange rate showed a positive impact on external debt while external debt servicing showed a negative impact on external debt. Specifically, 1% increase in exchange rate leads to about 0.06% increase in the external debt to RGDP ratio increase in debt burden. The negative association of exchange rates on external debts in the short-run is in variance with the study of Andleeb, Nadia, Saif, and Sadia (2023) who found a negative impact of exchange rates on external debt.

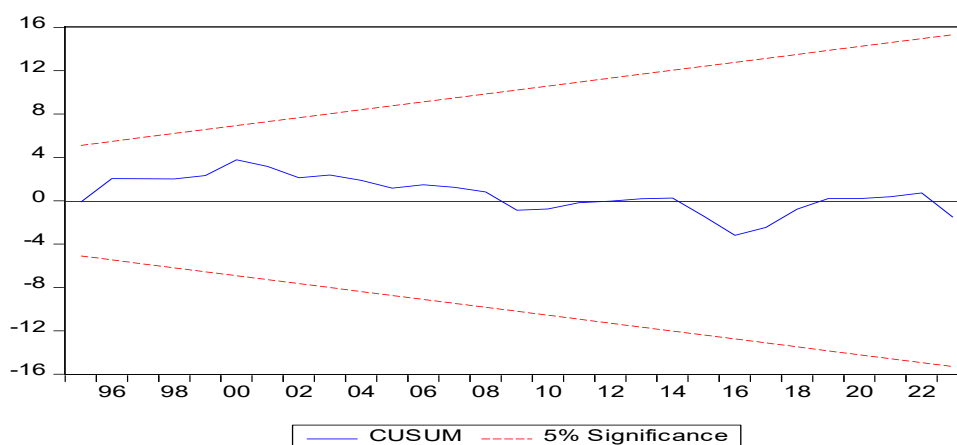
The result also revealed that both currently and previously, government expenditure and inflation have significant impacts on external debt. While inflation had a negative impact on external debt both in the current and previous time, government expenditure has a positive impact in the current time and a negative impact in the previous time. 1% increase in government expenditure leads to about 15% increase in external debt accumulation. External reserve and interest rate were found to be negatively related with external debt in the current time but positively related to external debt in the previous time.

The error correction term ECM (-) which is -1.440480, is statistically significant with the correct sign (negative). The ECM coefficient shows the speed of adjustment towards the long-term equilibrium given a shock, indicating that about 144% of the disequilibrium is being corrected within a year. This fast adjustment shows the rate of volatility of exchange rate and the dynamic status of the connectivity between external debt and exchange rate in Nigeria. This illustrates a substantial reversion to equilibrium conditions in the face of post-disturbances and a reconfirmation that the variables used in this model were cointegrated.

Stability Test

The CUSUM residuals was employed to determine the model's stability. The outcome as shown in Figures 1 revealed that the parameter and the model is stable over the period given that the plots lie inside the critical boundaries. This indicating a stable long-run coefficient of the model.

Fig 1 Plot of Cumulative Sum of Recursive Residuals





CONCLUSION AND RECOMMENDATIONS

Conclusion

The study examined the impact of exchange rates on external debt in Nigeria. This study rested on the fundamental equilibrium exchange rate theory and adopted the model of Mohammed and Rajah (2016) which was modified to justify the investigation. The variables used in the study include; external debt, exchange rate, government expenditure, inflation rate, interest rate, foreign direct investment, foreign reserves, and external debt servicing. Prior to the estimation, the unit root and cointegration test were carried out using the Augmented Dickey-Fuller unit root test and ARDL bound test respectively.

The ARDL methodology was adopted for the estimation, the estimation results show the dynamic relationship between the dependent variable and the independent variables. It further revealed how the independent variables impacted the dependent variable both in the short-run and long-run respectively. The results of the study revealed that both in the long run and the short run, exchange rate positively and significantly impacts external debt. Government expenditure was also found to positively and significantly impact external debt and it has the greatest magnitude as compare to other variables. There was also a rapid speed of adjustment to long-run equilibrium.

Recommendations

Following the outcome of this investigation, it was obvious that both exchange rate and government expenditure impacted external debt in Nigeria. Based on this observation, the following recommendations were made:

1. Government should put in place economic policies with emphasis on stabilizing the naira against the currencies of major trading partners. This is because the increase in the country's exchange rate consequently increases debt accumulation.
2. Government expenditure was found to be the major cause of external debt. Thus, government expenditure should be more productive and channeled towards projects that can bring in revenue to take care of the debt servicing thereby reducing the debt accumulation.
3. Inflation was found to have a negative impact on external debt. Nevertheless, the policy measures to control inflation are strongly recommended, as high inflation will increase the expenditure more than revenue thereby increasing the accumulation of debt.

REFERENCES

- Adamu, I. M. & Rasiah, R. (2016). The determinants of external debt in Nigeria. Available at; SSRN:<https://ssrn.com/abstract=2865568> or <http://dx.doi.org/10.2139/ssrn.2865568>
- Aigbedion, I. M., Iyakwari, A.D. B & Mairana, I. A (2020). Public external debt and its impact on exchange rates in Nigeria. *International Journal of Advanced Studies in Business Strategies and Management*, 8(5), 4236-4244



- Ajayi, L.B. & Oke, M.O. (2012). Effect of external debt on economic growth and development of Nigeria. *International Journal of Business and Social Science*, 3(12): 18-29
- Andleeb, Z., Nadia, N., Saif, R., & Sadia, I. (2023). Impact of exchange rate and foreign direct investment on external debt: evidence from Pakistan using ARDL cointegration approach. *IRASD Journal of Economics*, 5(1)
- Augustine, B. (2019). Impact of exchange rate depreciation on external indebtedness: evidence from a sample of emerging economies. *IISES International Academic Conference, Vienna Austria*.
- Blessy A. & Lakshmi K. (2020). Original sin, currency depreciation, and external debt burden: evidence from India, *International Journal of Economics and Financial Issues*, 10(3), 58-68.
- Boris, F., Menbere, W. T. & David, H. (2021). Currency depreciation in emerging economies: a blessing or curse for external debt management. *Journal of International Economics*, 6 (3).
- Central Bank of Nigeria (2021). Understanding Monetary Policy, Series No. 8
- Central Bank of Nigeria (2022). Understanding Monetary Policy, Series No. 10
- Chanadana, A., Adamu, J., & Musa, A. (2020). Impact of government expenditure on economic growth in Nigeria. *CBN Journal of Applied Statistics*, 11 (2)
- Fatima-Ezzahra, R., & Mostafa, L (2025): Empirical investigation of the relationship between public external debt sustainability, foreign reserves and fixed exchange rate. *Cogent Economics and Finance, Taylor & Francis Journals*, 13(1); 2457478-245, December.
- Francis, A.O. (2021). Naira-dollar exchange rate palaver and Nigeria's manufacturing sector performance. *Otuoke Journal of Social Sciences (OJSS) 1 (1)*.
- Gabriel, A. & Paschal, I. P. O. (2016). Responsiveness of foreign exchange rate to foreign debt: evidence from Nigeria. *International Journal of Arts Humanities and Social Sciences, Vol.1, No.5*
- Imoagwu, C.P., Ezenekwe, U. R., & Nwogwugwu, U. C. (2023). Rising external debt and exchange rate: empirical evidence from Nigeria. *International Journal of Advanced Economics*, 5(4), 90-106.
- Kola, S., Somoye, I. & Sheriffdeen, T. (2015). Exchange rate movements: external debt problems in Nigeria. *Journal of Market Forces*, 10, (2)
- Kouladoum, J.C. (2018). External debts and real exchange rates in developing Countries: evidence from Chad. Université de Sarh publishers, Chad
- Lever, H. & Huhne, C. (1985). Debt and danger: the world financial crisis. London, Penguin books limited
- Mijiyawa, A. G. & Oloufadi, D. K. (2023). "Effect of remittance inflows on external debt in developing Countries. *Open Economies Review*, Springer, 34(2): 437-470,
- Moazzam M.D. (2022). External debt and real exchange rate volatility in South Asia. *South Asian Journal of Macroeconomics and Public Finance* 12(1), 83–110.
- Mordi, C. N. O. (2020). Challenges of exchange rate volatility in economic management in Nigeria. *CBN Economic and Financial Review*, 30, (3)
- Nwanne, T. F. I. & Eze, O. R (2015). Assessing the effect of external debt servicing and receipts on exchange rates in Nigeria. *International Journal of Economics and Finance*, 7, (9)
- Obadan, M.I. (2006). Overview of exchange rate management in Nigeria from 1986 to date. *CBN Economic and Financial Review*, 30, (3)



- Odior, E., S. & Arinze, S. (2017). The dynamics of inflation, public debt, and exchange rate in Nigeria. *Business and Economic Quarterly Review* 1 (4), 19–34.
- Odionye, J. C., Odo, A. C., Orji, S. A., Agoh, N., Ihezukwu, V. A., Ojike, R. O. & Okpara, R. M. (2024): Threshold-based influence of currency devaluation on external debt sustainability: Insights from smooth transition regression and multiple thresholds nonlinear ARDL approaches, *The Journal of International Trade & Economic Development*, DOI: 10.1080/09638199.2024.2389873
- Ogbeifun, M. I. (2007). The politics of external debt relief: Nigeria's unique experience, *African Journal of Stability and Development*, 1(1), 14-32.
- Okoye, L.U., Modebe, N.J., Erin, O.A. & Evbuomwan, G. O. (2013). Effect of external debt on economic growth: Evidence from Nigeria. *Advances in Social Sciences Research Journal*, 4(7), 4046-4058
- Oluwatoyosi, T.O., Timothy, T. O., & Abolade, F. A. (2024). Government expenditure, inflation, and economic growth in Nigeria. *Lapai Journal of Economics*; 8, (1)
- Oriakhi, D. E. (2004). Introduction to public finance. Revised edition. Published by Mindex publisher, Benin city, Nigeria.
- Saheed, Z. S., Sani, I. E., & Idakwoji, B. O. (2015). Impact of public external debt on the exchange rate in Nigeria. *European Journal of Business and Management*, 7(21), 51-57.
- Sri Sukma, W., Said, M., & Nazamuddin, D. (2019). Does exchange rate determine foreign debt? empirical evidence from Indonesia. *East African Scholars Journal of Economics, Business and Management*, Vol.2 No.6
- Staveley-O Carroll, J., & Staveley-O'Carroll, O. M. (2018). Exchange rate targeting in the presence of foreign debt obligations. *Journal of Macroeconomics*, 8(56), 113–134.
- Sulaiman, L.A. & Azeez, B. A. (2012). Effect of External Debt on Economic Growth of Nigeria, *Journal of Economics and Sustainable Development*, 3(8): 71-79
- Terry, P. (2003). David Ricardo on public debt: Studies in the history of economics. *Journal of economics*, 113, (448)
- Timothy, A. A., Lawrence, O. F., Gbenro, M. S. & Chidinma, E. E (2020). Investigating external debt and exchange rate fluctuations in Nigeria: any difference with ARDL model? *Studia Universitatis Babeş-Bolyai Oeconomica*, 65(3), 53-64.
- United Nation Economic Commission for Africa (2024). Exchange rate devaluations and external debt management in Africa. Available online at www.uneca.org/exchange-rate-devaluations-and-external-debt-management-in-africa