Journal of Economics and Behavioral Studies (ISSN: 2220-6140)
Vol. 17, No. 1, pp. 43-54, March 2025

Institutional Environment and the Quest for Stable Exchange Rate in Nigeria

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Abstract: This research empirically investigates the influence of Nigeria's institutional environment on exchange rate stability using annual data from 1981 to 2023. The study uses co-integration analysis to find a co-movement between exchange rate volatility and the institutional environment measures (measured by political risk and the unpredictability of revenue sources), with the expansion of the financial sector and adjustments to exchange rate policy serving as control variables. Political risk and the unpredictability of revenue sources have a positive and substantial short- and long-term impact on Nigeria's exchange rate volatility. The results suggest that exchange rate policy only has a negative and significant impact on exchange rate volatility over the long period, while financial sector expansion has a positive but insignificant influence in both periods. The causation test reveals a unidirectional correlation between the volatility of revenue sources and the volatility of currency rates, even though there is a bidirectional association between exchange rate volatility and both political risk and revenue source volatility. This suggests that the institutional environment is endogenous to the volatility of Nigeria's currency rate. The findings suggest that restructuring Nigeria's political system and diversifying its economy away from its reliance on oil could stabilize currency rate volatility and mitigate the effects of demand fluctuations and global oil price fluctuations.

Keywords: *Exchange rate, Institution, Political risk, exchange rate policy, financial sector development*

1. Introduction

One significant macroeconomic factor that affects a nation's economy is the exchange rate. It is the rate at which one's currency gets converted to another. Wide-ranging effects on growth may result from an open economy in which the demand for foreign currency outpaces the supply of exchange rate and economic activity (Schnabl, 2007). Nigeria relies on imports of technology, raw materials, and other associated goods to support its economy; the strain on foreign exchange resulting from a lack of foreign earnings to meet demand has frequently caused exchange rate volatility. Like other economies throughout the world, Nigeria's economy has suffered over time from the impact of consistently fluctuating exchange rates when compared to more developed nations. The currency rate has frequently been volatile as a result of not having enough foreign revenues to meet demand. Emerging markets like Nigeria attach importance to exchange rates because they determine the degree of uncertainty that characterizes their markets and the necessity of lowering the expenses and hazards related to foreign exchange transactions. A stable exchange rate depends on the level of industrialization, which can accelerate structural change and economic diversification, among other things.

Despite the implementation of many exchange rate policy regimes in Nigeria with the expectation that the economy would respond favorably, the attempt to stabilize the country's economy through exchange rate stability has failed (International Monetary Fund, 2021; World Bank, 2023). In the 1990s, Nigeria, in particular and Africa in general, implemented policy reforms that tended to rely on only macroeconomic conditions and the exchange-rate regime chosen by them; this cannot be said to be the case with Nigeria.

Policy measures aimed at addressing the economic challenges in Nigeria have had limited success, as the exchange rate remains volatile and unresponsive to the policies. Notable examples include the Inter-Bank Foreign Exchange Market (IFEM), which opened on October 25, 1999; the Autonomous Foreign Exchange Market (AFEM), established in 1995; and the Structural Adjustment Program (SAP), which was started in 1986. To assist the Naira in achieving a fair exchange rate, the IFEM was designed. However, like the AFEM, the IFEM's operations were disrupted due to supply-side constraints, ongoing expansionary fiscal policies, and the persistent excess liquidity in the system. As a result, a policy change occurred on July 22, 2002, when foreign exchange demand pressures increased and external reserves continued to decline. The apex bank reintroduced

the Dutch Auction System (DAS) to replace the IFEM. The goal was to establish a more realistic exchange rate for the Naira, control excessive foreign exchange demand, preserve volatile external reserves, and stabilize the exchange rate (Imoisi, Uzomba & Olatunji, 2010).

The exchange rate unification reform, which was implemented recently in 2023, was to combine all exchange rates into a single market-determined exchange rate to facilitate price discovery and transparency in the foreign exchange market, among other reasons. Regretfully, it is challenging to pinpoint the precise effects of exchange rate unification because Nigeria did so during a period of high inflation, a significant budget and balance of payments deficit, high government borrowing, high energy prices as a result of the removal of fuel subsidies, low government revenue, and a shortage of foreign exchange (FX). The success of Nigeria's currency rate unification process could be impacted by these unfavorable economic realities. (Ozili, 2024)

In a well-functioning market economy, a flexible exchange rate system is ideal, as exchange rates typically fluctuate around an equilibrium value, with excessive volatility generally arising only from occasional business cycles. However, for a developing, oil-dependent, open economy like Nigeria, adopting a flexible exchange rate would lead to significant volatility in the exchange rate between the domestic currency and the internationally referenced U.S. dollar for several reasons. First, as an oil-dependent economy, Nigeria's exchange rate is heavily influenced by global oil prices, which are determined externally. Factors such as OPEC's quota system, artificial controls on global oil prices, and competitive strategies during oil surpluses contribute to market inefficiencies that affect exchange rates. These dynamics would have substantial implications for Nigeria's exchange rate. Second, as a small, open economy, Nigeria is a price taker in the international market and more likely to follow global market trends. This results in high exchange rate volatility. Thus, a flexible exchange rate system would be detrimental to Nigeria's balance of payments. Finally, Nigeria's status as a developing economy suggests it lacks the necessary collateral resources to control the shocks from a market-driven system, further exacerbating exchange rate volatility.

Stylized facts in Nigeria suggest that exchange rate stability appears to be less affected by increased macroeconomic stability. In 2014, Nigeria's economy grew to be the biggest in Africa and the 26th largest globally. It is currently the ninth-largest exporter worldwide. Nigeria has mostly fallen short of the expectations following the initial oil boom in the 1970s despite these enormous potentials. The nation has had difficulty meeting its macroeconomic objectives, which include raising living standards, lowering unemployment, and managing inflation. During the period under review, throughout the 1980s and until 2023, the value of the naira fluctuated. It fluctuated around N 0.61 to N 3.57 from 1980 to 1990, and from 1991 to 2000, it fluctuated around N 21.886 to N 65.047 against the US dollar. Between 2001 and 2010, it continues to fluctuate around N 118.97 to N 198.65. The intended outcome of the policy to salvage the situation was not achieved, as it continued to oscillate between 2011 and 2024 from N 157.5 to N 1,533. (CBN, 2023). Some economists and financial analysts have posited that exchange rate intervention has been underpricing (that is, undervaluing) or overpricing (that is, overvaluing) the domestic currency and that the efforts to correct these imbalances would even introduce more volatility.

The situation outlined above clearly highlights the need to assess how macroeconomic policies contribute to supporting and stabilizing the exchange rate. Specifically, it raises the issue of whether the macroeconomic environment, together with the reforms implemented in Nigeria, is sufficient to ensure exchange rate stability. To establish a macroeconomic policy framework that supports sustainable economic growth and diversification, Fischer (1993) outlined five essential prerequisites. These consist of a controllable balance of payments, a low and steady rate of inflation, a real exchange rate that is competitive and predictable, a fiscal policy that is steady and sustainable, and an appropriate real interest rate. Thus, attaining exchange rate stability requires a robust macroeconomic strategy in addition to other elements. We add the significance of the institutional environment to Fischer's (1993) criteria, recognizing that weak institutions frequently cause problems for emerging nations.

Prior research has mostly concentrated on the link between exchange rate swings and policy volatility, suggesting that a stable economic policy environment is necessary to sustain exchange rate stability. For example, Mirchandani (2013) used correlation analysis to examine macroeconomic factors affecting exchange rate volatility in India and discovered a close connection between inflation and currency rates. Ismaila (2016)

investigated how exchange rate depreciation affected Nigeria's economy after the implementation of structural adjustment programs (SAP) and discovered that net exports, total government spending, and the broad money supply all had a major long-term impact on real output. However, findings depict exchange rate depreciation did not significantly affect Nigeria's economic growth in either the short or long term and recommended that policymakers avoid relying too heavily on exchange rate depreciation as a growth strategy. Danmola (2013) investigated the influence of exchange rate volatility on Nigeria's macroeconomic variables using least squares and Granger causality tests, recommending the implementation of exchange rate controls after concluding that exchange rate volatility had a major, direct, and substantial impact on economic growth.

Several studies have explored the impact of the institutional environment on exchange rates, with evidence showing a positive connection between the institutional environment and the exchange rates of emerging economies. Studies supporting this positive correlation include those by Meftah and Nassour (2020), Adegboye, Osabohien, Olokoyo, Matthew, and Adediran (2020), Kechhagia and Metaxas (2020), Sakanko, Obilikwu, and David (2020), Yakubu (2019), Aziz (2017), Nguyen (2015), Chaib and Siham (2014), and Chau et al. (2014). However, Jurcic, Franc, and Barisic (2020) found proof of a negative relationship between the exchange rate shocks and the institutional environment. Another important factor influencing exchange rates is the export dynamics of a country, which has led to studies examining the effect of institutions on export performance. Research by Lin, Flachsbarth, and von Cramon-Taubadel (2018) and Chetthamrongchai, Jermsittiparsert, and Saengchai (2020), among others, found a positive relationship between institutional environment and exports in developing countries, while Mehrara and Keikha (2013) reported the opposite. Jama (2020) simply identified a relationship between the two variables. Additionally, Lin, Lin, Wang, and Wu (2021) examined the quality of exports and found that a stronger institutional environment enhances the quality of a country's export commodities.

Bouraouri and Hammami (2017) examined the relationship between currency rates and institutional quality, which is a measure of political instability, in five Arab Spring nations. From 1991 to 2009, using panel pool data (PPD). Their findings showed that political instability negatively affected both the value and volatility of the domestic currencies in these nations. Similarly, Culiuc and Kyobe (2017) examined the influence of institutions, measured by the Ease of Doing Business, on real exchange rates in several developing countries from 1990 to 2003, employing Structural Vector Autoregression (SVAR). They discovered a robust correlation between the real exchange rate and several measures of ease of doing business. In another study, Belke and Vogel (2015) explored the linkage between exchange rate regimes and institutions (represented by economic freedom) in selected sub-Saharan African countries from 1992 to 2011, using fully modified ordinary least squares. Their findings showed that external liberalization and exchange rate arrangements had a negative association, with more advantageous regulatory business environments positively affecting investment, financial, and labor market sectors.

This research contributes to the corpus of empirical research by examining how Nigeria's attempts to attain exchange rate stability are impacted by the institutional context. A key gap in previous research on Nigeria is the limited focus on how the institutional environment influences exchange rate stabilization efforts in Nigeria. Despite various policies and reforms designed to address structural weaknesses, these efforts have largely not succeeded. The institutional environment, which may act as a conduit for policies and reforms that result in naira stability, is probably being overlooked. This forms the foundation of the current study. Another notable gap in prior research is the failure to account for potential time series breaks in data, which could compromise the reliability of their conclusions. This study addresses that issue. While earlier studies on Nigeria have separately studied the effects of policy and institutions on exchange rates to assess their combined effect on exchange rate volatility, this article integrates both components into a single framework. The paper's structure after the introduction is as follows: Section 2 outlines the methodology; Section 3 presents and discusses the empirical data and the final section offers the conclusion.

2. Methodology

Data set and description of variables

The analysis utilizes annual data from 1981 to 2023; this period is significant as it brings to fruition the imperative of an investigation into the nature and dynamics of the institutional environment and exchange rate

stability in Nigeria. Data were sourced from a variety of published sources. The residuals of a regression on the nominal exchange rate in a univariate generalized autoregressive conditional heteroscedasticity (ARCH) model are used to calculate exchange rate volatility; the study employs a second-generation governance indicator for the institutional context, namely, the political risk index and revenue source volatility. Three key benefits come from using second-generation governance indicators: (1) they have operational significance. , (2) they are suitable for in-depth quantitative research, and (3) they are politically acceptable. The analysis utilizes data from the International Country Risk Guide (ICRG, 2023) and the Central Bank of Nigeria's (CBN, 2023) Statistical Bulletin. The choice to focus on the political risk index and revenue source volatility is founded on two primary factors in the study. First, it evaluates the ability and efficacy of social institutions, taking into account the accomplishments of government initiatives and the level of public policy satisfaction. Therefore, the institutional environment's ability to deliver essential public services is vital for a country's pursuit of its macroeconomic goals. Second, there is no doubt that the composite index of political risk index is imperious to economic outcomes, as demonstrated in prior empirical studies on Nigeria (Kimberly, 2014; Ayinde, 2020).

The control variables used in the study are changes in exchange rate policy and financial sector development. The choice of these two variables is premised on one main reason. First, it is instructive to note that the Nigerian economy has witnessed many exchange rate policies owing to the various systems adopted and the different foreign exchange rate market structures (Ayinde, 2020). It is not out of place that whenever the monetary authority adopts a different exchange rate policy, the foreign exchange rate market will be distorted, at least in the short run, and if this distortion persists, it will lead to naira volatility in tandem with the international reference currency. Second, financial sector development remains one of the collateral effects of growth development for every economy (Ehigiamusoe and Lean, 2019). The extent to which the financial sector is developed determines how financial products would be valued in terms of price and variety. In a well-developed financial sector, the price of financial products is appreciably low, and there are many varieties of financial products. The information was taken from the Central Bank of Nigeria's Annual Statistics (CBN, 2023).

Model specification and estimation procedure

Stemming from the theoretical framework, the model's functional form is specified as follows:

$$\Delta InERVOL_t = \beta_0 + \sum_{i=l}^{\rho} \Phi_1 \, \Delta lnERVOL_{t-1} + \sum_{i=0}^{\rho} \phi_1 \, \Delta lnPOLITR_{t-i} + + \sum_{i=0}^{\rho} \mathrm{d}_1 \, \Delta InRESV_{t-i} + \sum_{i=0}^{\rho} \delta_1 \, \Delta lnEXRP_{t-i} + \sum_{i=0}^{\rho} \delta_1 \, \Delta ln(FSD)_{t-i} + \gamma_5 ECT_{t-1} + \mu_t - -(1)$$

The control variable in Equation 1 above is proxied by changes in exchange rate policy (ΔEXRP) and the depth of financial sector development. $(\frac{M_2}{GDP})$. The measure of exchange rate volatility is the residual obtained from the GARCH (1, 1) estimation of a univariate autoregressive model of the nominal exchange rate. In a generic sense, a GARCH (1, 1) model is specified as;

$$y_t = \mu_t + u_t \quad (2)$$

Where;

$$\mu_t = 0(cons\tan t); \; u_t = \sigma_t \varepsilon_t$$

$$y_t = u_t = \sigma_t \varepsilon_t \quad (3)$$

$$Var(y_t \mid y_{t-1}) = \sigma_t^2 = \alpha_1 + \alpha_2 y_{t-1}^2 + \beta_1 \sigma_{t-1}^2; \alpha_1 >= 0; \alpha_2 >= 0$$

$$\varepsilon_t \sim i.i.d(\mu = 0, \sigma^2 = 1) \quad (4)$$

$$y_t = u_t = (\alpha_1 + \alpha_2 y_{t-1}^2)\varepsilon_t \quad (5)$$

A GARCH (1, 1) model models the variance over time t using the values of previous squared observations and variances. Where α_1 Is the offset term that denotes the lowest which the variance can assume at any point in time; σ_{t-1}^2 Is the instantaneous variance at time t-1? The restrictions $\alpha_1 >= 0; \alpha_2 >= 0$ Are imposed to avoid

negative variance. The variance of the series at time t is predicted by the lag value of the variable. As is the case, the variance of the series is the focus for exchange rate volatility if we assume that the mean value equals zero.

$$exr_t = u_t = (\alpha_1 + \alpha_2 exr_{t-1}^2)\varepsilon_t \quad (6)$$

Exchange rate volatility is first extracted from a univariate generalized autoregressive conditional heteroscedasticity (GARCH) framework as the first stage in the two-step estimation process. A pre-estimation test is a necessary condition before estimating the model. This was done by carrying out a unit root test using two stationarity techniques, i.e. Ng and Perron (2001) and Kwiatkowski-Philips-Schmidt-Shin (1992) tests were considered for the purpose. Perron and Vogelsang (1992) and Zivot and Andrews (1992) focus on unit root tests with structural breaks, the decision to use these tests was driven by the specific challenges encountered in most time series data. Overall, the use of four-unit root tests aims to enhance robustness, facilitate comparison, and prevent potential spurious regression results. The method of analysis used is the Autoregressive Distributed Lag (ARDL) model because it delivers more robust results, especially with small datasets. Banerjee and associates (1993). The ARDL model can be linearly transformed into a dynamic model. The first step is to examine the co-movement between the variables. In doing this, a Wald test was conducted to determine whether co-movement exists. To determine the rate of adjustment and equilibrium, the long-term connection was estimated first, followed by the short-term coefficient using the ARDL specification's error correction representation.

The modified paired Granger causality test Precisely, the Toda and Yamamoto (1995) test is employed in this investigation. This framework is based on an enhanced VAR model and employs a modified Wald test statistic. The TY method is a modified VAR model applied within a multivariate context, accommodating series with different integration orders. The primary benefit of this causation approach is that, unlike traditional Granger causality, the TY framework provides greater power when handling series with varying integration levels (Lawal et al., 2023). This enhances the likelihood of accurate model specification and reduces the risk of spurious causality. The bivariate model is stated as follows:

$$y_{1t} = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} y_{1t-i} + \sum_{j=k+1}^{k+d_{\max}} \alpha_{2j} y_{1t-j} + \sum_{i=1}^{k} \delta_{1i} y_{2t-i} + \sum_{j=k+1}^{k+d_{\max}} \delta_{2j} y_{2t-j} + \upsilon_{1t}$$

$$y_{2t} = \beta_0 + \sum_{i=1}^{k} \beta_{1i} y_{1t-i} + \sum_{j=k+1}^{k+d_{\max}} \beta_{2j} y_{1t-j} + \sum_{i=1}^{k} \phi_{1i} y_{2t-i} + \sum_{j=k+1}^{k+d_{\max}} \phi_{2j} y_{2t-j} + \upsilon_{2t}$$

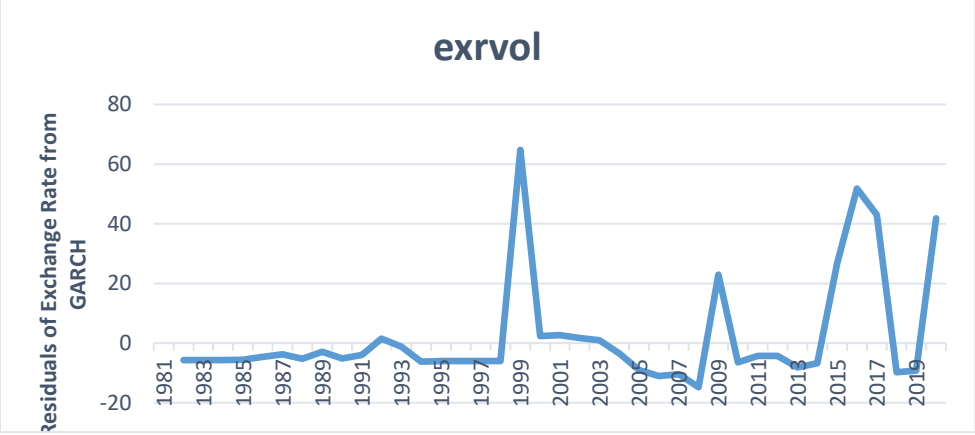
Where the ideal lag length is indicated by k, the maximum order of integration, or AIC and SIC, are among the common information factors that determine this. Once the orders of integration of each variable have been obtained, this will be ascertained.

3. Results and Discussion

The trend depicted in Figure 1 shows that exchange rates in Nigeria were relatively stable between the periods 1981 and 1986 and 1994 and 1998. The former period coincides with the period before the commencement of SAP in Nigeria, while the latter period relates to the time when the exchange rate was fixed. It was during the height of military incursion in Nigeria under General Sani Abacha. The general ruled Nigeria between 1993 and 1998. Aside from these two periods, however, indications of substantial fluctuations in currencies are seen in Nigeria in all other periods. Specifically, there was exchange rate volatility in the country somewhere between 1998 and 2000, 2008 and 2010, and 2014 and 2018 and since 2019. These periods are periods of high exchange rate spikes in Nigeria, and the exchange rate during these periods witnessed acute depreciation of the domestic currency. The period 1998 – 2000 birthed democratic dispensation in Nigeria; the period 2008 – 2010 signaled the era of the global economic cum financial crisis and the period between 2014 and 2018 witnessed another period of acute exchange rate depreciation in Nigeria. During this period, there was an economic recession and a stock market crash in Nigeria. Also, the COVID-19 pandemic has dire consequences on the stability of the exchange rate in Nigeria. Remarkably, only the period between 2004 and 2008 suggests that exchange in Nigeria witnessed acute appreciation. This period coincides with the period of banking sector reforms in the country. The bank recapitalization exercises that herald a series of mergers and acquisitions in Nigeria led to the inflow of foreign capital. This led to an excessive supply of the foreign currency of the United States dollar

over the demand. This leads to currency appreciation as the price (i.e., the exchange rate) of the domestic currency in terms of the foreign currency falls.

Figure 1: Exchange Rates Trend



The correlation matrix in Table 1 details the coefficients of correlation between the variables. The principal diagonal elements are the correlation coefficients of the variable on itself. These coefficients are unity (that is, 1). The upper triangular matrix and lower triangular matrix are the same, indicating both the direct and reverse causality among the variables. The correlation coefficients indicate that there is no issue with the series' collinearity or multicollinearity, as none of the correlation coefficients attain the 0.90 threshold. The correlation coefficient between revenue source volatility (RSV) and the growth of the financial sector is determined by the ratio of the gross domestic product to the broad money supply. (M2_GDP), is 0.83, this is still marginally less than the 0.90 threshold value for collinearity. This indicates that the correlation between these two respective variables is positively strong but could not warrant the problem of collinearity or multicollinearity since these coefficients are lesser than the 0.90 threshold value.

Table 1: Correlation Matrix

Variables	EXCERPT	EXRVOL	M2_GDP	POLIT_RISK	RESV
EXRP	1.00	0.10	0.17	-0.04	0.33
EXRVOL	0.10	1.00	0.28	0.09	0.27
M2_GDP	0.17	0.28	1.00	-0.16	0.83
POLIT_RISK	-0.04	0.09	-0.16	1.00	-0.22
RESV	0.33	0.27	0.83	-0.22	1.00

Sources: Author's Computation

The results from Ng and Perron, shown in Table 2 with trend and intercept, provide evidence that the variables display a heterogeneous order of integration; since none of the variables are integrated at order 2, it is logically reasonable to conclude that both results lead to the same outcome. Furthermore, Table 3 results show that for EXRVOL, POLITI-RISK, REVS, and M2_GDP, the break dates are generally stable, except for RESV and EXRVOL. For these variables, the break year is identified as 2013 with an intercept and 2010 for EXRVOL, while 1999 with an intercept and 2016 with both trend and intercept are reported for EXRVOL.

Table 2: Unit Root Test Result (with intercept and linear trend)

Variable	NG&PERRON	KPSS	order of int
EXRVOL	-8.1000	0.081	I (1)
EXRP	-5.2020	0.133**	I (0)
M2_GDP	-3.4111	0.133**	I (1)
POLIT_RISK	-8.9388	0.099	I (0)
RESV	1.5442	0.158**	I (1)
ΔEXRVOL	-17.001**	0.062	I (1)

ΔEXRP	-19.000**	0.045	I (1)
ΔM2_GDP	-14.4862*	0.059	I (1)
ΔPOLT_RISK	-13.8001*	0.079	I (1)
ΔRESV	-10.6397**	0.157	I (1)

Sources: Author's Computation

The outcomes of these tests at the unit root level show two essential implications for modeling. First, the mix of the I (0) and I (1) variables included within the same modeling framework supports the use of an autoregressive distributed lag (i.e., ARDL) model. Again, the presence of structural fractures lends credence to the fact that the link between exchange rate volatility and the institutional environment in Nigeria can also be investigated with the use of symmetric as well as linear models.

Table 3: Structural Break Unit Root Test

	Intercept		Intercept and trend	
Variable	**T-Statistics**	**Break Date**	**T- Statistics**	**Break Date**
EXRVOL	-5.2957*	1999	-5.5861*	2016
POLITE	-6.2171**	1999	-5.8087**	1999
RESV	-5.7643*	2013	-4.6365*	2010
FD	-5.4810**	2007	-5.4486*	2007
EXRP	-3.3752	2010	-3.6741*	2010

Sources: Author's Computation

Long run dynamics

In the long run, as detailed in Table 4, the exchange rate volatility at lag 1 indicates that the autoregressive components of the model are well suited with a -0.407 coefficient and corresponding probability values of 0.030. Even at the 5 percent level, this is noteworthy. The one-period lag effect of exchange rate volatility has a substantial detrimental impact on its present dynamics, according to economic intuition. The findings indicate that both the political risk factor and revenue sources, at their current levels, positively affect exchange rate volatility in Nigeria. Political risk has a 3.249 coefficient and 0.001 probability value, while the corresponding values for revenue source volatility are 8.511 and 0.000, respectively. This suggests that a unit increase in political risk results in a 3.249 unit increase in the exchange rate's volatility, while an increase in revenue source volatility leads to an 8.511 increase in exchange rate volatility. The implication is that the more the increases in these two components of the institutional environment, the more volatile the behavior exhibited by the exchange rate. These two variables aggravate the volatility of the exchange rate in Nigeria. These align with theoretical expositions and empirical evidence obtained from the literature. Evidence for this has been obtained for Nigeria to suggest that sound political culture is required to stabilize the exchange rate in Nigeria. Similarly, revenue source volatility should also be considered if the government intends to lessen exchange rate volatility in the country. This finding also aligns with logic and theoretical expositions. First, it is logical that revenue from oil is the mainstay of the Nigerian economy, and the revenues generated from the source are bound to be volatile as the sales of these oil products are traded at international prices, largely determined by the exchange rate. A preponderance of empirical evidence supports these findings of the effects of the institutional environment in determining the volatility of the exchange rate in Nigeria. These studies include Chau et al. (2014), Freeman et al. (2000), Asteriou and Sarantidis (2016), and Bouraouri and Hammami (2017), among others.

Table 4: Long-Run Result

Variables	Coefficients	T-statistics	Probability
C	-5.920	-2.494	0.030
Exrvol (-1)	-0.407	-2.472	0.031
Polit_risk	3.249	4.320	0.001
Resv	8.511	6.569	0.000
Exrp(-2)	-2.645	-2.853	0.016
M2_gdp	0.674	0.561	0.586
Dummy_exrvol	2.902	2.706	0.020

R^2= 0.951, Adjusted R^2, 0.843, F- Statist 8.85 (0.0000), DW: 2.315

According to estimations for the long term, exchange rate policy has a negative and substantial impact on Nigeria's exchange rate volatility. The exchange rate policy has a coefficient of -2.645, a -2.853 T-statistics value and a 0.016 probability value. Nonetheless, the higher the exchange rate policy, the lower the volatility of the exchange rate in the country. This finding is seriously circumspect, as it tends to suggest that policymakers are not doing enough to ensure that appropriate policy is in place for managing exchange rates toward stability. Heuristically, it is an indication that there is a need for more intentional and proactive policies of exchange rate management in Nigeria. However, the nation's currency rate volatility has been made worse by the degree of financial development, albeit insignificantly. This is evident in the coefficient of 0.674 and probability value of 0.586. The implication is that for the exchange rate to stabilize in Nigeria, there is a need for the financial sector to be developed to provide the needed collateral effects to stimulate investment and enhance growth altogether. Additionally, 2.902 T-statistics and 0.020 related probability values indicate that at the five percent significance level, the dummy variable that the model uses to reflect the structural break problem is significant. The adjusted coefficient of determination (adjusted R-squared) is 0.843. This indicates that the independent variables explained 84.3 percent movement, the remaining 15.7 percent could be explained by extraneous factors beyond the reach of this study. More so, Durbin-Watson statistics of 2.31 indicate that there is no autocorrelation problem in the estimation, as the DW statistics fall within the acceptable threshold of 1.6 – 2.4 for the absence of an autocorrelation problem. The F-statistics value of 8.85 and probability value of 0.000 imply that the model does not suffer any specification bias and or problem. This lends credence to the overall fitness of the model.

Short run dynamics

As seen in Table 5, in the short run, the error correction term (proxied as ECT) is properly signed with a negative value of -0.9113 for the coefficient, a T-statistics value of -11.189 and a corresponding probability value of 0.000. The -0.9113 coefficient of the ECT suggests that about 91% of disequilibrium is corrected in the current year. Hence, there would be a full recovery back to the equilibrium of the exchange rate in less than a year once affected by economic shock. This implies that about 91 percent adjustment to equilibrium is achieved during the recovery period of a year. Also, the lagged exchange rate volatility (proxied as it is) is significant, with a -0.394 coefficient and a 0.002 probability value. This short-term influence is consistent with the long-term, one-period-lag effects on the present exchange rate level. The conclusion is that if the exchange rate had been more volatile the year before, it would be less volatile this year. Additionally, Dummy Exrvol indicates that the coefficient of 2.902 is significant even at the 1 percent level, supporting the idea that structural breaks influence Nigeria's currency volatility. This verifies the ARDL with the structural break analysis technique.

Table 5: Short-run Result

Variables	Coefficients	T-statistics	Probability
D(exrvol(-1)	-0.394	-3.942	0.002
D(poli_risk(-1))	3.249	7.263	0.000
D(M2_gdp(-1))	-0.971	-1.512	0.159
D(resv(-1)	15.071	10.109	0.000
D(extra(-1))	9.533	2.119	0.058
Dummy_exrvol	2.902	7.083	0.000
ECT (-1)	-0.9113	-11.189	0.000

R^2= 0.966, Adjusted R^2=0.930, DW= 2.32,
Sources: Author's computation

When taking into account how the institutional environment affects short-term exchange rate volatility, the findings indicate that political risk and revenue source volatility are positive and impact positively. Specifically, the coefficient of political risk is 3.249 with a 7.263 T-statistics value and a 0.000 probability value. Revenue source volatility has a 15.071 coefficient with a 10.109 T-statistics value and a 0.000 probability value. Also, only the degree of development of the financial industry is insignificant of all the two control variables. In the short term, exchange rate policy has a positive and substantial influence on exchange rate volatility. The coefficient is 9.533 with a 2.119 T-statistics value and a 0.000 probability value. This suggests that a unit rise in exchange rate policy in the short run would aggravate domestic currency volatility. This contrasts sharply with the findings obtained in the long run, where more exchange rate policy would be needed to reduce its

volatility. The intuition from here is that exchange rate policy has a time-variant influence on the volatility of the exchange rate in the country.

The adjusted coefficient of determination of 0.930 reveals that 93% of the movement in exchange rate volatility is largely accounted for by the independent variables included in the model, with only 7 percent of the variations remaining unexplained. These unexplained variables are extraneous endogenous. The Durbin-Watson statistic of 2.32 suggests no autocorrelation problem, as it ranges between the expected thresholds of 1.60 and 2.40.

Causality Test Result

By the selection criteria, the initial lag length for estimation is set to 3, while the lag length used is 4. The results of the autocorrelation test, with a value of 46.4113 and a corresponding p-value of 0.3712, indicate no autocorrelation up to 4 lags. The general direction of the causal link between institutional indicators and exchange rate volatility is clarified by these findings, suggesting that institutional environment measures in Nigeria do not Granger cause exchange rate volatility. This hypothesis is tested at a 10 percent significance level. The findings of the causality test are presented in Panel C of Table 7.

Table 6: VAR Residual Serial Correlation LM –Test Results

Lags	LM-stat	Prob.
1	66.7421	0.4170
2	71.3381	0.4229
3	53.8213	0.5812
4	46.4113	0.3712

Source: Author's computation

As a consequence, the findings show which way institutional quality metrics and exchange rate volatility are causally related overall. According to the null hypothesis, Nigeria's institutional quality metrics do not contribute to the nation's exchange rate volatility.

Table 7: Causality Test

Panel C: Causality from other variables to EXRVOL

Dependent Variable: EXRVOL

Variables	Chi-Square	Prob. Values
POLITR	2.3189	0.5089
RESV	7.162	0.0669
FD	2.4215	0.4896
EXRP	1.8194	0.6107
ALL	27.0043	0.0789

Source: Author's computation

Revenue source volatility is the only individual institutional quality measure that significantly impacts Nigeria's exchange rate volatility at the 10 percent significance level, as shown in Panel C of Table 7 above. Nevertheless, collective Granger causality between institutional environment measures and exchange rate volatility in Nigeria cannot be precluded at the 10 percent level, as depicted by the 27.0043 chi-square value and the 0.0789 probability value.

Panel D: Causality from EXRVOL to other variables

Variables	Chi-Square	Prob. Values
POLITR	13.82544	0.0032
RESV	6.604382	0.0856
FD	2.208451	0.5303
EXRP	0.060161	0.9961

Source: Author's computation

The second set of causal relationships is shown in Panel D of Table 7; the findings show that at the five and ten percent significant levels, the null hypotheses cannot be disproved. These results are instructive because they demonstrate that only revenue source volatility and political risk cause exchange rate volatility. Overall, the results demonstrate a causal correlation in both directions between exchange rate volatility and the institutional environment. This may be seen in the results combining panels C and D of Table 7. It is obvious from the empirical result that the institutional environment variables are endogenous to exchange rate volatility in Nigeria.

4. Conclusion

This article's primary goal is to investigate the connection between Nigeria's institutional environment and exchange rate volatility. The analysis covers the years 1981–2023 using annual data. A two-step procedure was adopted in the estimation process. The findings from this study have some policy implications. First, the GARCH (1,1) estimation shows that the exchange rate is truly volatile in Nigeria. This indicates that the government should institute an exchange rate policy that will stabilize the exchange rate in Nigeria. This is necessary since Nigeria is a small, open, oil-dependent economy. Second, the results of the autoregressive distributed lag model demonstrate that the exchange rate's volatility exhibits a countercyclical behavior in the long-run situation in Nigeria. Third, an increase in these two components of the institutional environment (political risk and revenue sources volatility), the more volatile the behavior exhibited by the exchange rate in Nigeria. In line with this, development programs must incorporate institutional-stimulating measures that particularly address various dimensions of the institutional environment, especially political and economic institutions with and among various sectors of the economy. Suggesting that political restructuring, aimed at curbing arbitrary manipulation of the domestic currency's exchange rate and reducing its volatility, along with policies that foster financial sector development, are important policy recommendations.

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