Exchange Rate Volatility and Stock Market Performance in Nigeria: Evidence from EGARCH and TGARCH Models

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ABSTRACT

This study examines the effect of exchange rate volatility on stock market performance in Nigeria over the period 2010–2025 using monthly data. Exchange rate volatility is modelled using asymmetric Generalized Autoregressive Conditional Heteroskedasticity (EGARCH and TGARCH) techniques, while its effect on stock market returns is analysed within a multivariate regression framework including oil prices and inflation.

The results show strong persistence in exchange rate volatility, with the EGARCH model yielding a GARCH coefficient of 0.9754 ($p < 0.001$) and the TGARCH model confirming significant persistence ($\beta = 0.6468$, $p < 0.001$). No significant asymmetric effect is observed ($\gamma = 0.1876$, $p = 0.4580$). Regression results indicate that exchange rate volatility does not significantly affect stock market returns ($\beta = 0.1162$, $p = 0.111$), while crude oil prices exert a positive and significant effect ($\beta = 0.2003$, $p < 0.001$). Inflation is found to be insignificant, and the model explains 9.6% of the variation in stock returns ($R^2 = 0.096$).

The findings suggest that exchange rate volatility influences the Nigerian economy mainly through uncertainty effects rather than direct stock market transmission. The study highlights the dominance of oil price movements in shaping stock market performance and provides policy insights on exchange rate stability and macroeconomic resilience.

Keywords: Exchange rate volatility; Stock market performance; EGARCH; TGARCH; Nigeria.

INTRODUCTION

Uncertainty regarding exchange rate fluctuations is one of the main sources of macroeconomic uncertainty in both developed and emerging countries. Exchange rate fluctuations can have an impact on trade performance, capital flows, the inflation process, and even financial market performance. The maintenance of exchange rate stability is one of the objectives of economic policies because exchange rates can create macroeconomic uncertainty, especially in emerging countries where the structural fragility of their financial system exposes them to potential external risks (Bahmani-Oskooee & Hegerty, 2007; Aghion et al., 2009).

The link between exchange rate volatility and stock market returns has been extensively discussed in the literature in financial economics. With regard to the theoretical relationship between the two variables, the flow approach and the portfolio balance approach models have provided some explanations for this linkage. The flow approach model was formulated by Dornbusch and Fischer (1980). According to the flow approach model, stock prices react to changes in exchange rates due to the profitability and competitiveness of the corporation. Currency devaluation leads to improved competitiveness of export goods from the country and hence greater profits, which lead to improved stock market performance. On the other hand, currency appreciation leads to reduced competitiveness, hence lower stock prices. The portfolio balance approach model was put forward by Branson (1983) and Frankel (1983).

Although the above theories offer a lot of insights, whether they apply to developing nations is not clear. This is because financial markets in developing nations are characterized by policy involvement, poor integration of the financial markets, reliance on export of commodities, and rigid structures. These could mean that the impact of exchange rates on stock market returns may differ across countries.

The empirical findings regarding the exchange rate-stock market link are quite contradictory. On one hand, some scholars find negative associations because they note that increased volatility of the exchange rate creates more uncertainty, thus discouraging investors from buying stocks (Adjasi et al., 2008; Zhao, 2010; Tsai, 2012). It might appear that the more unstable the currency becomes, the worse the stock market performs since the level of investor's confidence is likely to fall. On the other hand, there are researchers who identify positive or bidirectional links or simply insignificant associations (Nieh & Lee, 2001; Phylaktis & Ravazzolo, 2005; Bahmani-Oskooee & Saha, 2016), which suggests that the effect of exchange rate volatility largely depends on a number of country-specific variables.

Nigeria represents one of the most suitable settings to explore this phenomenon. Being among the leading countries in terms of crude oil exports, Nigeria is extremely susceptible to any possible external factors resulting from fluctuations in international oil prices. Exchange rates are strongly determined by fluctuations in the value of oil prices because these have a significant impact on foreign exchange revenues, government budgeting activities, and macroeconomic performance. Besides, the last decade has seen a great number of alterations in Nigeria's foreign exchange industry, including exchange rate liberalization in 2016, economic shocks related to the COVID-19 pandemic in 2020, and changes in foreign exchange regulations in 2023.

Studies regarding Nigeria have resulted in inconsistent results. Some scholars claim that the relationship between the exchange rate and the stock market is negative because the volatility in exchange rate makes investors uncertain about making investments (Oseni & Nwosa, 2011; Lawal et al., 2017). Meanwhile, other studies reveal either no significant association between the two variables or only weak correlation, which means that the exchange rate is not necessarily the leading factor for stock market behaviour (Akpan & Atan, 2012; Eze & Okpala, 2014). Most recent research focuses on nonlinear dynamics and asymmetry in response, which implies that standard models do not cover all aspects of the stock market dynamics (Adekoya & Oliyide, 2021; Bouri et al., 2022).

Another viewpoint in the analysis of the general economic effects of exchange rate variability can be found in the uncertainty-investment approach. According to this theory, uncertainty makes investments more valuable since decision-making is delayed until uncertainties are sorted out. Exchange rate variability might thus have indirect consequences on economic performance by increasing uncertainty, regardless of its direct effect on stocks returns (Bernanke, 1983; Dixit & Pindyck, 1994; Bloom, 2009). This perspective could prove interesting, especially in an economy like that of Nigeria, where uncertainties can greatly affect investment behaviour.

Although the literature has expanded considerably, there are still some important areas of research that need further investigation. Firstly, most past works have used relatively short sample sizes, failing to consider structural shifts in the Nigerian foreign exchange market that may have occurred recently. Secondly, a great number of past studies use linear econometrics and do not account for such financial phenomena as clusterization of volatility, persistence, or nonlinearity in the dynamics of financial variables (Bahmani-Oskooee & Saha, 2016; Adekoya & Oliyide, 2021). Finally, exchange rate volatility's role for investment uncertainty deserves further research.

This paper attempts to fill these research gaps by analyzing the relationship between exchange rate volatility and stock market returns in Nigeria based on monthly data from 2010 to 2025. Exchange rate volatility is measured using an asymmetric GARCH model, particularly the Exponential GARCH (EGARCH) and the Threshold GARCH (TGARCH). Volatility persistence and asymmetry can be examined using these two approaches. Measured volatility is then used in the regression analysis, where its impact on stock market returns is analyzed alongside oil prices and inflation.

This paper adds value to existing research in several key ways. Firstly, it offers contemporary analysis based on data that reflects structural changes within the foreign exchange system of Nigeria. Secondly, it utilizes asymmetric volatility models, which offer a more accurate depiction of exchange rate fluctuations than traditional linear models. Lastly, it broadens the scope of analysis from financial markets' performance to consider the implications of the results in the context of the uncertainty-investment relationship.

The main objective of this study is to examine the effect of exchange rate volatility on stock market performance in Nigeria and assess its implications for investment-related uncertainty. Specifically, the study seeks to:

1. Estimate exchange rate volatility in Nigeria using EGARCH and TGARCH models.
2. Examine the effect of exchange rate volatility on stock market returns while controlling for oil prices and inflation.
3. Evaluate the implications of exchange rate volatility for investment-related uncertainty in Nigeria.

MATERIALS AND METHODS

This section presents the data sources, variable descriptions, and econometric techniques employed to examine the relationship between exchange rate volatility and stock market performance in Nigeria.

Data Collection

This research makes use of monthly secondary data, ranging from January 2010 to December 2025. The time span of this study includes crucial events that took place in Nigeria's foreign exchange market, such as exchange rate liberalisation in 2016, economic challenges caused by the COVID-19 pandemic, and foreign exchange policy changes in 2023.

Four variables were used in the analysis. Official USD/NGN exchange rate, referred to as EXR in this paper, was taken from the Central Bank of Nigeria.

ASI, an index that reflects performance of the Nigerian Exchange Group, serves as a proxy for stock market return in this study. Inflation rate (INF) and crude oil prices (OIL) were included as control variables since Nigeria depends on crude oil exports for its foreign exchange reserves and is subject to macroeconomic volatility. OIL data were collected from international financial databases, whereas INF data came from the Central Bank of Nigeria.

Logarithmic returns for all variables were calculated in order to eliminate heteroskedasticity and variance instability. It also makes the results easily interpretable in percentage terms (Tsay, 2010; Brooks, 2019).

Exchange Rate Volatility Modelling

Financial time series are often characterized by volatility clustering and time-varying variance, making conventional linear models unsuitable for volatility estimation. To capture these characteristics, exchange rate volatility was estimated using asymmetric Generalized Autoregressive Conditional Heteroskedasticity (GARCH) models (Engle, 1982; Bollerslev, 1986).

Exponential GARCH (EGARCH) Model

The Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGARCH) model proposed by Nelson (1991) was employed to estimate exchange rate volatility and capture potential asymmetries in the response of volatility to market shocks. The EGARCH(1,1) model is specified as:

$$\ln(\sigma_t{}^2) = \omega + \alpha\left|\frac{\epsilon_{t-1}}{\sigma_{t-1}}\right| + \gamma\left(\frac{\epsilon_{t-1}}{\sigma_{t-1}}\right) + \beta\ln(\sigma_{t-1}^2)$$

where:

- σ_t^2 represents conditional variance (exchange rate volatility)
- α measures the magnitude effect of shocks
- γ captures symmetric or leverage effects
- β measures volatility persistence

A significant and positive value of β indicates persistent volatility, while a significant γ parameter suggests asymmetric responses to positive and negative shocks.

Threshold GARCH (TGARCH) Model

To further investigate possible asymmetric effects, the Threshold GARCH (TGARCH) model developed by Glosten et al. (1993) was estimated. The TGARCH(1,1) specification is given as:

$$\sigma_t^2 = \omega + \alpha\epsilon_{t-1}^2 + \gamma D_{t-1}\epsilon_{t-1}^2 \beta\sigma_{t-1}^2$$

where:

Where D_{t-1} is a dummy variable that takes the value 1 when the lagged error term is negative and 0 otherwise.

The parameter γ measures whether negative shocks exert a different effect on volatility than positive shocks of similar magnitude.

Regression Model Specification

Following the estimation of exchange rate volatility, the generated volatility series was incorporated into a regression model to examine its effect on stock market performance. The model is specified as:

$$SMR_t = \delta_0 + \delta_1 ERV_t + \delta_2 OIL_t + \delta_3 INF_t + n_t$$

where:

- SMR_t represents stock market returns
- ERV_t represents estimated exchange rate volatility
- OIL_t represents crude oil prices
- INF_t represents inflation rate
- n_t represents the error term.

The inclusion of oil prices and inflation controls for important macroeconomic factors that may influence stock market performance in Nigeria.

Diagnostic Tests

Stationarity test of the variables involved the use of the Augmented Dickey–Fuller (ADF) unit root test before estimating the model. The existence of volatility clustering and conditional heteroskedasticity was assessed by conducting the ARCH–LM test. This process is necessary since it confirms that the data is suitable for carrying out volatility modelling.

In the empirical part of the study, econometrics techniques used for time series modelling in finance were applied in order to capture issues related to volatility persistence, asymmetry, and exchange rate volatility effect on stock markets performance.

RESULTS AND DISCUSSIONS

Time Series Behaviour of the Variables

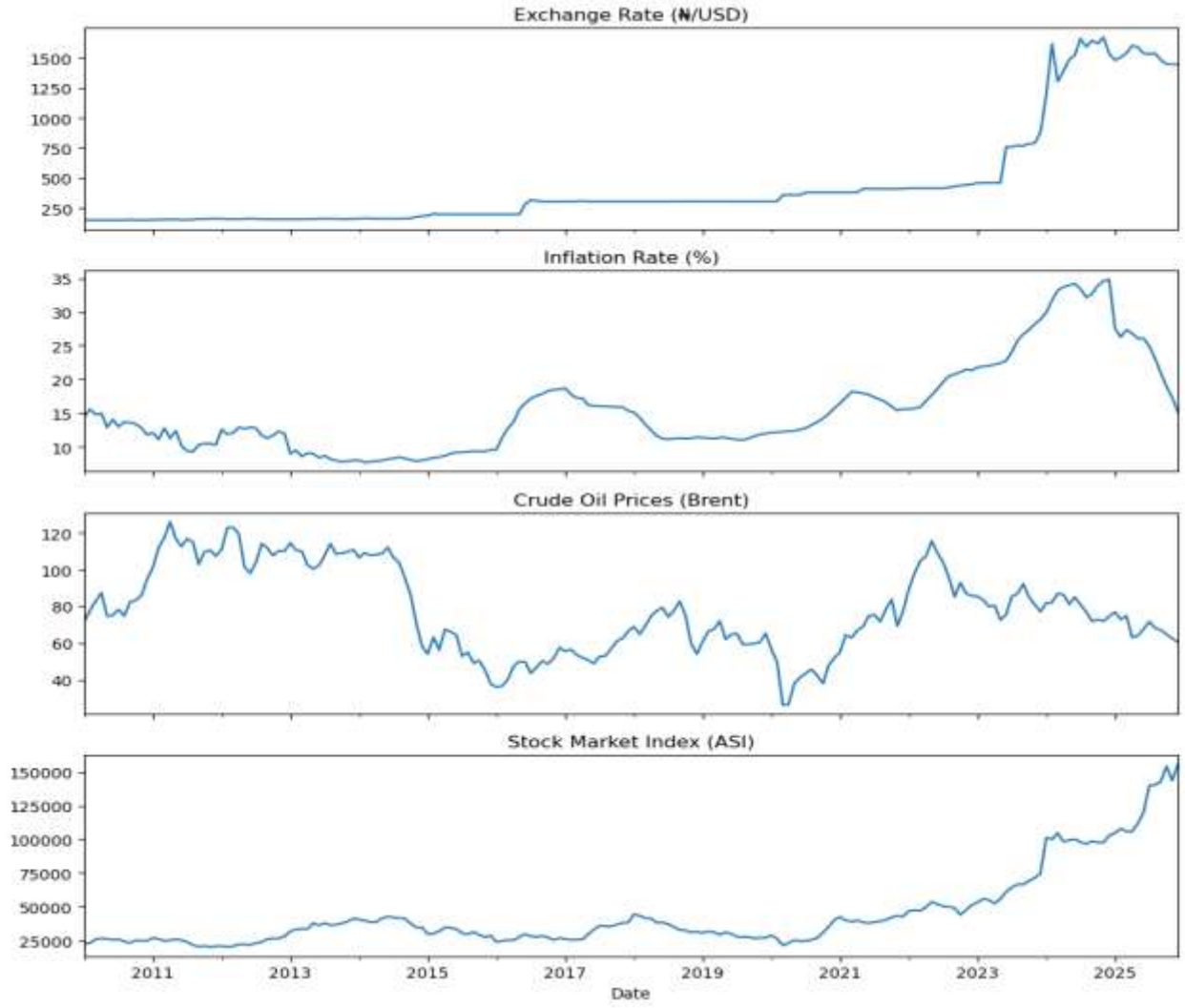

Figure 1 Time Series Plot of Exchange Rate, Inflation, Oil Prices and Stock Market Performance

Figure 1 provides a visual representation of the dynamics of the exchange rate (EXR), inflation rate (INF), crude oil prices (OIL), and stock market index (ASI) in Nigeria during the period 2010–2025. A cursory look at the plot shows the existence of considerable movements for all variables examined above, implying that there could be dynamic trends or even volatility among others.

As depicted in Figure 1 above, the exchange rate series exhibits a significant upward trend, especially after 2016 due to depreciation of the Nigerian naira vis-à-vis the US dollar. The considerable rises witnessed after 2023 are as a result of foreign exchange regulations implemented by the Central Bank of Nigeria. Such trends imply that there was volatility in Nigeria's foreign exchange rates.

For the inflation rate, the plot depicts a cyclical pattern in which inflation fluctuates between moderation and acceleration. During the early years of the study period, i.e., between 2012 and 2015, inflation was relatively stable. However, inflation began to fluctuate significantly starting from 2016 to reach the peak between 2023 and 2024. The fluctuations may be explained by exchange rate pass-through, changes in the supply side, and changes in monetary policies, among others.

For the price of crude oil, the series appears quite volatile with significant drops being witnessed in the year 2015–2016 and 2020. These are periods when global crude oil markets experience shocks. On the other hand,

oil prices appear to recover between 2021 and 2022. Considering that Nigeria is one of the top producers of oil, the price dynamics could be of great concern regarding foreign exchange revenues, among others.

The stock market index shows an increasing trend over the period considered. After 2023, the plot indicates remarkable growth, suggesting that investors were very active in their investment strategies. Such a trend may arise from positive expectations about market activities, investments, and changes in macroeconomic conditions, among other factors.

It can therefore be concluded that the variables considered have significant movements, and it is reasonable to examine the presence of stationarity, volatility, and structural breaks, among others.

Descriptive Statistics

Table 1 Summary Statistics of Variables

Variable	Observations	Mean	Std. Dev.	Minimum	25th Percentile	Median	75th Percentile	Maximum
EXR (₦/USD)	192	439.64	431.35	150.00	162.21	305.53	412.45	1670.89
INF (%)	192	15.51	6.78	7.70	11.20	13.28	17.87	34.80
OIL (USD/barrel)	192	77.65	23.30	26.35	60.27	74.88	98.58	125.89
ASI (Index Points)	192	44,317.05	29,075.04	20,003.37	26,412.03	34,600.10	43,965.22	155,613.03

Table 1 provides the descriptive statistics for the set of variables used in the study. It is noteworthy that the dataset comprises 192 monthly observations, ranging from January 2010 to December 2025. The descriptive statistics indicate significant variations among the variables due to dynamic changes within Nigeria's macroeconomic and financial environments over the entire research period.

The average exchange rate (EXR) was recorded as ₦439.64 per US dollar with quite a high standard deviation of ₦431.35. Significant differences between the minimum value of ₦150.00/USD and the maximum value of ₦1,670.89/USD suggest significant depreciation and instabilities of the Nigerian naira throughout the analysis period. Therefore, wide dispersion of exchange rates can be taken as an initial indication of exchange rate fluctuations potentially influencing the financial markets.

The inflation (INF) averaged 15.51% with the corresponding standard deviation of 6.78%. It can be seen that the value of the inflation rate varied from the minimum value of 7.70% to the maximum value of 34.80%, thus implying significant instability of the general price level. The observed fluctuations can be attributed to macroeconomic problems faced by Nigeria, including the effects of exchange rate pass-through, disruptions in the supply chain, and monetary policy measures.

Oil prices (OIL) amounted to the average level of USD 77.65 per barrel with fairly high variability that is captured in the value of standard deviation equal to USD 23.30. During the research period, crude oil prices varied from USD 26.35 to USD 125.89 per barrel. It should be noted that volatility of oil prices plays a vital role since Nigeria's economy depends on the export of crude oil to generate income and revenues.

Finally, the All Share Index (ASI) measured by means of the Nigerian Exchange Group amounted to the mean value of 44,317.05 points with quite a high standard deviation of 29,075.04 points. The minimum and

maximum values of ASI were 20,003.37 and 155,613.03 points, respectively. These figures confirm significant fluctuations of the stock market over time, which is indicative of different macroeconomic conditions and investor expectations.

Stationarity Analysis

Table 2 Augmented Dickey-Fuller (ADF) Unit Root Test Results

Variable	ADF Statistic	p-value	Decision (5% level)	Order of Integration
EXR (Log Returns)	-12.4222	0.0000	Reject H_0	I(0)
INF (Log Returns)	-3.8303	0.0026	Reject H_0	I(0)
OIL (Log Returns)	-11.6910	0.0000	Reject H_0	I(0)
ASI (Log Returns)	-11.8824	0.0000	Reject H_0	I(0)

Stationarity was determined using the Augmented Dickey Fuller (ADF) test for unit root.

The findings show that all variables have log return forms that are stationary at the 5% level of significance. That is, all the ADF statistics for the variables: exchange rate returns (EXR), inflation (INF), crude oil prices (OIL), and stock market returns (ASI) are highly negative, and their associated p-values are less than the level of significance of 0.05. Therefore, all the hypotheses on the null unit root cannot be accepted.

The ADF statistic for exchange rate return series is -12.4222 with a p-value of 0.0000. The series is therefore highly stationary. Similarly, the ADF statistic and p-value for inflation are -3.8303 and 0.0026 respectively; hence, indicating that the series is stationary. On the other hand, crude oil price series and stock market return series are also highly stationary with ADF statistics of -11.6910 and -11.8824 respectively.

In addition, it can be seen that all variables are integrated of order zero (I(0)). That is, they are already stationary and thus do not need further differencing in estimating their models. This conclusion is drawn from econometrics theory, where return series are usually stationary even if the level series are non-stationary (Hamilton, 1994; Enders, 2015).

Stationarity of all variables is an important condition for any econometric modeling since it prevents one from obtaining erroneous statistical outcomes. Stationarity of the series means that it can be used for modeling volatility and regression analysis. Therefore, the next step for the study is to use ARCH-LM test and GARCH model to determine volatility characteristics.

Test for ARCH Effects

Table 3 ARCH-LM Test Results

Variable	LM Statistic	p-value	Decision (5% level)	ARCH Effect
EXR (Returns)	17.4308	0.0654	Fail to Reject H_0	Weak Evidence
INF (Returns)	7.1896	0.7074	Fail to Reject H_0	No ARCH Effect
OIL (Returns)	18.2169	0.0514	Fail to Reject H_0	Borderline
ASI (Returns)	3.0624	0.9799	Fail to Reject H_0	No ARCH Effect

To evaluate whether there is conditional heteroscedasticity, Autoregressive Conditional Heteroskedasticity Lagrange Multiplier test (ARCH-LM test) was used.

According to the results displayed in Table 3, it can be concluded that the hypothesis of no ARCH effect is not rejected at 5% level of significance for all variables. An LM statistic of 17.4308 with a p-value of 0.0654 was obtained from exchange rate returns, while a higher LM statistic of 18.2169 with a p-value of 0.0514 was derived from crude oil prices. These p-values are relatively close to significance at 5%, indicating presence of ARCH effect although it is weak.

For inflation and stock market return, higher p-values were obtained which are 0.7074 and 0.9799 respectively. Hence, based on the results, exchange rate return has higher volatility compared to inflation and stock market return.

Even though there is lack of strong statistical evidence at 5% level of significance, the series for exchange rate exhibits financial time-series characteristics, such as high variations, and persistence of movements as depicted in the graphs drawn above. According to prior research, exchange rates in emerging countries usually have time-varying volatility that might not be fully revealed by normal ARCH-LM tests (Kanas, 2000; Yang & Doong, 2004).

There is presence of weak to borderline ARCH effect in exchange rate return. This provides adequate reason to carry out further analysis using asymmetric GARCH models. Thus, the paper moves forward in estimating EGARCH and TGARCH models of exchange rate volatility in Nigeria.

EGARCH Estimation Results

Table 4 Results of the EGARCH Model

Parameter	**Coefficient**	**Std. Error**	**t-Statistic**	**p-value**	**Interpretation**
μ (Mean)	-0.0053	0.0028	-1.877	0.0605	Not statistically significant
ω (Constant)	0.0027	0.2420	0.011	0.9910	Not significant
α (ARCH Effect)	0.6328	0.1590	3.989	0.0001	Significant
β (GARCH Effect)	0.9754	0.0325	29.997	0.0000	Highly significant

The Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGARCH) model was employed to analyze the dynamics of the volatility of exchange rate returns in Nigeria. The outcomes of the analysis are illustrated in Table 4.

It should be noted that the coefficient of the mean equation ($\mu = -0.0053$) is negative and statistically insignificant ($p = 0.0605$). Thus, the average return of the exchange rate in the specified period does not differ significantly from zero. As can be seen from these data, exchange rate movements in Nigeria are determined predominantly by disturbances and volatility dynamics and not by trends in returns.

It is necessary to state that the constant ($\omega = 0.0027$) is statistically insignificant ($p = 0.9910$). It means that the level of the baseline of the variance is quite small considering that the effect of shocks and volatility in the past is considered. Such a result is common when working with volatility behavior as it is described mostly by dynamic terms in finance time series.

As can be seen from the results obtained, the value of the ARCH parameter is equal to $\alpha = 0.6328$, which is statistically significant at the level of 1% ($p < 0.001$). In other words, there is a significant response of exchange rate volatility to market disturbances in the short term. Thus, any deviations in the exchange rate contribute greatly to its volatility.

It is particularly important that the value of the GARCH term equals 0.9754. The specified coefficient is positive and close to one. At the same time, it is highly statistically significant ($p < 0.001$). These results serve as convincing evidence of the presence of volatility persistence in Nigeria's foreign exchange market. High values of this parameter demonstrate a high rate of dissipation of shock effects and, thus, lead to the persistence of volatility levels.

The presence of such dynamics of volatility means that the uncertainty of the Nigerian exchange rate persists for a long time. It can be explained by constant macroeconomic imbalance, unstable earnings of foreign exchange income, dependency on the export of raw materials (crude oil), as well as uncertainty of exchange rate policies (Nelson, 1991; Kubo, 2008).

In terms of investment processes, such a situation can be interpreted in line with the uncertainty–investment framework. Namely, it is clear that such behavior leads to an increase in uncertainty in investment decisions and the postponement of their implementation until the reduction of risks is achieved.

TGARCH Estimation Results

Table 5 Results of the TGARCH model

Parameter	Coefficient	Std. Error	t-Statistic	p-value	Interpretation
μ (Mean)	-0.0042	0.0019	-2.257	0.0240	Statistically significant
ω (Constant)	0.000096	0.000066	1.449	0.1470	Not significant
α (ARCH Effect)	0.2594	0.1540	1.684	0.0922	Weakly significant
γ (Asymmetry)	0.1876	0.2530	0.743	0.4580	Not significant
β (GARCH Effect)	0.6468	0.0791	8.181	0.0000	Highly significant

In order to further understand the characteristics of exchange rate volatility, the TGARCH model was estimated. The use of the TGARCH model makes it possible to consider the possibility of the existence of asymmetric effects in which the effect of positive and negative shocks may be significantly different. The results of estimating the TGARCH model are shown in Table 5.

The coefficient ($\mu = -0.0042$) of the mean equation is negative and statistically significant at the 5% level ($p = 0.0240$). This result means that during the period under study, returns in the foreign exchange market exhibited a slight negative trend. Even though the value of the estimated coefficient is low, its significance shows that there is a systematic part in exchange rate return fluctuations.

The intercept term ($\omega = 0.000096$) is statistically insignificant ($p = 0.1470$) and positive, which means that without considering the effects of previous shocks and volatility, the baseline volatility was equal to zero. This finding is consistent with those made when estimating the EGARCH model, and it means that exchange rate volatility is driven by dynamic market conditions instead of a constant underlying variance.

The ARCH coefficient ($\alpha = 0.2594$) is statistically insignificant at the 10% level ($p = 0.0922$) and is positive. This finding implies that recent shocks contribute to the creation of the current level of exchange rate volatility. Even though the short-term effect of past shocks is not strong in comparison to that estimated in the EGARCH case, the result proves the existence of the phenomenon of volatility clustering in the foreign exchange market.

The asymmetry coefficient ($\gamma = 0.1876$) is positive but insignificant ($p = 0.4580$). It can be concluded that positive and negative shocks have a similar effect on exchange rate volatility, i.e., there is no proof that negative shocks lead to stronger reactions in volatility compared to positive ones. Overall, the lack of the effect of asymmetry implies that exchange rate volatility in Nigeria is mainly symmetric.

The coefficient ($\beta = 0.6468$) is highly significant ($p < 0.001$) and positive. It is interpreted as evidence that the effects of exchange rate shocks are persistent, and the long-term reaction to these shocks will affect the volatility level in the future. Unlike the EGARCH model, in which the value of the persistence coefficient was higher, here it demonstrates lower values but is still considerable. Consequently, there is evidence of the persistence of exchange rate uncertainty.

Therefore, the results of estimating the TGARCH model are consistent with those of the EGARCH model. It is clear that exchange rate shocks are persistent, but there is evidence of their long-term impact on volatility. Furthermore, contrary to many financial markets, in which adverse shocks cause stronger reactions, there are no asymmetries in exchange rate volatility in Nigeria.

Finally, the results obtained when using the TGARCH model provide new evidence that the persistence of volatility is a more characteristic feature of exchange rate volatility compared to asymmetry. In conclusion, it can be said that while designing policies for reducing exchange rate volatility in Nigeria, authorities should focus on dealing with its root causes instead of worrying about shocks' directions.

3.7 Effect of Exchange Rate Volatility on Stock Market Performance

Table 6 Regression Analysis Results

Variable	Coefficient	Std. Error	t-Statistic	p-value	Interpretation
Constant	-0.0089	0.0044	-2.027	0.044	Significant
EXR (Exchange Rate Volatility)	0.1162	0.0730	1.601	0.111	Not significant
OIL (Oil Price Returns)	0.2003	0.0460	4.332	0.000	Highly significant
INF (Inflation Returns)	-0.0246	0.0760	-0.322	0.748	Not significant

Table 7 Regression Analysis Model Summary

Statistic	Value
R^2	0.096
Adjusted R^2	0.081
F-statistic	6.607 ($p = 0.0003$)
Durbin–Watson	1.920

To examine the effect of exchange rate volatility on stock market performance, a multiple regression model was estimated with stock market returns as the dependent variable and exchange rate volatility, oil price returns, and inflation returns as the explanatory variables. The results are presented in Tables 6 and 7.

Exchange rate volatility has a positive and non-significant impact on stock market returns in Nigeria (EXR, $\beta = 0.1162$, $p = 0.111$). This implies that changes in exchange rates do not affect stock market returns significantly in the country during the considered period. Even though there exists a positive correlation between an increase in exchange rate returns and stock market returns, its effect is too small to be statistically meaningful.

The insignificant relationship between exchange rate volatility and stock market returns can be linked to the weakness of the mechanism of the transmission of exchange rates to stock markets. As opposed to what the flow-oriented approach suggests, changes in exchange rates apparently do not have a significant impact on

corporate profits and thus cannot affect stock prices. This may be linked to certain market-related characteristics and limitations.

On the contrary, oil price returns demonstrate a positive and highly significant influence on stock market returns (OIL, $\beta = 0.2003$, $p < 0.001$). In other words, the increase in oil prices leads to improved stock market performance in Nigeria. This can be explained by the importance of the oil export industry for the economy of Nigeria and its ability to generate significant revenues for the country. Therefore, the positive dynamics in oil prices will help improve the situation in the country and stimulate stock market performance.

Inflation returns have a negative but non-significant effect on stock market returns (INF, $\beta = -0.0246$, $p = 0.748$). Thus, the short-term changes in the inflation rate during the studied period are not expected to have a significant effect on the behavior of stock market participants and their decisions. The impact of the inflation rate on the stock market can be seen only when examining long-term trends because inflation can lead to the accumulation of risks in the long term.

It should be noted that the coefficient of determination of the regression model shows that the independent variables account for 9.6% of the variance in stock market returns. Although this proportion is relatively low, it is not uncommon when trying to estimate stock market returns because stock returns are driven by many factors that are hard to take into account within the scope of the research.

After accounting for model complexity, the adjusted R-squared of 8.1% confirms that the explanatory power of the independent variables remains moderate. Moreover, the whole model is statistically significant at $p = 0.0003$, which can be concluded from the F-test of 6.607. Thus, the explanatory variables account for some of the variations in the dependent variable.

Finally, the Durbin-Watson statistic equaling 1.920 suggests the lack of autocorrelation issues in the obtained regression coefficients.

Concluding, the results show that exchange rate returns do not affect stock market returns while the oil price returns serve as the most influential independent variable. In other words, the stock market reacts more sensitively to the fluctuations in the oil market than to those in the foreign exchange market. This means that volatility in the foreign exchange market can have indirect effects on the stock market via influencing economic activity.

DISCUSSION OF FINDINGS

The research conducted in this study explores the relationship between exchange rate volatility and stock market performance in Nigeria using asymmetric GARCH models and regression analysis. It yields significant findings that will be useful in providing insight into the behavior of exchange rate volatility and its effects on financial market performance in Nigeria.

Based on the results of volatility modeling, exchange rate volatility in Nigeria can be described as extremely persistent. Both EGARCH and TGARCH models provided positive and significant GARCH coefficients, which confirms the fact that the foreign exchange market shocks have a long-term impact on it. The extremely high value of persistence found using EGARCH model indicates that volatility takes a long time to converge and creates extended periods of uncertainty in the economy. This conclusion is consistent with the phenomenon known as volatility clustering observed in financial markets and corresponds with previous findings on exchange rate behavior in emerging economies, which show persistence as an inherent feature of this variable (Engle, 1982; Bollerslev, 1986; Kubo, 2008).

Exchange rate volatility was not found to have any significant asymmetric features. According to the insignificant asymmetry coefficient derived using TGARCH model, positive and negative foreign exchange shocks cause approximately equal volatility in Nigeria. This result indicates that in Nigeria's foreign exchange market, the volatility depends primarily on persistence rather than the type of shock received. The finding diverges from the evidence provided by Yang & Doong (2004), Bahmani-Oskooee & Saha (2016), who report

that in many developed financial markets, adverse shocks create larger volatility than favorable ones. The result may indicate the effect of exchange rate management policies, regulation, and other peculiarities of the Nigerian foreign exchange market on volatility generation.

With regard to stock market performance, the results of regression analysis revealed no significant relationship between exchange rate returns and stock market returns. This result is particularly unexpected because it contradicts the basic predictions made according to the flow-oriented model, which states that exchange rate movements affect stock prices through changes in competitiveness and corporate profits. The lack of significant relationship means that exchange rate volatility in Nigeria does not translate to stock market volatility.

This result may be explained by several possible reasons. Firstly, due to structural rigidities, exchange rate movement and stock price relationship might be impeded. Secondly, the integration of domestic financial markets with international financial markets in Nigeria might be relatively low, resulting in reduced sensitivity of stock prices to exchange rate volatility. Finally, investors may consider other factors like macroeconomic variables, rather than exchange rates, when making decisions to invest in stocks.

Crude oil prices were identified as a significant factor impacting stock market performance. The positive correlation between crude oil price returns and stock market returns confirms the continued importance of the oil market in determining economic performance in Nigeria. As one of the major oil-producing countries, Nigeria remains highly dependent on the oil market for earning money and sustaining its economic development. Favorable movements of oil prices may, therefore, enhance investor confidence, stimulate economic activities, and improve stock market performance.

These results contribute to the ongoing discussions about exchange rate–stock market relationships in emerging economies. In contrast to the evidence provided by many previous studies indicating that these relationships exist in most cases, the study proves the existence of significant deviations in case of countries experiencing structural rigidity and commodity dependence. The finding suggests that macroeconomic relationships are highly sensitive to structural factors of the economy and should be considered separately.

What is more important, the results suggest that the effect of exchange rate volatility may occur through higher uncertainty rather than through affecting stock prices. Persistent foreign exchange volatility leads to increased uncertainty concerning future business performance and future investments. High levels of uncertainty may force companies and investors to defer their decision-making, which, in turn, has long-term impact on economic performance. The finding fits well in the uncertainty-investment model of the economy.

CONCLUSION

This study examines the impact of exchange rate volatility on stock market performance in Nigeria with a view to assessing its implications for investment uncertainty over the period 2010-2025. The study utilizes asymmetric volatility modeling approach involving the estimation of EGARCH and TGARCH models in order to analyze exchange rate volatility dynamics and explore its effects on stock market returns under control for oil prices and inflation.

The findings of the study show that exchange rate volatility in Nigeria exhibits a very high level of persistence. This conclusion is justified by the results of both the EGARCH and TGARCH models that reveal shocks to the foreign exchange market tend to have a persistent nature. Therefore, exchange rate uncertainty becomes one of the major sources of economic uncertainty in Nigeria, despite the lack of strong evidence of exchange rate volatility asymmetry.

It was found that exchange rate volatility do not have any significant impact on stock market performance. Hence, the study finds no proof that there is a significant transmission mechanism between the foreign exchange and stock markets in Nigeria. On the other hand, oil prices are shown to have a positive and statistically significant impact on stock market returns that can be explained by the ongoing relevance of the oil

industry in Nigeria's economy. There is no statistically significant association between inflation and stock market performance.

Thus, the contribution of this study lies in providing up-to-date information about the exchange rate-stock market relationship, based on recent data on major structural changes in Nigeria's foreign exchange market and asymmetric GARCH models used to investigate the dynamics of exchange rate volatility. Moreover, the study shows that persistence rather than asymmetry is the dominating characteristic of exchange rate dynamics in Nigeria.

Policy makers should take these findings into account in order to design effective economic and financial policies in Nigeria. Exchange rate management policies will become especially relevant in this context as persistent volatility discourages investments due to uncertainty related to the costs, revenue, and return on investment of foreign investments. It will be reasonable to reduce reliance on crude oil revenues in order to diminish vulnerability to foreign market shocks. The results of this research generally agree with literature available regarding various emerging nations which heavily rely on commodities, since exchange rate instability plays a bigger role in creating macroeconomic uncertainty than causing stock market fluctuations in such countries. Studies carried out in other emerging nations of Africa and Asia have proven that the structural nature of these economies, limited integration of their financial markets and their reliance on commodities for earning exports usually hinder the process of passing exchange rate shocks onto the stock markets in these nations. Hence, measures designed to improve foreign exchange market stability, enhance credibility of policies, earn diversified export income and lower dependence on oil export could benefit the Nigerian economy.

In conclusion, it should be noted that while exchange rate volatility is an important source of economic uncertainty in Nigeria, its effect on stock market performance is minimal. Crude oil prices play a far more important role in stock market development. Further studies can be devoted to testing this hypothesis through including additional macroeconomic variables, sectoral stock market indices, and different volatility modeling approaches.

Data Availability

The data used in this study were obtained from publicly available sources, including the Central Bank of Nigeria (CBN), the Nigerian Exchange Group (NGX), and international commodity market databases. The datasets are available from the corresponding author upon reasonable request.

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