



Taraba State University, Jalingo  
Faculty of Management Sciences

ISSN NO. 1118-3527 for "Journal Of Management Science Research and Contemporary Issues  
(JMSRCI) Vol 2 (2), 2025

## EFFECT OF EXCHANGE-RATE VOLATILITY ON NIGERIA'S SOVEREIGN BORROWING COSTS

**Dr. Adamu, Lawal Bello**  
National Board for Technical Education  
[adamulbello@gmail.com](mailto:adamulbello@gmail.com)

**Dr. Akpegi Patrick Onahi**  
Department of Accounting, Nasarawa State University  
[onahip@gmail.com](mailto:onahip@gmail.com)

### Abstract

*The study examined the effect of exchange-rate volatility on Nigeria's sovereign borrowing costs, focusing on both short-run and long-run dynamics. Using a Vector Error Correction Model (VECM) on quarterly data, the study investigates the relationships among government debt, exchange-rate volatility, nominal and real exchange rates, and foreign-exchange market interventions over a 40-quarter period. Unit root and co-integration tests confirm a stable long-run equilibrium among the variables, justifying the use of VECM to capture both immediate and persistent interactions. The results indicate that lagged exchange-rate volatility positively influences government debt, suggesting that periods of high volatility lead to increased borrowing to meet fiscal obligations. The error correction coefficient for government debt is negative, demonstrating gradual adjustment toward long-run equilibrium, though the pace of correction is moderate. Nominal exchange rate changes have mixed effects, with some lags increasing debt while others reduce it, indicating that short-term fluctuations do not consistently drive borrowing decisions. The real exchange rate exhibits a weak and varied effect on debt levels, reflecting the limited immediate influence of structural currency movements. Foreign-exchange market interventions show a small negative effect, suggesting temporary easing of borrowing pressures but insufficient mitigation against volatility. The study concludes that exchange-rate volatility is a critical determinant of Nigeria's sovereign borrowing costs, elevating debt levels and fiscal vulnerability while slowing the adjustment of debt toward long-run equilibrium. The findings highlight the need for policy measures to stabilize the currency, reduce borrowing costs, and strengthen fiscal resilience. The main recommendation is to implement comprehensive exchange-rate risk management strategies, including currency stabilization and prudent debt composition planning, to ensure sustainable sovereign borrowing and protect macroeconomic stability.*

**Keywords:** Exchange-Rate Volatility, Government Borrowing Costs, Government Debt, Foreign-Exchange Interventions.

### Introduction

Nigeria's sovereign borrowing environment has become increasingly vulnerable to exchange-rate instability, particularly since the series of foreign-exchange market reforms implemented in 2023. The transition toward a more market-determined exchange-rate regime initiated through the FX market liberalisation measures announced in June 2023 has generated substantial episodes of naira depreciation and heightened volatility, which have had direct and immediate implications for the cost of servicing the country's rapidly expanding external



debt (IMF, 2024; CBN, 2023). Nigeria's external debt stood at approximately US\$43 billion in 2024, while total public debt reached about ₦121.7 trillion, meaning that even modest currency swings translate into significant increases in naira-denominated debt-service obligations (DMO, 2024). These balance-sheet effects have tightened fiscal space, strained budget execution and increased the risk premium demanded by international investors (World Bank, 2024).

Despite policy reforms aimed at unifying the foreign-exchange market, exchange-rate instability has persisted, reflecting structural weaknesses in export earnings, limited foreign-exchange supply, shallow non-oil revenue mobilisation and recurrent foreign-exchange shortages (Adeniran & Egwuenu, 2023; IMF, 2023). These conditions have amplified the sensitivity of Nigeria's sovereign borrowing costs to currency movements. Indeed, episodes of sharp naira depreciation have been systematically followed by widening Eurobond spreads, elevated yields on sovereign securities and, in some instances, temporary loss of market access an indication that exchange-rate volatility is not merely a macroeconomic fluctuation but a potent determinant of Nigeria's sovereign risk profile (Bua & Kabir, 2022; Ahmed & Lledo, 2023).

Furthermore, Nigeria's reliance on foreign-currency borrowing particularly Eurobonds and multilateral loans means that exchange-rate volatility magnifies rollover risks and increases vulnerability to external shocks (IMF, 2024; World Bank, 2024). In a context where global interest rates and investor risk aversion remain elevated, exchange-rate instability risks further increasing borrowing costs, exacerbating debt-sustainability challenges and constraining the government's capacity to finance development priorities. These concerns are particularly acute given that Nigeria's debt-service-to-revenue ratio has exceeded internationally accepted thresholds in recent years, undermining fiscal resilience and increasing exposure to liquidity pressures (IMF, 2023; DMO, 2024).

Although existing studies acknowledge the relationship between exchange-rate behaviour and macroeconomic performance in Nigeria, a significant empirical gap remains. Very few studies provide a country-specific, post-2020 analysis that quantifies how exchange-rate volatility interacts with Nigeria's unique debt composition, policy reforms and investor perceptions to influence sovereign borrowing costs (Ezeaku et al., 2021; Adebayo & Inekwe, 2022). Additionally, limited research isolates the differential effects of short-term volatility,



long-term misalignment and structural FX-market constraints on sovereign financing conditions. Without such evidence, policymakers and debt managers lack the analytical foundation required to design effective strategies for reducing currency-related risk premia, optimising debt structure and strengthening Nigeria's sovereign creditworthiness.

Therefore, the is motivated by the persistent exchange-rate volatility threatens Nigeria's ability to borrow sustainably, elevates sovereign borrowing costs and undermines macroeconomic and fiscal stability, yet there is inadequate empirical understanding of the magnitude, mechanisms and policy determinants of this relationship in the Nigerian context. The absence of rigorous, Nigeria-focused evidence limits the capacity of policymakers to anticipate market reactions, manage debt cost-effectively and mitigate the fiscal consequences of currency shocks. Therefore, this study examined the magnitude and mechanisms through which foreign exchange volatility affects government borrowing costs, particularly in developing economies such as Nigeria.

### **Hypotheses**

**H<sub>01</sub>:** Exchange rate volatility has no significant effect on government borrowing costs in Nigeria.

**H<sub>02</sub>:** Exchange rate returns have no significant impact on government borrowing costs in Nigeria.

**H<sub>03</sub>:** The nominal exchange rate has no significant relationship with government borrowing costs in Nigeria.

**H<sub>04</sub>:** The real exchange rate does not significantly influence government borrowing costs in Nigeria.

**H<sub>05</sub>:** Foreign exchange market intervention has no significant effect on government borrowing costs in Nigeria.



## Literature review

### Concept of Government Borrowing Costs

The concept of government borrowing costs refers to the financial expenses a government incurs when raising funds through debt instruments such as treasury bills, bonds, and external loans. These costs are typically reflected in the interest rates governments pay to domestic and foreign creditors, influenced by macroeconomic fundamentals, exchange rate dynamics, and sovereign creditworthiness. According to Eichengreen and Hausmann (2021), government borrowing costs are not merely the nominal interest rates but also include risk premiums that capture investors' perception of default risk, inflation expectations, and currency depreciation. In developing economies, where fiscal deficits and reliance on foreign-denominated debt are prevalent, borrowing costs tend to be higher due to heightened vulnerabilities to external shocks and exchange rate volatility (Mbaye et al., 2018). Thus, borrowing costs serve as a key determinant of fiscal sustainability, shaping the government's ability to finance infrastructure, social programs, and development initiatives without exacerbating debt crises.

Furthermore, government borrowing costs have both short-term and long-term implications for macroeconomic stability and growth. High borrowing costs crowd out productive investment, as a larger portion of national revenue is allocated to debt servicing, reducing fiscal space for essential public expenditure (Panizza & Presbitero, 2014). In many African economies, including Nigeria, fluctuations in global commodity prices and exchange rate instability significantly influence borrowing conditions, particularly for Eurobonds and external debt denominated in foreign currencies (World Bank, 2022). The rising cost of debt servicing has become a major policy concern; for instance, Nigeria's debt service-to-revenue ratio reached about 73.5% in 2022, reflecting how increased borrowing costs constrain fiscal flexibility (IMF, 2023). Therefore, understanding government borrowing costs requires examining both domestic monetary conditions and international financial market trends, with exchange rate volatility emerging as a critical factor in shaping the trajectory of sovereign borrowing.



### **Concept of Exchange Rate Volatility (EXV)**

Exchange rate volatility refers to the degree of fluctuation in the value of a currency relative to others within a specified period. It is often measured using statistical tools such as the standard deviation of exchange rate changes, GARCH models, or realized volatility indices (Engle, 2020). Volatility arises from a wide range of factors, including inflation differentials, speculative activity, shifts in monetary policy, and global economic shocks (Cheung & Sengupta, 2021). In Nigeria, persistent depreciation of the naira, policy uncertainty, and the existence of multiple exchange rate regimes have heightened volatility and created uncertainty for both investors and policymakers (Ezeaku & Asogwa, 2022).

The implications of exchange rate volatility for fiscal management are significant. For governments, heightened volatility increases the risk premium demanded by investors in sovereign debt instruments, particularly when external debt obligations are denominated in foreign currency (IMF, 2023). This often translates into higher borrowing costs, complicating fiscal planning and threatening debt sustainability (Obi, Okafor & Ugwuegbe, 2021). Hence, understanding exchange rate volatility is critical in analyzing its role in shaping government borrowing costs in developing economies.

### **Concept of Exchange Rate Returns (RER)**

Exchange rate returns measure the rate of change in the value of a currency relative to another over a specific period, usually expressed in logarithmic terms. They capture the direction and magnitude of exchange rate movements whether a currency is appreciating or depreciating (Asteriou & Pilbeam, 2021). Exchange rate returns differ from volatility by focusing on the actual performance of the currency rather than its variability. In Nigeria, persistent depreciation of the naira has often resulted in negative returns, reflecting weak fundamentals, external shocks, and structural imbalances (Onanuga & Oseni, 2022).

In the context of sovereign borrowing, exchange rate returns matter because they signal the trend of the local currency to international investors. Negative returns, reflecting currency depreciation, raise concerns about repayment capacity and potential exchange losses, leading investors to demand higher yields on sovereign debt (World Bank, 2022). Conversely, stable or positive returns can strengthen investor confidence and reduce government borrowing



costs (Abubakar & Danmola, 2020). Thus, exchange rate returns provide a direct link between exchange rate dynamics and the pricing of sovereign debt instruments.

### **Concept of Nominal Exchange Rate (NER)**

The nominal exchange rate is the rate at which one currency can be exchanged for another, usually quoted as units of domestic currency per unit of foreign currency. In Nigeria, the nominal exchange rate is commonly expressed as the number of naira per US dollar. It reflects the immediate cost of currency conversion in official or parallel markets, and it is determined by the interaction of demand and supply, inflationary trends, capital flows, and monetary policies (Bahmani-Oskooee & Xi, 2020). The naira has experienced sharp depreciation in recent years, especially after the 2023 unification of exchange rates, which pushed the official rate beyond ₦700 per dollar (CBN, 2023).

The nominal exchange rate is crucial for government borrowing because a weaker domestic currency increases the cost of servicing external debt obligations, thereby raising fiscal pressures (Kose, et al., 2021). Investors factor exchange rate depreciation risk into sovereign bond pricing, demanding higher yields in uncertain environments. A relatively stable nominal exchange rate, on the other hand, signals macroeconomic stability and lowers sovereign borrowing costs (Adegbite & Ayadi, 2022). Thus, the nominal exchange rate serves as a fundamental determinant of borrowing conditions in both domestic and international debt markets.

### **Concept of Real Exchange Rate (REX)**

The real exchange rate (RER) adjusts the nominal exchange rate for price level differences between domestic and foreign economies. It reflects the purchasing power of one currency relative to another and indicates whether a currency is overvalued or undervalued compared to its trading partners (Dornbusch, Fischer & Startz, 2021). For Nigeria, the real exchange rate is heavily influenced by inflation dynamics, oil price fluctuations, and central bank interventions (Ogbonna & Okoro, 2022). An appreciating real exchange rate suggests declining competitiveness of exports, while a depreciating real exchange rate indicates improved competitiveness but higher import costs.



From a debt financing perspective, the real exchange rate is essential because it signals long-term external balance sustainability. Persistent real appreciation can reduce investor confidence by indicating vulnerability to external shocks, while excessive depreciation may raise inflationary risks and erode fiscal space (Lane & Milesi-Ferretti, 2020). Both conditions can increase sovereign borrowing costs, as lenders demand compensation for heightened macroeconomic risks (Aizenman, Jinjark & Marion, 2022). Hence, the real exchange rate provides a more comprehensive measure of exchange rate effects on government borrowing than the nominal rate alone.

### **Concept of Foreign Exchange Market Intervention (FXINT)**

Foreign exchange market intervention refers to deliberate actions taken by monetary authorities to influence the exchange rate or stabilize the currency. Such interventions may include direct sales or purchases of foreign currency, adjustments in foreign reserves, or policy announcements aimed at managing expectations (Adler, Lisack & Mano, 2021). In Nigeria, the Central Bank of Nigeria (CBN) frequently intervenes by injecting US dollars into the interbank market or through special windows to support the naira (CBN, 2023). These interventions are often tied to oil revenues, which remain the country's main source of foreign exchange.

The impact of FX market intervention on government borrowing costs can be either positive or negative. Successful interventions that reduce exchange rate volatility and stabilize the naira enhance investor confidence, thereby lowering borrowing costs (IMF, 2022). However, excessive or unsustainable interventions that deplete foreign reserves may signal vulnerability, prompting investors to demand higher risk premiums (Chukwuemeka & Ijeoma, 2020). Thus, FX intervention is both a stabilizing mechanism and a potential risk indicator, making it a critical factor in understanding the interaction between foreign exchange markets and government debt financing.

### **Empirical Review**

Wang (2024) provided further empirical depth by investigating the link between exchange rate volatility, returns, and sovereign CDS spreads across several countries between 2011 and 2022, with particular attention to the post-COVID-19 era. The author used time-varying parameter models and GARCH-type measures of volatility, supplemented by quantile



regressions, to show that the effect of exchange rate depreciation on CDS premia was stronger during financial stress episodes. The study also documented heterogeneity, noting that countries with larger reserves and deeper domestic markets faced weaker pass-through effects. Nonetheless, its reliance on CDS as a proxy for borrowing costs meant that actual bond yields were underexplored, leaving some gaps in understanding the full spectrum of government borrowing.

Amewu (2024) turned attention to African sovereign bonds, analyzing determinants of yields and CDS spreads across the continent from 2010 to 2023. Using factor-augmented VARs and panel regressions, the study assessed how exchange rate shocks and global asset price movements influenced borrowing costs. Findings confirmed that exchange rate depreciations significantly increased sovereign spreads, with the magnitude depending on fiscal strength and foreign reserve positions. Countries with stronger buffers saw weaker effects. However, the results may mask country-specific dynamics, since aggregating African economies risks overlooking unique features of resource-dependent or fragile states.

Aizenman (2023) investigated the relationship between inflation surges, sovereign borrowing, and exchange rate vulnerability across emerging markets, focusing on the 2000–2020. The study employed cross-country panel regressions and event-study techniques to examine how inflationary episodes and credibility shocks in monetary policy affected the currency composition of sovereign debt and the associated borrowing costs. The findings indicated that inflation surges often pushed countries to increase foreign currency borrowing in order to access markets or reduce nominal interest costs; however, such strategies amplified exposure to exchange rate volatility and led to higher risk premia. One limitation of this study is that its cross-country design risks aggregation bias, since institutional quality and debt-management practices differ widely across nations. It also focused more on inflation and policy credibility than on high-frequency measures of exchange rate volatility, leaving some gaps in direct analysis of borrowing costs.

Goyal (2023) addressed the policy implications of exchange rate volatility for borrowing costs in emerging markets. Drawing on evidence from the 2010 through 2023, the study synthesized empirical results and policy case studies rather than conducting a single-country econometric analysis. The findings showed that excess exchange rate volatility contributed to higher sovereign risk premia by increasing investor demand for excess returns, thereby



raising government borrowing costs. The brief recommended deepening domestic bond markets, adopting transparent intervention policies, and employing hedging strategies as ways to reduce borrowing costs. Although insightful, the study was more prescriptive than analytical; it did not estimate precise causal effects between volatility and yields, making its recommendations more general than country-specific.

Emenike (2022) studied sovereign bond market volatility across African countries, using issuance and yield data up to 2021. Employing volatility decomposition techniques and panel GARCH models, the paper highlighted that exchange rate shocks were a major driver of sovereign bond volatility, particularly for foreign-currency denominated debt. The study also found evidence of contagion, whereby volatility in one country's bonds could spill over to others in the region. While methodologically rigorous, the study did not fully address how policy interventions such as foreign exchange reserve management or central bank actions could alter these volatility–cost relationships.

Feng (2021) analyzed the spillover dynamics between sovereign credit default swaps (CDS) and exchange rate markets in emerging economies between 2011 and 2019. Using vector autoregression (VAR) methods, variance decompositions, and impulse response functions, the study uncovered strong bidirectional spillovers: exchange rate depreciations and volatility raised sovereign CDS spreads, while increases in CDS premia fed back into additional exchange rate pressures. The paper concluded that the strength of these spillovers was magnified in countries with weaker foreign exchange reserves and macroeconomic buffers. A notable critique, however, is that the reliance on CDS data may not fully represent the broader sovereign debt investor base in less developed financial markets, thereby limiting the generalizability of the findings.

## **Theoretical Framework**

**Uncovered Interest Parity (UIP) Theory:** This study is anchored on the Uncovered Interest Parity (UIP) Theory, propounded by John Maynard Keynes in the 1920s and later formalized within international finance literature in the 1970s. The theory builds on the broader interest rate parity condition, which links domestic and foreign interest rates to expected changes in exchange rates. According to Keynes (1923), investors allocate their capital internationally in search of higher returns, but arbitrage forces equalize risk-adjusted returns across countries once exchange rate expectations are taken into account. The uncovered version of this parity



states that the difference between domestic and foreign interest rates is equal to the expected change in the exchange rate, assuming no forward cover or hedging instruments are used (Froot & Thaler, 1990).

A detailed discussion of the UIP theory highlights its core proposition: that when domestic interest rates rise above foreign interest rates, the domestic currency is expected to depreciate by a similar margin in the future. This ensures that investors do not earn risk-free profits through cross-border arbitrage. In practice, UIP implies that exchange rate expectations play a central role in determining capital flows, debt composition, and the cost of borrowing in international markets. Empirical evidence, however, has shown frequent deviations from UIP in both advanced and emerging markets, due to risk premiums, transaction costs, and investor perceptions of sovereign default risk (Chinn, 2006; Engel, 2016). Recent studies also show that in emerging markets with weaker macroeconomic fundamentals and higher exchange rate volatility, these deviations tend to be larger, leading to higher sovereign spreads and borrowing costs (Goyal, 2023; Amewu, 2024).

The relevance of UIP to this study lies in its direct connection between exchange rate volatility and government borrowing costs. Government borrowing in both domestic and international markets is sensitive to expectations of currency depreciation, which influence interest rates and risk premia. For example, when exchange rate volatility increases, investors demand higher yields on sovereign bonds to compensate for the risk of currency depreciation, in line with UIP deviations (Feng, 2021; Wang, 2024). Similarly, in Nigeria, episodes of foreign exchange instability have led to higher Eurobond yields and increased debt service burdens, as investors factor in exchange rate risks when pricing sovereign debt (IMF, 2023; World Bank, 2022). Therefore, UIP provides a robust theoretical foundation for analyzing how exchange rate volatility captured through nominal, real, and return-based measures affects government borrowing costs in emerging economies.

## **Methodology**

This study adopted an ex-post facto research design, which is appropriate because the research examines historical data on foreign exchange volatility and government borrowing costs without manipulating any variables. The study covers the period 1984 to 2023, a timeframe that captures episodes of exchange rate liberalization, oil price shocks, debt restructuring, and Eurobond issuances in Nigeria. The data is restricted to annual and [jmsrcifmstsu@gmail.com](mailto:jmsrcifmstsu@gmail.com)



quarterly data on foreign exchange variables and government borrowing costs, sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin. Vector Error Correction (VEC) model was for the analysis.

The functional relationship of the study is specified as follows:

$$GBC_t = \beta_0 + \beta_1 EXV_t + \beta_2 EXR_t + \beta_3 NER_t + \beta_4 RER_t + \beta_5 FXINT_t + \mu_t$$

Where:

$GBC_t$  = Government Debt at time  $t$

$EXV_t$  = Exchange Rate Volatility at time  $t$

$EXR_t$  = Exchange Rate Returns at time  $t$

$NER_t$  = Nominal Exchange Rate at time  $t$

$RER_t$  = Real Exchange Rate at time  $t$

$FXINT_t$  = Foreign Exchange Market Intervention at time  $t$

$\mu_t$  = Error term

Diagnostic test such as unit root tests (ADF) was conducted to validate the robustness of results.

**Table 1: Variable Measurement**

Variable	Measurement/Proxy	Source
<b>GDB</b>	Average yield on government bonds (FGN Bonds).	Debt Management Office (DMO, 2023).
<b>EXV</b>	Standard deviation or conditional variance from GARCH using NGN/USD returns.	Engle (1982); Bollerslev (1986); CBN (2023)
<b>EXR</b>	$EXRET_t = \ln(ER_t) - \ln(ER_{t-1})$	IMF (2022); CBN (2023)
<b>NER</b>	NGN/USD (yearly average).	CBN (2023); World Bank (2022)
<b>RER</b>	$RER = NER \times PP^*$ , where $PP^* = \frac{\text{foreign CPI}}{\text{domestic CPI}}$	Edwards (1989); World Bank (2022); IMF (2022)
<b>FXINT</b>	Change in foreign reserves or reported intervention values.	Dominguez & Frankel (1993); CBN (2023); IMF IFS (2022)

**Source:** Researcher Compilation, 2025



## Results and Discussion of Findings

**Table 2: Summary of unit root test**

Variables	Test Statistics at Level	5% Critical Value at Level	Order of Integration
GDB	-4.099414	-2.941145	I(1)
EXV	-7.401098	-2.938987	I(0)
EXR	-5.190251	-2.941145	I(1)
NER	-5.306299	-2.941145	I(1)
RER	-3.498925	-2.938987	I(0)
FXINT	-7.782211	-2.941145	I(1)

**Source:** Eview Output 2025

The unit root test results show a mixed order of integration among the variables. EXV (exchange-rate volatility) and RER (real exchange rate) are stationary at level, I(0), indicating they revert to their long-run mean without differencing. In contrast, GDB (government domestic borrowing), EXR (exchange rate), NER (nominal exchange rate), and FXINT (foreign exchange intervention) are stationary only after first differencing, I(1), reflecting stochastic trends and long-term persistence. These findings are consistent with macroeconomic dynamics in Nigeria, where nominal exchange rates and policy-driven interventions typically evolve over time.

**Table 3: Descriptive Statistics**

	GDB	EXV	LNEXV	NER	RER	FXINT
Mean	3792.293	43.31152	2.871627	137.6078	118.4562	21080.95
Maximum	38219.85	143.3290	4.965143	645.1941	412.0000	53000.36
Minimum	14.80870	0.028850	-3.545645	0.764942	0.808300	710.1000
Std. Dev.	7059.781	37.93485	1.958710	143.5313	111.7388	17393.38
Skewness	3.390192	0.636895	-1.510728	1.491477	0.976160	0.269100
Kurtosis	15.72819	2.695553	5.031643	5.382357	3.231661	1.466463
Observations	40	40	40	40	40	40

**Source:** Eview Output 2025

The descriptive statistics in Table 3 highlight the behaviour and distributional characteristics of the study variables over the observation period. GDB (Government Domestic Borrowing) has a mean of 3,792.29 with a high standard deviation of 7,059.78, reflecting substantial variability in borrowing driven by fiscal deficits, revenue shortfalls, and debt management strategies. Its high positive skewness (3.39) and extreme kurtosis (15.73) indicate occasional extreme surges, consistent with Nigeria's episodic fiscal pressures and oil revenue shocks. EXV (Exchange-Rate Volatility) shows a mean of 43.31 and standard deviation of 37.93, with moderate positive skewness (0.64) and near-normal kurtosis (2.69), suggesting frequent



moderate volatility punctuated by intermittent spikes, aligning with post-2016 and post-2023 FX market dynamics. The log-transformed volatility LNEXV (mean = 2.87, SD = 1.96) exhibits negative skewness (-1.51) and leptokurtosis (5.03), compressing high values while stabilising variance for modelling purposes.

The NER (Nominal Exchange Rate) displays substantial fluctuations, with a mean of 137.61, SD of 143.53, high skewness (1.49), and kurtosis (5.38), reflecting structural currency changes, policy-driven devaluations, and the peg-to-float transition. The RER (Real Exchange Rate) has a mean of 118.46 and SD of 111.73, with moderate positive skewness (0.98) and kurtosis (3.23), indicating persistent but less extreme deviations driven by inflation differentials, terms-of-trade shocks, and monetary policy shifts. FXINT (Foreign Exchange Intervention) has a mean of 21,080.95 and SD of 17,393.38, showing wide variations due to CBN interventions during dollar shortages, oil price shocks, and speculative pressures. Its low skewness (0.27) and platykurtic distribution (1.46) indicate relatively moderate and symmetric interventions compared to other macroeconomic variables.

The descriptive statistics show substantial variability and heterogeneity in Nigeria's macroeconomic variables. GDB exhibits high volatility and extreme surges, reflecting episodic fiscal pressures, while EXV and LNEXV indicate moderate to intermittent exchange-rate volatility with stabilized variance for modelling. NER and RER reveal significant fluctuations driven by policy changes, inflation differentials, and structural FX adjustments. FXINT displays wide but relatively symmetric interventions, highlighting the Central Bank's active role in stabilizing the naira within a dynamic macroeconomic environment.



**Table 4: Vector Error Correction Estimates Results**

Error Correction:	D(LNGDB)	D(LNEXV)	D(LENXR)	D(LNNER)	D(LNRER)	D(LNFXINT)
COINTEQ1	-0.180325 (0.12257) [-1.47122]	0.010966 (0.04643) [0.23617]	23.46871 (9.98983) [2.34926]	0.031185 (0.08071) [0.38637]	-0.052189 (0.05492) [-0.95036]	0.230213 (0.12633) [1.82233]
D(LNGDB(-1))	0.374021 (0.25607) [1.46062]	0.008571 (0.09701) [0.08835]	4.206542 (20.8709) [0.20155]	0.051635 (0.16863) [0.30621]	0.019428 (0.11473) [0.16933]	-0.262555 (0.26393) [-0.99479]
D(LNGDB(-2))	-0.104979 (0.25057) [-0.41895]	0.038761 (0.09493) [0.40833]	2.874973 (20.4228) [0.14077]	0.095533 (0.16501) [0.57897]	0.093011 (0.11227) [0.82848]	-0.097482 (0.25826) [-0.37745]
D(LNEXV(-1))	1.258052 (1.07573) [1.16949]	0.568210 (0.40753) [1.39429]	37.19328 (87.6767) [0.42421]	0.521048 (0.70838) [0.73555]	0.323851 (0.48197) [0.67193]	1.442016 (1.10874) [1.30059]
D(LNEXV(-2))	0.277954 (0.79520) [0.34954]	-0.151910 (0.30125) [-0.50426]	-32.13105 (64.8124) [-0.49575]	-0.103880 (0.52365) [-0.19838]	-0.124602 (0.35628) [-0.34973]	-1.192169 (0.81961) [-1.45456]
D(LENXR(-1))	0.007260 (0.01471) [0.49342]	-0.000977 (0.00557) [-0.17531]	-2.612177 (1.19917) [-2.17832]	-0.001729 (0.00969) [-0.17843]	-0.001014 (0.00659) [-0.15388]	-0.011745 (0.01516) [-0.77449]
D(LENXR(-2))	-0.004600 (0.00983) [-0.46799]	-0.002447 (0.00372) [-0.65729]	-1.602280 (0.80110) [-2.00011]	-0.003432 (0.00647) [-0.53019]	-0.001307 (0.00440) [-0.29689]	0.004599 (0.01013) [0.45393]
D(LNNER(-1))	-1.656546 (1.91183) [-0.86647]	0.101146 (0.72427) [0.13965]	268.4267 (155.822) [1.72264]	0.146242 (1.25896) [0.11616]	0.404174 (0.85658) [0.47185]	1.502248 (1.97050) [0.76237]
D(LNNER(-2))	0.781520 (1.48274) [0.52708]	0.459897 (0.56172) [0.81873]	149.1528 (120.850) [1.23420]	0.529644 (0.97640) [0.54244]	0.350397 (0.66433) [0.52744]	0.024803 (1.52825) [0.01623]
D(LNRER(-1))	-0.365876 (2.03008) [-0.18023]	-0.284495 (0.76907) [-0.36992]	-243.3330 (165.460) [-1.47065]	-0.498764 (1.33683) [-0.37309]	-0.568304 (0.90956) [-0.62481]	-1.387236 (2.09238) [-0.66300]
D(LNRER(-2))	-1.247459 (1.20540) [-1.03489]	-0.355880 (0.45665) [-0.77933]	-131.4364 (98.2453) [-1.33784]	-0.563052 (0.79377) [-0.70934]	-0.495921 (0.54007) [-0.91825]	1.379714 (1.24239) [1.11053]
D(LNFXINT(-1))	-0.304083 (0.18377) [-1.65473]	-0.013773 (0.06962) [-0.19784]	1.976935 (14.9777) [0.13199]	-0.025959 (0.12101) [-0.21452]	-0.015927 (0.08233) [-0.19344]	-0.357651 (0.18940) [-1.88829]
D(LNFXINT(-2))	-0.188151 (0.17914) [-1.05032]	0.062685 (0.06786) [0.92369]	0.257164 (14.6005) [0.01761]	0.092712 (0.11796) [0.78594]	0.085778 (0.08026) [1.06874]	-0.240083 (0.18463) [-1.30032]
R-squared	0.326204	0.470014	0.378947	0.199697	0.361236	0.542702

Source: Eview Output 2025

The Vector Error Correction Model (VECM) estimates reveal the existence of a long-run equilibrium relationship among government debt, exchange-rate volatility, exchange-rate levels (nominal and real), and foreign exchange market interventions in Nigeria. The error [jmsrcifmsts@gmail.com](mailto:jmsrcifmsts@gmail.com)



correction coefficient for government debt ( $D(LNGDB)$ ) is  $-0.1803$ , indicating that deviations from the long-run equilibrium are partially corrected each period. Although the associated t-value ( $-1.4712$ ) suggests marginal statistical significance, the negative sign confirms that when government debt diverges from its long-run trajectory, approximately 18% of the disequilibrium is corrected in the subsequent period, consistent with error correction theory (Engle & Granger, 1987; Gujarati & Porter, 2021). This indicates that adjustment towards equilibrium occurs, but the process is gradual, reflecting persistent external shocks and structural fiscal pressures.

In the short run, lagged exchange-rate volatility ( $D(LNEXV(-1))$ ) has a positive coefficient of 1.2581 on government debt, suggesting that increases in volatility tend to elevate domestic borrowing in subsequent periods. This observation aligns with the empirical findings of Nwafor and Aluko (2022), who highlight that heightened currency uncertainty in Nigeria increases the government's reliance on domestic debt to finance deficits and buffer against external shocks. The result also resonates with recent developments: Nigeria's public debt rose from ₦121.7 trillion in 2024 to about ₦149.4 trillion in early 2025, with external debt in dollar terms reaching approximately US\$46 billion (Debt Management Office, 2025; CBN, 2025). The sharp depreciation of the naira over the same period amplified the naira-denominated cost of external debt, corroborating the VECM finding that volatility drives borrowing.

Nominal and real exchange rates (NER and RER) show heterogeneous short-run effects on government debt, with some lagged coefficients positive and others negative, but generally statistically insignificant. This suggests that short-term movements in exchange-rate levels alone have limited direct influence on domestic borrowing decisions, in line with observations by Okereke and Eze (2021), who note that it is the uncertainty or volatility of the currency rather than its absolute level that drives fiscal responses. Similarly, foreign exchange market interventions (FXINT) exhibit a negative but modest effect on government borrowing, implying that central bank interventions may occasionally alleviate borrowing pressures by stabilising the naira, although these effects are limited in magnitude.

The  $R^2$  values, ranging from 0.20 to 0.54, indicate that the model explains a moderate portion of the variation in each variable. Given the complexity of Nigeria's macroeconomic environment, which is influenced by oil price fluctuations, global financial conditions, and structural revenue challenges, these results are plausible (Akinlo & Emmanuel, 2023).



The VECM results highlight that exchange-rate volatility and FX interventions are important determinants of Nigeria's sovereign borrowing dynamics. Persistent volatility elevates debt servicing costs and constrains fiscal flexibility, while FX interventions provide only partial relief. These findings underscore the importance of robust exchange-rate risk management, prudent debt structure planning, and effective fiscal buffers to mitigate currency-induced debt vulnerabilities (Okonkwo, 2022; Nwafor & Aluko, 2022).

### **Conclusion and Recommendations**

This study investigated the impact of exchange-rate volatility on Nigeria's sovereign borrowing costs using a Vector Error Correction Model (VECM) framework. The findings indicate that Nigeria's government debt dynamics are significantly influenced by currency market fluctuations. Specifically, lagged exchange-rate volatility was found to exert a positive effect on domestic borrowing, suggesting that heightened currency risk compels the government to rely more on domestic debt to meet fiscal obligations. The error correction mechanism further revealed that deviations from the long-run equilibrium in debt and exchange-rate relationships are partially corrected over time, albeit at a relatively slow pace. This slow adjustment underscores the persistence of macroeconomic imbalances induced by currency shocks.

Additionally, nominal and real exchange rates, as well as foreign-exchange interventions, showed heterogeneous and generally weak short-run effects on borrowing. This suggests that while FX interventions can occasionally alleviate fiscal pressures, their effectiveness is limited by structural weaknesses in export earnings, shallow non-oil revenue mobilization, and recurring foreign-exchange shortages. Overall, the study confirms that exchange-rate volatility is a potent determinant of Nigeria's sovereign risk profile, influencing both the cost and composition of public debt, and reinforcing the country's vulnerability to external shocks.

Based on the findings, the study proposes the following recommendations:

1. The Central Bank of Nigeria should adopt more proactive and strategic foreign-exchange market interventions aimed at reducing excessive volatility. This may include targeted FX auctions, currency hedging mechanisms, and improved coordination with fiscal authorities to stabilize macroeconomic conditions.
2. The government should consider diversifying its debt portfolio to balance domestic and foreign currency obligations. Reducing over-reliance on external debt



denominated in US dollars or other foreign currencies can mitigate the impact of naira depreciation on debt servicing costs.

3. Improving domestic revenue sources beyond oil, such as taxation and other fiscal instruments, would reduce dependence on borrowing and provide a buffer against exchange-rate shocks.
4. The use of financial instruments such as currency swaps, forward contracts, or other hedging mechanisms can protect the government against sharp exchange-rate movements, lowering the risk premium demanded by international investors.
5. Policymakers should integrate macroeconomic forecasting and stress-testing into debt management strategies, ensuring that fiscal planning accounts for potential currency fluctuations and external shocks. This will support sustainable borrowing and improve Nigeria's sovereign creditworthiness,
6. Further empirical studies should be conducted to continuously assess the evolving relationship between exchange-rate volatility and sovereign borrowing costs, particularly in light of post-2023 FX market reforms and global interest rate fluctuations.



## REFERENCES

- Adebayo, A., & Inekwe, J. (2022). *Exchange rate volatility and fiscal sustainability in emerging economies*. Nigerian Economic Review.
- Adegbite, T., & Ayadi, F. (2022). Currency fluctuations and sovereign debt management in Africa. *Journal of African Finance*, 14(2), 45–63.
- Adeniran, O., & Egwuenu, E. (2023). The impact of exchange rate risk on public debt servicing in Nigeria. *African Journal of Economic Studies*, 19(1), 78–95.
- Adler, G., Lisack, N., & Mano, R. (2021). *Sovereign borrowing costs and currency risk: Evidence from developing countries* (IMF Working Paper No. 21/98). International Monetary Fund.
- Ahmed, S., & Lledo, V. (2023). Exchange rate volatility and debt sustainability in emerging markets. *World Bank Policy Research Working Paper*, 10456.
- Aizenman, J. (2023). Global financial conditions and exchange rate exposure in emerging economies. *Journal of International Money and Finance*, 125, 102738. <https://doi.org/10.1016/j.jimonfin.2023.102738>
- Aizenman, J., Jinjara, Y., & Marion, N. (2022). Exchange rate fluctuations and sovereign borrowing costs: Evidence from Asia and Africa. *Emerging Markets Review*, 51, 100842. <https://doi.org/10.1016/j.ememar.2021.100842>
- Akinlo, A. E., & Emmanuel, O. (2023). Exchange rate fluctuations and government debt sustainability in Nigeria. *Journal of African Economic Studies*, 12(3), 45–63.
- Amewu, K. (2024). Foreign exchange interventions and debt management in sub-Saharan Africa. *African Finance Journal*, 26(1), 23–41.
- Asteriou, D., & Pilbeam, K. (2021). *Applied econometrics* (3rd ed.). Palgrave Macmillan.
- Bahmani-Oskooee, M., & Xi, C. (2020). Exchange rate volatility and macroeconomic variables in emerging markets. *Economic Modelling*, 91, 30–43. <https://doi.org/10.1016/j.econmod.2020.02.005>
- Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics*, 31(3), 307–327. [https://doi.org/10.1016/0304-4076\(86\)90063-1](https://doi.org/10.1016/0304-4076(86)90063-1)
- Bua, I., & Kabir, R. (2022). Sovereign debt and exchange rate exposure in Africa. *African Journal of Economic Policy*, 29(2), 55–72.
- Central Bank of Nigeria (CBN). (2023). *Annual economic report 2023*. CBN Press.
- Central Bank of Nigeria (CBN). (2025). *Monthly economic report, March 2025*. CBN Press.
- Cheung, Y., & Sengupta, R. (2021). Exchange rate volatility and sovereign debt: Evidence from emerging markets. *Emerging Markets Review*, 48, 100801. <https://doi.org/10.1016/j.ememar.2020.100801>
- Chinn, M. D. (2006). The predictive power of purchasing power parity. *Journal of International Money and Finance*, 25(5), 620–638. <https://doi.org/10.1016/j.jimonfin.2005.11.002>
- Chukwuemeka, E., & Ijeoma, N. (2020). Exchange rate dynamics and external debt servicing in Nigeria. *African Journal of Economic Policy*, 27(1), 34–52.
- Debt Management Office (DMO). (2023). *Annual debt report 2023*. Abuja: DMO.
- Debt Management Office (DMO). (2024). *Quarterly public debt statistical bulletin, Q4 2024*. Abuja: DMO.
- Debt Management Office (DMO). (2025). *Public debt statistical bulletin, Q1 2025*. Abuja: DMO.
- Dominguez, K. M., & Frankel, J. (1993). Does foreign exchange intervention matter? *The Portfolio Balance Approach*. National Bureau of Economic Research Working Paper No. 4500.



- Dornbusch, R., Fischer, S., & Startz, R. (2021). *Macroeconomics* (14th ed.). McGraw-Hill Education.
- Edwards, S. (1989). Exchange rate misalignment in developing countries. *World Bank Economic Review*, 3(3), 227–265. <https://doi.org/10.1093/wber/3.3.227>
- Eichengreen, B., & Hausmann, R. (2021). Currency mismatches, debt, and sovereign risk. *Journal of International Economics*, 131, 103500.
- Emenike, A. (2022). Exchange rate shocks and fiscal performance in Nigeria. *Nigerian Journal of Economics*, 15(2), 55–73.
- Engel, C. (2016). Exchange rates, interest rates, and the risk premium. *American Economic Review*, 106(2), 436–474.
- Engle, R. F. (1982). Autoregressive conditional heteroskedasticity with estimates of the variance of United Kingdom inflation. *Econometrica*, 50(4), 987–1007. <https://doi.org/10.2307/1912773>
- Engle, R. F. (2020). Dynamic conditional correlation: A simple class of multivariate GARCH models. *Journal of Business & Economic Statistics*, 8(3), 1–12.
- Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica*, 55(2), 251–276. <https://doi.org/10.2307/1913236>
- Ezeaku, P., & Asogwa, S. (2022). Fiscal sustainability and exchange rate volatility in Nigeria. *International Journal of Economics and Finance*, 14(4), 101–119.
- Ezeaku, P., Asogwa, S., & Nwosu, M. (2021). Exchange rate fluctuations and sovereign debt cost: Evidence from Nigeria. *African Journal of Finance*, 12(1), 88–105.
- Feng, Y. (2021). Exchange rate volatility and government debt dynamics. *Emerging Markets Finance and Trade*, 57(11), 3173–3189.
- Froot, K. A., & Thaler, R. (1990). Anomalies: Foreign exchange. *Journal of Economic Perspectives*, 4(3), 179–192.
- Goyal, R. (2023). Exchange rate risk and sovereign debt: A panel analysis of emerging economies. *International Review of Economics & Finance*, 81, 345–359.
- Gujarati, D. N., & Porter, D. C. (2021). *Basic econometrics* (6th ed.). McGraw-Hill Education.
- International Monetary Fund (IMF). (2022). *World economic outlook database, October 2022*. IMF.
- International Monetary Fund (IMF). (2023). *Fiscal monitor: Debt sustainability analysis*. IMF.
- International Monetary Fund (IMF). (2024). *Global financial stability report, April 2024*. IMF.
- Keynes, J. M. (1923). *A tract on monetary reform*. Macmillan.
- Kose, M. A., Ohnsorge, F., & Sugawara, N. (2021). Global growth and capital flows. *Journal of International Money and Finance*, 112, 102367.
- Lane, P. R., & Milesi-Ferretti, G. M. (2020). International financial integration: Theory and evidence. *Journal of Economic Literature*, 58(2), 371–453.
- Mbaye, S., Badia, M., & Chae, K. (2018). Debt dynamics in low-income countries: Emerging issues. *IMF Working Paper No. 18/35*.
- Nwafor, J., & Aluko, T. (2022). Exchange rate volatility and fiscal financing in Nigeria. *Nigerian Journal of Economics and Finance*, 8(2), 112–130.
- Obi, E., Okafor, F., & Ugwuegbu, O. (2021). Sovereign debt, exchange rate shocks, and fiscal sustainability. *African Economic Research Consortium, Policy Paper 45*.
- Ogbonna, G., & Okoro, I. (2022). Foreign exchange interventions and government debt in Nigeria. *Journal of African Financial Studies*, 10(1), 55–74.



Taraba State University, Jalingo  
Faculty of Management Sciences

ISSN NO. 1118-3527 for "*Journal Of Management Science Research and Contemporary Issues*  
(*JMSRCI*) Vol 2 (2), 2025

- Okereke, V., & Eze, P. (2021). The effect of currency fluctuations on domestic borrowing: Evidence from Nigeria. *African Development Review*, 33(1), 89–106.
- Okonkwo, M. (2022). Sovereign debt, currency risk, and fiscal sustainability in emerging economies. *Journal of Fiscal Studies*, 19(4), 233–250.
- Onanuga, A., & Oseni, T. (2022). Exchange rate volatility and debt servicing in Nigeria. *Nigerian Journal of Economic Policy*, 28(2), 101–119.
- Panizza, U., & Presbitero, A. F. (2014). Public debt and economic growth: Is there a causal effect? *Journal of Macroeconomics*, 41, 21–41.
- Wang, H. (2024). Sovereign borrowing costs and exchange rate dynamics in emerging markets. *Emerging Market Finance Journal*, 36(2), 77–98.
- World Bank. (2022). *Global economic prospects, June 2022*. World Bank Group.
- World Bank. (2024). *Debt sustainability analysis for Nigeria*. World Bank Group.
- Yakub, M. (2015). Exchange rate policy and debt servicing in Nigeria. *Journal of Economic Management*, 7(2), 23–41.