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The impact of conversion rate fluctuations on emerging financial markets: an econometric study for the period (2013–2024)

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This study investigates the impact of exchange rate fluctuations, specifically those affecting the Nigerian Naira against the US Dollar, on the performance of the Nigerian financial market between 2013 and 2024. Given Nigeria's heavy reliance on oil exports and its exposure to external macroeconomic shocks, understanding the implications of currency volatility on market behavior is crucial. This paper utilizes an Autoregressive Distributed Lag (ARDL) model to capture both short-term and long-term dynamics, incorporating inflation and interest rates as control variables.

Monthly time-series data were collected from reputable financial databases, including the International Monetary Fund (IMF) and Investing.com. Stationarity was confirmed using the Augmented Dickey-Fuller (ADF) test, while the Bounds Test confirmed the existence of a cointegrated relationship among the variables. The results indicate a statistically significant and negative relationship between the Naira conversion rate and the NSE 30 Index, especially in the short term, supporting the theory that currency depreciation undermines investor confidence and market performance. Long-term analysis also reveals that interest rates negatively influence the market index, whereas inflation showed an insignificant impact within the model's structure.

These findings align with existing literature and reinforce the role of currency stability in enhancing capital market growth in emerging economies. The study concludes with policy recommendations targeting exchange rate management, inflation control, and investor-driven regulatory frameworks to foster economic resilience. The originality of this study lies in its extended time frame, comprehensive econometric modeling, and focus on integrated macro-financial variables, which together offer valuable insights for policymakers, investors, and scholars interested in financial market dynamics under currency stress in resource-dependent economies like Nigeria.

Key words: Exchange rate volatility; Emerging markets; Nigerian Stock Exchange; ARDL model; Inflation; Interest rates; Financial market index; Cointegration; Currency depreciation; Macroeconomic indicators.

Problem statement and analysis of recent research. Financial markets play a pivotal role in the sustainable development of national economies, particularly in developing countries where financial integration and capital market maturity remain limited. Among the many macroeconomic factors affecting financial market performance, exchange rate volatility has emerged as one of the most disruptive [1]. In economies like Nigeria—where crude oil exports dominate government revenues and foreign reserves—exchange rate fluctuations, especially between the Naira (NGN) and the US Dollar (USD), have significant implications for investor behavior, market confidence, and capital flows.

The Nigerian Stock Exchange (NSE), being highly exposed to global shocks and local currency depreciation, frequently experiences instability tied to external trade imbalances, global oil price fluctuations, and speculative pressures on the Naira [2]. While the Central Bank of Nigeria has implemented a mix of monetary tools and exchange rate regimes to stabilize the currency, the persistent volatility of the Naira continues to challenge the efficient functioning of financial markets.

In recent years, several empirical studies have examined the interaction between exchange rate volatility and financial market performance in emerging economies. For example, Aderemi et al. **(**2020) [3], employed an ARDL model to investigate the impact of external debt and exchange rate fluctuations on Nigeria's macroeconomic indicators, revealing a strong inverse relationship between exchange rate instability and stock market performance. Tamunowariye & Anaele (2022) [4], also confirmed the long-run adverse effects of exchange rate volatility using ARDL techniques in the context of oil-dependent economies. Furthermore, studies such as Oseni (2016) [5] and Umoru et al. (2023) [6], have incorporated volatility modeling approaches like GARCH and nonlinear estimations to reveal asymmetric responses and contagion effects from global markets. These findings reinforce the theoretical expectation that unstable exchange rates distort investor behavior, reduce market confidence, and impair capital formation.

Despite these contributions, several limitations remain in the literature. Many studies focus on narrow time frames and often isolate the exchange rate as the sole explanatory variable, overlooking other critical macroeconomic factors such as inflation and interest rates. In addition, few studies provide a unified framework that distinguishes between short-run and long-run dynamics. To contribute to this evolving literature, the present study applies the Autoregressive Distributed Lag (ARDL) model to investigate how fluctuations in exchange rates, interest rates, and inflation collectively affect stock market performance in Nigeria. This approach is expected to yield insights relevant to monetary authorities, investors, and development policy experts.

Nigeria was selected as the case study due to the availability of comprehensive and high-frequency monthly data on exchange rates, inflation, interest rates, and financial market performance, which enables the effective application of econometric models such as ARDL, the Nigerian financial market is relatively active and responsive to macroeconomic variables, providing a suitable empirical environment for analyzing the dynamic relationship between currency fluctuations and stock market performance. Furthermore, Nigeria and Algeria share several structural economic characteristics, including a strong reliance on oil exports and exposure to external shocks. This similarity enhances the relevance of the findings, making them potentially insightful for understanding similar macro-financial challenges in the Algerian context and other emerging economies.

The relationship between exchange rate dynamics and financial market performance has become a central concern in macroeconomic literature, particularly in developing economies where structural vulnerabilities and external shocks often amplify financial instability. In Nigeria, recurrent depreciation of the Naira largely driven by oil price volatility and global monetary shifts—has undermined investor confidence and disrupted the flow of capital within the Nigerian Stock Exchange (NSE), as demonstrated by Shittu, Marcus, and Acha (2019) [7]. The country’s dependence on crude oil exports further exposes its financial system to speculative currency attacks and global volatility spillovers, as suggested by Sikiru and Salisu using time series data from January 2008 to June 2023 [8]. Several empirical studies have explored the exchange rate–stock market nexus using various econometric approaches. For instance, Adeniyi et al. (2019) utilized the ARDL model and found a long-run negative relationship between currency depreciation and stock returns in Nigeria [9].

In recent years, a growing body of literature has investigated the dynamic interplay between exchange rate volatility and stock market performance across Africa. Ngondo& Khobai

(2015) emphasized the impact of exchange rate uncertainty on trade and capital flows in South Africa [10], while Kouadio et al. (2020) underscored the role of exchange rate stability in attracting foreign investment in West Africa. Akinlo, & (2021)[11] linked monetary shocks to financial development in the CEMAC region, Gobodi. (2020). applied the NARDL technique in Zimbabwe [12], revealing asymmetric effects of macroeconomic fluctuations on equity markets.

In the Nigerian context, Ajala et al. (2021) [13] highlighted that currency depreciation exerts stronger adverse effects on stock returns than appreciation. At the global level, Chang et al. (2024) [14] investigated the exchange rate–stock market linkage in Taiwan during the pandemic period using the cross-quantilogram approach, their results revealed a short-lived but significant negative causality from currency movements to stock returns, such findings highlight how currency shocks can affect investor behavior even in more developed financial systems. In contrast, emerging markets like Nigeria tend to experience more persistent volatility effects, as shown in studies by Ogunsanya & Adamson (2024), [15] examined exchange rate movements and equity returns in Sub-Saharan Africa and confirmed a unidirectional causality from stock performance to exchange rate behavior. Atipaga et al. (2024) [16] and Yaya et al. (2024) [17] added evidence of strong cross-market connectedness under volatility regimes using wavelet and quantile VAR models, respectively.

Further contributions include Msomi & Ngalawa (2024) [18], who confirmed the responsiveness of exchange rates to shifts in monetary fundamentals. Additionally, Watard et al. (2024) [19] confirmed significant volatility spillovers among African markets, while Rufai et al. (2023) [20]and Kemoe et al. (2024) [21] emphasized the inflationary and financial stress implications of currency instability in the region.

Despite these significant contributions, several limitations persist in the existing literature. First, many studies rely on short sample periods or country-specific shocks such as the COVID-19 pandemic or commodity price collapses without capturing the full macroeconomic evolution over a longer horizon. This narrow scope may overlook structural and policy-driven changes that affect the exchange rate–stock market relationship in the long term. Second, while numerous studies focus solely on the exchange rate variable, relatively few adopt a comprehensive macro-financial framework that simultaneously incorporates inflation and interest rates key monetary policy instruments that influence investor expectations and market behavior.

Moreover, limited attention has been paid to the asymmetry and nonlinearity of these relationships, especially in African economies where market inefficiencies and policy rigidities prevail. The reliance on linear models in such settings may lead to incomplete or biased interpretations. Another critical gap lies in the lack of integration between diagnostic testing, short-run dynamics, and long-run equilibrium analysis, particularly when using monthly data that reflect higher-frequency market responses.

To address these gaps, the present study employs the Autoregressive Distributed Lag (ARDL) modeling framework to analyze the short-run and long-run effects of exchange rate movements, inflation, and interest rates on stock market performance in Nigeria. By using monthly data from 2013 to 2024, the research applies an integrated ARDL model to offer a nuanced and time-sensitive assessment of macro-financial interactions, aiming to inform both academic debates and practical policymaking in emerging economies.

To achieve its main objective, the present study is structured around the following scientific and practical tasks: to review and synthesize existing theoretical and empirical literature that examines the relationship between exchange rate dynamics and stock market behavior in developing economies, with particular emphasis on oil-exporting nations such as Nigeria; To identify both the short-run and long-run effects of fluctuations in the Naira–US Dollar exchange rate on the performance of the Nigerian Stock Exchange (NSE 30 Index), while accounting for inflation and interest rates as key macroeconomic control variables; To apply the Autoregressive Distributed Lag (ARDL) modeling framework in order to analyze both immediate (short-term) and equilibrium (long-term) interactions among the selected macroeconomic variables using monthly time-series data covering the period from 2013 to 2024; To conduct diagnostic tests for stationarity, cointegration, and error correction mechanisms, utilizing advanced econometric tools such as the Augmented Dickey-Fuller (ADF) test and the Bounds Test approach, in order to ensure robustness and model validity; To interpret and contextualize the empirical results within established macroeconomic frameworks, including theories such as Purchasing Power Parity (PPP), Interest Rate Parity (IRP), and the Efficient Market Hypothesis (EMH), while also comparing findings with recent empirical studies; To propose poli-

cy-relevant recommendations aimed at enhancing the effectiveness of exchange rate management strategies and strengthening the resilience of Nigeria's capital markets amid persistent macroeconomic volatility and global financial uncertainty, and based on the research objectives, the following hypotheses were formulated: H_{01}: Exchange rate fluctuations do not significantly affect the performance of the Nigerian stock market; H_{11}: Exchange rate fluctuations have a significant impact on the NSE 30 Index. H_{02}: Inflation and interest rates do not significantly influence the NSE 30 Index in the long run; H_{12}: Inflation and interest rates significantly influence the NSE 30 Index in the long run.

The aim of the study. The purpose of this study is to empirically investigate the impact of exchange rate fluctuations on stock market performance in Nigeria during the period 2013–2024. Specifically, it examines both the short- and long-term effects of exchange rate movements, inflation, and interest rates on the NSE 30 Index, using the ARDL econometric model. The findings aim to inform monetary policy decisions in emerging economies.

Materials and Methods of Research. This study employs a quantitative econometric approach based on monthly time-series data covering the period from January 2013 to September 2024. The variables used in the analysis include the Nigerian Naira to US Dollar exchange rate, the NSE 30 Index, inflation rate, and interest rate. These indicators were selected due to their macroeconomic significance and availability of reliable data.

The data for exchange rate, inflation, and interest rates were collected from the official databases of the International Monetary Fund (IMF), while the NSE 30 Index data were obtained from Investing.com. Prior to analysis, all data series were examined for completeness, consistency, and accuracy.

To explore the dynamic relationships among the variables, the study applies the Autoregressive Distributed Lag (ARDL) model developed by Pesaran and Shin (1998). This method is particularly suitable for analyzing datasets with variables that are integrated at different orders specifically I(0) and I(1) and is known for its effectiveness with small and moderate sample sizes, making it appropriate for emerging market economies.

Definition of Key Variables

Nigerian Naira Conversion Rate (NGN/USD). This represents the official monthly average exchange rate of the Nigerian Naira against the US Dollar. It reflects the external value of the domestic currency and serves as a key indicator of Nigeria's international competitiveness and macroeconomic stability [22].

Stock Market Index (NSE 30 Index): The NSE 30 Index is a benchmark index of the Nigerian Stock Exchange, representing the performance of 30 of the most capitalized and liquid companies listed on the exchange. It is used as a proxy for overall stock market performance and investor sentiment [23].

Inflation Rate: Measured as the year-on-year percentage change in the Consumer Price Index (CPI), the inflation rate indicates the rate at which the general level of prices for goods and services is rising, thereby eroding purchasing power [24].

Interest Rate: This refers to the Central Bank of Nigeria's Monetary Policy Rate (MPR), which influences borrowing costs, investment decisions, and the general liquidity conditions in the economy[25].

The methodological process began with stationarity testing using the Augmented Dickey-Fuller (ADF) test to determine the integration order of each variable. Ensuring that none of the variables are I(2) is a critical assumption for applying the ARDL model. Following this, optimal lag lengths were identified using the Akaike Information Criterion (AIC), helping to reduce autocorrelation and ensure accurate model specification.

Subsequently, the bound's testing approach was conducted to assess the presence of a long-run cointegration relationship among the variables. Upon confirmation of cointegration, the ARDL model was estimated to determine both short-term fluctuations and long-term equilibrium relationships. The inclusion of an error correction term (ECT) allowed for the measurement of the speed of adjustment toward long-run equilibrium following short-term disturbances.

To ensure the robustness and validity of the results, a series of diagnostic tests were performed. These included the Breusch-Godfrey LM test to detect autocorrelation, as well as tests for heteroscedasticity and normality of residuals. The model's statistical soundness ensures that the findings are reliable for interpreting macro-financial interactions in the Nigerian context.

Research results and Discussion. This section provides a detailed empirical assessment of the relationship between macroeconomic variables and the Nigerian financial market performance. The analysis follows a structured econometric procedure that begins with preliminary statistical diagnostics, followed by model estimation and interpretation of both short-run and long-run dynamics.

Using monthly data spanning over a decade (2013–2024), the study explores how fluctuations in the exchange rate, along with inflation and interest rates, shape the trajectory of the NSE 30 Index. The Autoregressive Distributed Lag (ARDL) framework was selected due to its flexibility in handling variables with different integration orders and its ability to capture dynamic interactions over time.

The subsections that follow present the results sequentially—starting with unit root testing to assess the stationarity of the series, followed by cointegration analysis, estimation of model coefficients, diagnostic evaluations, and a graphical overview of variable behavior. The results are contextualized with reference to theoretical models and compared with findings from previous empirical literature.

1. Stationarity and Model Specification

Equation 1. General ARDL Model Functional Form

A dependent variable (Y) and K explanatory variables (x1, x2, …, xk) make up the basic form of the ARDL model:

$$\Delta Y_t = c + \sum_{i=1}^{p} B_{1i}\Delta_{x1,t-1} + \sum_{i=1}^{q1} B_2\Delta_{x2,t-1} + \sum_{i=1}^{q2} B_3\Delta_{x3,t-1} + \cdots \sum_{i=1}^{qk} B_k\Delta_{xk,t-1} + a_1 y_{t-1} + a_2 x_{1t-1} + a_3 x_{2t-1} \ldots + a_k x_{kt-1} + \varepsilon_t$$

In the given equation, the following notations and terms are defined as:

c - the intercept term, or constant;

Δ - represents the first differences of the variables, indicating changes in the variables from one period to another;

k - the number of explanatory variables;

P - the lag period for the dependent variable;

q1, q2, …, qkq - the lag periods for the explanatory variables x1, x2, …, xk respectively;

β1i, β2, β3, …, βk - ccoefficients representing the short-term relationship between the dependent and explanatory variables;

α1, α2, …, αk - ccoefficients representing the long-term relationship between the dependent and explanatory variables;

єt - the error term, capturing random disturbances in the model.

Prior to estimating the ARDL model, it is essential to determine the order of integration of each time series to ensure the validity of the approach. The ARDL bounds testing procedure requires that none of the variables be integrated of order two, I(2), to avoid spurious regression results.

To assess the time-series properties of the variables, the Augmented Dickey-Fuller (ADF) unit root test was applied to the exchange rate, inflation rate, interest rate, and NSE 30 Index.

The results presented in Table 1 indicate that all variables—exchange rate (NGN/USD), interest rate, inflation, and the NSE 30 Index—are non-stationary in their level form but become stationary after first differencing. This confirms that the series are integrated of order one, I(1), thus meeting the conditions for applying the ARDL model. Given this integration order, the study proceeds with the ARDL framework to explore both the short-run dynamics and long-run equilibrium relationships among the macroeconomic variables.

2. Cointegration Test

Having confirmed that all variables are integrated of order one [I(1)], meaning that they are non-stationary at level but become stationary after first differencing, the next step is to test for the existence of a long-run equilibrium relationship among the variables using the ARDL bounds testing approach developed by Pesaran et al. (2001). This integration order satisfies the preconditions for applying the ARDL model, which requires that none of the variables be integrated of order two [I(2)] .

The results of the bounds test presented in Table 2 show that the computed F-statistic (3.97) exceeds the upper critical bound at the 5% significance level. This leads to the rejection of the null hypothesis of no cointegration, confirming the existence of a stable long-run relationship between the exchange rate, interest rate, inflation rate, and the NSE 30 Index. Accordingly, the ARDL model can be validly applied to estimate both the long-run coefficients and the short-run dynamics of the macroeconomic variables.

The ARDL model was estimated to use EViews 10. According to the Akaike Information Criterion (AIC), the best-fitting model was identified as ARDL (4, 0, 0, 0). This specification includes four lags of the dependent variable (INDEX), while all independent variables exchange rate, inflation, and interest rate are included in their contemporaneous form. This lag structure is appropriate for capturing the short-term adjustments in the stock market index while ensuring model parsimony and avoiding overfitting.

Table 1 – **Results of the ADF Test**

Variables	Type	Without constant and trend		With constant and trend		With constant	
		At level	At first diff	At level	At first diff	At level	At first diff
Index	T stat	-0.650	-0.297	-1.710	-8.230	-1.320	-8.260
	Prob	0.432	0.0000	0.735	0.0000	0.615	0.0000
Ex	T stat	0.917	-5.462	-2.674	-5.574	-1.053	-5.614
	Prob	0.902	0.0000	0.552	0.0001	0.730	0.0000
i	T stat	-2.053	-2.838	-2.000	-2.844	-2.044	-2.824
	Prob	0.519	0.0050	0.5871	0.0018	0.267	0.0594
Inf	T stat	3.329	-0.817	-2.206	-3.674	1.799	-2.832
	Prob	0.999	0.0035	0.497	0.0297	0.999	0.0583

Source: prepared by the researchers based on EVIEWS 10 output.

Table 2 – **ARDL Cointegration Test**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INDEX (-1)	0.802471	0.119055	6.740341	0.0000
INDEX (-2)	0.030909	0.151731	0.203706	0.8392
INDEX (-3)	0.024169	0.152722	0.158257	0.8747
INDEX (-4)	-0.215587	0.114637	-1.880607	0.0641
EX	-0.450790	0.316814	-1.422886	0.1591
INFLATION	-0.776107	0.514833	-1.507493	0.1361
I	-38.13902	9.894106	-3.854722	0.0002
C	1344.866	316.5061	4.249100	0.0001
R-squared			0.913712	
Adjusted R-squared			0.905323	
S.E. of regression			84.68200	
Sum squared residuals			516314.9	
Log likelihood			-464.4129	
F-statistic			108.9169	
Prob(F-statistic)			0.000000	
Mean dependent var			1487.432	
S.D. dependent var			275.2134	
Akaike info criterion			11.51032	
Schwarz criterion			12.04853	
Hannan-Quinn criterion			11.90582	
Durbin-Watson stat			1.878082	

Source: prepared by the researchers based on EVIEWS 10 output.

3. Estimation of the Long-Run Relationship

Following the confirmation of cointegration among the variables, the long-run coefficients were estimated using the ARDL (4,0,0,0) model. The results, as presented in Table 3, indicate that the exchange rate coefficient is negative and statistically significant at the 1% level. This implies that a depreciation of the Naira—reflected in an increase in the exchange rate—leads to a decline in stock market performance. This finding supports the theoretical expectation that currency depreciation raises the cost of imports, fuels macroeconomic uncertainty, and reduces investor confidence.

Additionally, the interest rate is also negatively signed and statistically significant at the 5% level. This result suggests that higher interest rates increase the cost of capital, discourage investment activity, and ultimately reduce stock market returns. These outcomes align with the conventional view that tight monetary policy exerts contractionary pressure on capital markets.

Table 3 – **Long-Run Relationship Test**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EX	-1.109291	0.692645	-1.601528	0.0136
INFLATION	-1.909821	1.272021	-1.501407	0.1376
I	93.851328	10.859206	-8.642559	0.0000
	3309.4048	193.38751		
C	52	8	17.112815	0.0000

Source: prepared by the researchers based on EVIEWS 10 output.

In contrast, the inflation rate was found to be statistically insignificant in the long-run relationship. This may reflect the adaptive nature of inflation expectations in Nigeria or the ability of financial markets to absorb moderate inflation without significantly affecting asset prices. Alternatively, it could indicate that structural and supply-side factors play a more dominant role in driving inflation than monetary shocks.

4.Estimation of Short-Run Dynamics

The empirical findings from the ARDL (4,0,0,0) model confirm a statistically significant and negative relationship between the Naira/USD exchange rate and the Nigerian Stock Exchange (NSE 30 Index) in both the short and long run. This inverse association aligns with theoretical expectations derived from the purchasing power parity (PPP) and balance of payments (BOP) frameworks, which posit that exchange rate volatility undermines macroeconomic stability, reduces investor confidence, and erodes the real value of financial assets.

In the short run, as presented in Table 4, fluctuations in the exchange rate continue to exert a detrimental effect on stock market performance. The depreciation of the Naira adversely affects investor sentiment and triggers capital flight, leading to an immediate contraction in the NSE 30 Index. Moreover, the error correction term (ECT_{t-1}) is correctly signed (negative) and statistically significant at the 1% level, with an estimated coefficient of −0.44. This implies that approximately 44% of the deviation from long-run equilibrium is corrected within one month, confirming the presence of a moderate yet effective adjustment mechanism. The significance and magnitude of the ECT reinforce the stability and validity of the long-run cointegration relationship among the model variables.

Cointegration Equation (Error Correction Representation):

$$CointEq = INDEX - (1.1093 \cdot EX +$$

$$+ 1.9098 \cdot INFLATION - 93.8513 \cdot I +$$

$$+ 3309.4049)$$

Table 4 – **Short-Run Relationship Test**

Dependent Variable:
INDEX Selected Model: ARDL (4, 0, 0, 0)
Date: 06/09/2024
Time: 17:36
Sample: 2013M01 – 2023M12
Included observations: 120

Variable	Coefficient	Std. Error	t-Statistic
D (INDEX (-1))	0.269144	0.121539	2.214461
D (INDEX (-2))	0.272325	0.112128	2.428704
D (INDEX (-3))	0.255740	0.115366	2.216767
D(EX)	-0.865566	0.793928	-1.090233
D(INFLATION)	-1.856280	4.527599	-0.409992
D(I)	19.711994	21.404312	-0.920936
Cointeq(-1)	-0.449300	0.097583	-4.604265

Source: prepared by the researchers based on EVIEWS 10 output.

5.Model Diagnostic Tests

After estimating the short- and long-run coefficients, a series of diagnostic tests were conducted to validate the reliability and stability of the ARDL(4,0,0,0) model. The results, presented in Table 5, confirm that the model is free from key econometric issues that could undermine its validity.

Specifically, the Breusch-Godfrey LM test for serial correlation yields a p-value greater than 0.05, indicating no significant autocorrelation in the residuals. Likewise, the ARCH test returns a non-significant result, confirming the homoscedasticity of the residuals and ruling out heteroscedasticity.

In addition, the Jarque-Bera test for normality produces a p-value above the 5% threshold, suggesting that the residuals follow an approximately normal distribution. Taken together, these diagnostic checks affirm that the ARDL model is statistically sound, well-specified, and suitable for inference and policy interpretation.

Table 5 – **Breusch-Godfrey Test**

Model Specification: Ramsey RESET Test
Equation: UNTITLED
Specification: INDEX (-1) INDEX (-2) INDEX (-3) INDEX (-4) EX
INFLATION I C
Omitted Variables: Squares of fitted values

Statistic	Value	Df	Probability
T-statistic	0.619703	71	0.5374
F-statistic	0.384032	(1, 71)	0.5374

Source: prepared by the researchers based on EVIEWS 10 output.

6.Graphical Analysis

To complement the quantitative results and illustrate the temporal behavior of the key macroeconomic variables, a series of time-series plots are provided in Figures 1 through 4. These figures visually demonstrate the trends, volatility, and interactions of the exchange rate, inflation, interest rate, and the Nigerian Stock Exchange (NSE 30 Index) throughout the study period (2013–2024).

Nigerian Naira Conversion rate (NGN):

From figure 1 (refer to the appendix), it is evident that since 2013, Nigeria has faced a series of economic challenges affecting the currency conversion rate of the Nigerian Naira (NGN). These challenges include the decline in oil prices, which serve as the main source of revenue, as well as inflation issues and political instability. Consequently, the study period is divided into five phases as follows:

From 2013 to 2015, during this period, the currency conversion rate remained relatively stable, but began to decline due to falling oil prices. The government took steps to support the Naira through market interventions, which helped stabilize the currency conversion rate.

From 2016 to 2017, the Naira experienced a sharp depreciation against the dollar, with the currency conversion rate increasing from 278.02 NGN/USD to 409.51 NGN/USD. This devaluation led to economic deterioration and rising inflation. In June 2016, the government announced an adjustment in the currency conversion rate policy, resulting in an official devaluation of the Naira. Declining oil prices prompted the central bank to intervene to keep the currency conversion rate close to 200 NGN/USD. However, this intervention reduced foreign reserves, causing the Naira to lose about 30% of its value.

From 2018 to 2019, following the reforms, the Naira saw slight improvements, but challenges such as persistent inflation and volatile oil prices continued to affect its stability. A modest increase in foreign reserves helped support the currency conversion rate.

From 2020 to 2021, The economy was adversely affected by the COVID-19 epidemic, increasing pressure on the currency conversion rate. The decline in oil revenues further weakened the Naira.

From 2022 to 2024, this period experienced relative stability despite ongoing pressures. Some economic indicators began to show improvement, but the currency conversion rate remained susceptible to structural challenges within the economy.

1. NSE Index

Figure 1 shows that the curve fluctuates continuously throughout the study period. We observed that in April 2016, the index's value dropped significantly, which corresponded with the rise in the currency conversion rate. This suggests an initial inverse relationship between the currency conversion rate and the index.

Between 2013 and 2015, the Nigerian Stock Exchange (NSE) index performed well, benefiting from increased foreign investments and economic growth driven by rising oil prices. However, starting in 2016, declining oil prices negatively impacted government revenues and investments. Additionally, the devaluation of the Naira increased pressures on listed companies, leading to a decline in the index.

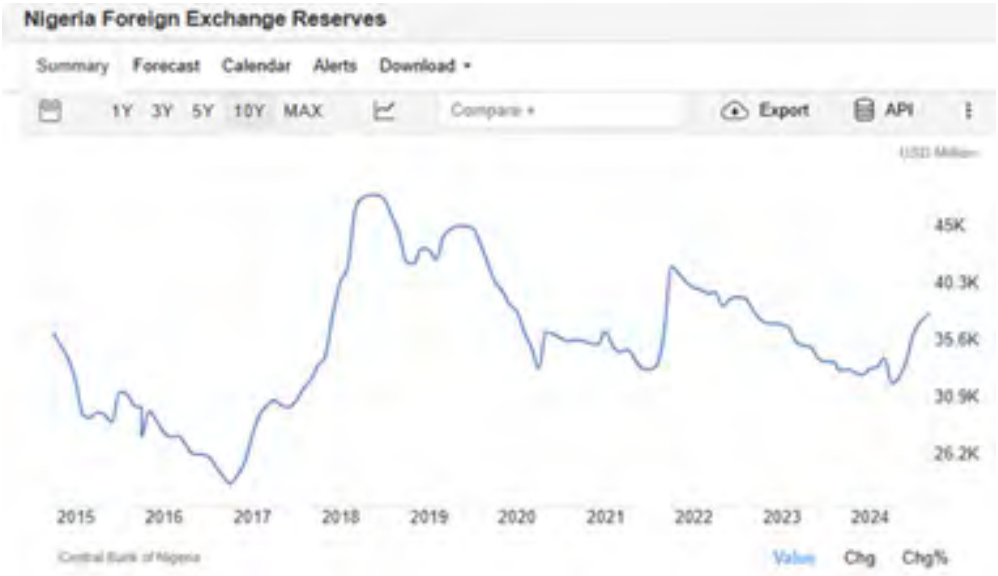

Fig 1. **Evolution of the Nigerian Naira Conversion rate.**

Source: prepared by author based on Trading Economics - Foreign Exchange Reserves.

Until 2018, improved oil prices and relative stability in monetary policy contributed to the recovery of the NSE index and boosted investments, resulting in a rise in the index.

In 2020, the pandemic had a substantial impact on financial markets, causing a sharp decline in the index due to concerns over the pandemic's effects. However, the government and the Central bank took measures to stimulate the economy, helping the market gradually recover.

From 2022 to 2024, the market showed gradual improvement with increasing economic activity and a return of investor confidence, despite ongoing challenges such as high inflation and rising interest rates, which affected the performance and profitability of companies.

2. Inflation Rate

From figure 2, it is evident that Nigeria experienced significant fluctuations in the inflation rate, influenced by various factors such as oil prices, monetary policies, and internal and external economic shocks, ongoing structural issues within the economy.

From 2013 to 2015, the inflation rate was relatively stable, as effective monetary policies managed to control price increases. The stability of oil prices contributed to steady government revenues, which helped mitigate inflationary pressures.

From 2016 to 2017, the inflation rate began to rise significantly, surpassing 18% in 2016. This increase was driven by declining oil prices, the devaluation of the Naira, and rising production costs, which led to higher prices for goods and services.

From 2018 to 2019, the inflation rate gradually declined to around 11% in 2019. This reduction was attributed to improved oil prices and Conversion rate stability, which helped alleviate inflationary pressures. However, inflation persisted due to structural factors within the economy.

From 2020 to 2021, the COVID-19 pandemic had a substantial impact on the economy, causing inflation to rise to elevated levels, exceeding 18% in 2021. This increase was due to rising costs of food and essential goods, driven by supply chain disruptions and increased demand for essential commodities.

From 2022 to 2024, the inflation rate continued to rise, reaching unprecedented levels, exceeding 22% in 2023. This surge was the result of rising energy prices, increased transportation costs, and ongoing structural issues within the economy.

3. Interest Rates

From the above figure 4, we observe that interest rates remained stable in 2013, as the government and the Central bank implemented balanced monetary policies to support economic growth and price stability. By 2014, interest rates declined due to the government's currency devaluation policy, which involved a 10% devaluation of the Naira in response to the global oil crisis. As a major oil exporter (90% of its exports), Nigeria faced declining foreign reserves, which fell to $37.17 billion, a decrease of 5.1%.

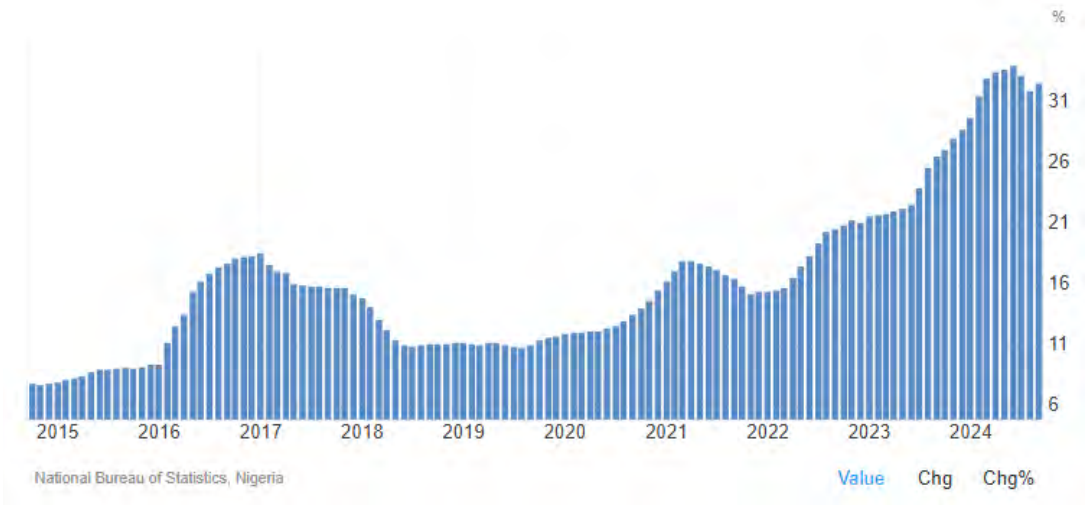

Fig 3. **Evolution of Nigeria's Inflation Rate.**

Source: prepared by the researcher based on data from Trading Economics - Nigeria Inflation Rate.

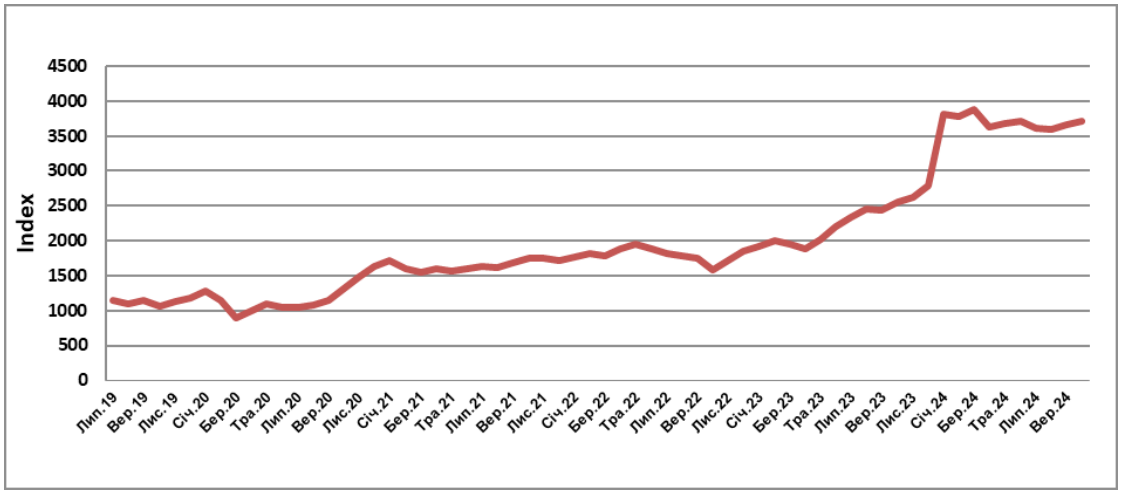

Fig 2. **Evolution of the Stock Market Index.**

Source: prepared by the researcher based on data from Investing.

Fig 4. **Evolution of Nigeria's Interest Rate.**

Source: Prepared by the researcher based on data from, Trading Economics - Nigeria Interest Rate.

In 2016, the Naira further depreciated, prompting the central bank to raise interest rates. The interest rate was increased to 14% to combat rising inflation. Although this increase helped reduce inflationary pressures, it negatively impacted borrowing and investment activities.

With the onset of COVID-19, the Central bank decided to lower interest rates again in 2020 to 11.5% to support the struggling economy. The lower interest rates encouraged borrowing and increased market liquidity.

By 2022, interest rates had risen significantly, reaching 14% to address the high inflation rate, which had exceeded 22%. This increase in interest rates was a response to growing inflationary pressures and aimed to stabilize the economy.

Testing Optimal Lag Lengths

The optimal lag lengths for the variables are determined using the Akaike Information Criterion (AIC). Based on figure 4, the appropriate model is ARDL (4, 0, 0, 0), indicating that the dependent variable has four lag periods, while the other variables (Conversion rate, inflation, and interest rates) have no lags. Thus, the study model can be formulated as follows:

$$\Delta index_t = c + \sum_{c=1}^{4} B_{1i} index_{t-1} +$$

$$+ \sum_{c=1}^{0} B_{2i} \Delta ex + \sum_{c=1}^{0} B_{3i} \Delta i_{t-1} +$$

$$+ \sum_{c=1}^{0} B_{4i} \Delta inf_{t-1} + \propto_1 index_{t-1} +$$

$$+ \propto_2 ex_{t-1} + \propto_3 i_{t-1} + \propto_4 inf_{t-1} + \varepsilon_t \quad (2)$$

Where:

Δ - represents first differences of the variables

C - the constant term

T - time trend

ϵt - the error term

B1, B2, B3, B4 - coefficients representing the short-term relationship

□1, □2, □3, □4 - coefficients representing the long-term relationship

The empirical findings of the ARDL model reveal a statistically significant and negative relationship between the Naira/USD exchange rate and the Nigerian Stock Exchange (NSE 30 Index), both in the short and long term. This inverse relationship is consistent with theoretical expectations rooted in the purchasing power parity (PPP) and balance of payments (BOP) frameworks. In particular, exchange rate volatility tends to undermine macroeconomic stability, reduce investor confidence, and erode the real value of financial assets.

In the short run, the depreciation of the Naira leads to immediate declines in equity prices, driven by increased uncertainty, speculative pressures, and reduced foreign investment inflows. This short-term reaction reflects the fragile nature of investor sentiment in emerging markets and mirrors similar findings in the literature across comparable economies.

The long-run analysis also highlights the negative impact of interest rates on stock market performance. Elevated interest rates raise the cost of capital, discourage borrowing, and reduce corporate profitability, thereby exerting downward pressure on equity values. These results reaffirm established monetary transmission mechanisms and align with prior empirical evidence using both linear and volatility-adjusted models.

Interestingly, the inflation rate was found to be statistically insignificant in both the short and long term. While this may appear counterintuitive, it reflects the structural characteristics of the Nigerian economy, where inflation is driven more by supply-side constraints—such as infrastructure bottlenecks and policy inefficiencies — than by traditional demand-side monetary dynamics. This finding supports the view that inflation in Nigeria often operates independently of capital market performance, especially under conditions of regulatory intervention and fiscal distortions.

From a comparative perspective, these results correspond with patterns observed in other African markets. For example, similar long-run sensitivities to exchange rate movements have been documented in Zambia and South Africa, although the magnitude and duration of the effects vary based on market depth, investor base, and regulatory resilience. Notably, some studies using quantile-based techniques have shown that exchange rate impacts are more pronounced under bearish market conditions—an insight that resonates with the short-term volatility effects captured in this study.

Finally, the robustness of the model is confirmed by diagnostic tests, including the Augmented Dickey-Fuller test for stationarity, the Breusch-Godfrey serial correlation test, and the ARDL Bounds Test. The error correction term (ECT) is correctly signed (negative) and statistically significant, indicating a dynamic and effective adjustment mechanism. Approximately 44% of any short-run disequilibrium is corrected within one period, affirming the model's validity and the stability of the cointegration relationship.

Overall, these results provide strong empirical support for the hypothesis that exchange rate instability and monetary tightening adversely affect capital market performance in Nigeria. The findings contribute to the broader literature on financial market vulnerability in resource-dependent economies and offer valuable guidance for monetary and exchange rate policy formulation.

Conclusions. This study has empirically examined the macro-financial relationship between exchange rate fluctuations and stock market performance in Nigeria using monthly data from 2013 to 2024. The ARDL model confirmed that depreciation of the Nigerian Naira against the US Dollar significantly undermines the NSE 30 Index, both in the short run and the long run. These findings align with monetary theories such as Purchasing Power Parity (PPP) and the Balance of Payments (BOP) framework, suggesting that exchange rate instability erodes investor confidence and capital market efficiency.

While interest rates were found to negatively affect equity performance in the long term, inflation exhibited no statistically significant impact—reflecting structural inflationary dynamics in the Nigerian economy that are often disconnected from monetary levers.

Given the sensitivity of financial markets to currency movements, the following policy recommendations are proposed: Stabilize the exchange rate through targeted interventions, enhanced foreign reserve buffers, and transparent currency management frameworks; Promote macroeconomic diversification, reducing reliance on oil exports by expanding the productive base into agriculture, manufacturing, and services; Adopt an inflation-targeting approach that balances interest rate policy with growth-friendly objectives, ensuring that investment and credit flows are not unduly restricted; Enhance regulatory oversight and investor protection, particularly through improved disclosure practices and the development of hedging instruments (e.g., currency futures).; Support market depth through financial infrastructure development, including digital trading platforms and capital market literacy programs.

For future research, it is recommended to explore asymmetric responses using advanced non-linear models such as NARDL, QARDL, or EGARCH. Moreover, sector-level disaggregation may reveal important industry-specific vulnerabilities to macroeconomic shocks.

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Вплив коливань курсу конверсії на фінансові ринки, що розвиваються: економетричне дослідження за період (2013–2024)

Меріем Дж., Соумія Б.

У цьому дослідженні розглядається вплив коливань валютного курсу, зокрема змін у співвідношенні між нігерійською найрою та доларом США, на функціонування фінансового ринку Нігерії у період з 2013 по 2024 роки. З огляду на суттєву залежність країни від експорту нафти та чутливість до зовнішніх макроекономічних шоків, вивчення наслідків валютної нестабільності є вкрай важливим для розуміння поведінки інвесторів та динаміки фондового ринку.

У роботі використовується економетрична модель авторегресивного розподіленого лагу (ARDL), яка дозволяє проаналізувати як коротко-, так і довгострокові взаємозв'язки між обмінним курсом і фондовим індексом NSE 30, а також враховуються такі макроекономічні змінні, як рівень інфляції та відсоткова ставка. Дані в часовому розрізі були зібрані з авторитетних джерел, включаючи Міжнародний валютний фонд (IMF) та Investing.com.

Результати аналізу підтверджують наявність статистично значущого та негативного впливу валютного курсу на індекс NSE 30, як у короткостроковому, так і в довгостроковому періодах. Знецінення найри призводить до зниження інвестиційної привабливості, зменшення довіри з боку інвесторів та зниження вартості активів. Крім того, виявлено, що підвищення відсоткової ставки негативно впливає на фондовий ринок, оскільки призводить до збільшення вартості капіталу та зниження прибутковості компаній. Водночас вплив інфляції виявився статистично незначущим, що може свідчити про структурний характер інфляційних процесів у Нігерії, обумовлений переважно нестабільністю постачання та неефективною інституційною політикою.

Отримані результати узгоджуються з теоретичними очікуваннями згідно з концепціями паритету купівельної спроможності (PPP) та платіжного балансу (BOP), а також з емпіричними дослідженнями, проведеними в інших країнах, що розвиваються. Надійність моделі підтверджується діагностичними тестами, включаючи тест Дікі-Фуллера, тест Бройша-Годфрі та тест меж ARDL. Значущий і негативний коефіцієнт корекції помилки (ECT) свідчить про наявність динамічного механізму відновлення рівноваги у довгостроковій перспективі.

Дослідження робить внесок у наукове обґрунтування ефективного управління валютною політикою та розроблення стратегій зміцнення фондового ринку в умовах макроекономічної нестабільності. Результати можуть бути корисними для центрального банку, інвесторів, урядових органів і дослідників, зацікавлених у вивченні фінансових ринків у країнах з ресурсною залежністю.

Ключові слова: валютна волатильність; ринки, що розвиваються; Нігерійська фондова біржа; модель ARDL; інфляція; відсоткові ставки; індекс фінансового ринку; коінтеграція; девальвація валюти; макроекономічні показники.

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