



EFFECT OF FOREIGN EXCHANGE RATE VOLATILITY AND CORPORATE PERFORMANCE: EVIDENCE FROM NIGERIA'S MANUFACTURING SECTOR

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Abstract

The forex volatility that greeted the 2023 general election in Nigeria and its exacerbation afterwards is a source of serious concern amongst manufacturers wherein unprecedented losses have been filed by major stock market participants among manufacturers in Nigeria. Consequent upon this, this study examines foreign exchange rate volatility's impact on the corporate performance of manufacturing firms in Nigeria using a panel regression design over a 10-year period. The study investigated the forex volatility effect on financial performance as measured with return on asset, return on equity and Tobin's Q. The findings revealed that forex volatility has no statistical significance on return on equity and return on asset. The study discovered that, forex volatility has statistically negative effect on Tobin's Q but does not have a significant effect on ROE and ROA. This informs the conclusion that foreign exchange volatility embeds public information in its effect on performance as the significant effect noted was on the stock market-based performance of manufacturing firms. Among other things, the report recommends that prospective investors in the industrial firms should create plans that strike a balance between both foreign exchange and the profitability of their respective investee companies.

Key words: Foreign exchange, financial performance, volatility, Manufacturing firms, Nigeria
JEL Code: J44

1. Introduction

Given the basic objective of corporate entity being profit-oriented and financial performance-driven, corporate profitability revolves around a company's capacity to make money, control costs, and make efficient use of its resources towards achieving profitability, create value for stakeholders, and ensure long-term sustainability, it is imperative that such performance can be undermined by the (mis)management of forex. Financial performance is a layered concept that cuts across various aspects of a firm's financial health, including profitability, liquidity, solvency, efficiency, and market performance. The manufacturing sector plays a significant role in a country's economic development and contributes significantly to its Gross Domestic Product (GDP) and employment (Adeniji, 2023). In Nigeria, it accounts for significant share of the GDP and has closed the unemployment gap even though it is faced with low access to affordable finance, poor infrastructural quality and a number of other challenges (Central Bank of Nigeria [CBN], 2025). However, since the liberalization of exchange rate (Forex) in the country in 2023, the sector faces some challenges on its financial performance. Specifically, Dangote Cement Plc, reported a significant FX loss of N86.4 billion in the second quarter of 2023 due to exposure to currency fluctuations. Lafarge Africa Plc also recorded a foreign exchange (forex) loss of N22.7 billion in its 2022 financial reports. Berger Paints Nigeria Plc lost N1.2 billion due to devaluation of the naira in its 2022 financial statements (Securities and Exchange Commission, 2023).

The Forex losses may have added to the decline in retained earnings, deterioration of financial performance indicators, revaluation losses arising from foreign currency-denominated balances, and exceptional non-operating losses. Forex volatility and the associated losses have underscored the importance of effective risk management strategies and hedging mechanisms for Nigerian companies with significant foreign currency exposure (Oshim & Nze, 2024). Previous research efforts have viewed the forex from different perspectives. Its volatility which explains the fluctuations or Changes in the currency rate between currencies over a given period has been examined on various measures of performance in Nigeria. Egolum et al., (2020) examined how exchange rate fluctuation affected financial performance of quoted conglomerate before the liberalization of forex and discovered a positive effect on ROA which is significant, thus suggesting that conglomerate could leverage exchange rate fluctuation to their advantage to improve their return on assets. In the finance sector, Abubakar (2020) observed that exchange rate volatility has no significant effect on Returns on Capital Employed (ROCE) and ROA for deposit money banks in Nigeria. More recently, Abina (2023) found that the need to improve financial engineering in managing forex volatility in Nigeria. This is particularly important because forex measures risk and uncertainty associated with the investments and economy as found that fluctuations in exchange rates had no discernible impact on engaged in international trade, foreign investments, or operations involving multiple currencies.

Meanwhile, researcher have hardly examined forex within the context of manufacturing firms since the liberalization of forex in 2023. More so, given the significance of the manufacturing sector in the Nigerian economy, the importance of financial performance for stakeholders and the challenges posed by forex volatility is crucial to understand the interplay between these factors in listed manufacturing firms in Nigeria. While the connection between financial performance and currency volatility has been widely studied, isolating the manufacturing firms for academic study, especially as Nigerians that face forex crises, is rare.

Given this gap, this study specifically addresses the research hypothesis:

Ho: Foreign exchange rate volatility does not significantly affect corporate performance in Nigeria's Manufacturing Sector

2. Conceptual Review

This section reviews the concepts of interest of this study from various perspectives. Specifically, the concept as addressed with respect to general and specific connotations as well as the various available measurements for each of the concepts. These concepts include foreign exchange rate, foreign exchange rate and volatility, corporate performance.

Foreign Exchange and Forex Volatility

The price of one currency represented in terms of another currency or set of different currencies is called an exchange rate. Abubakar (2020) established that the rate at which a currency is exchanged for another currency is known as exchange rate. It is known as the ratio at which a unit of currency of one country is stated in a different currency. The currency rate is a crucial economic factor in small open economies like Nigeria that actively participate in international trade. The exchange rate is the fundamental connection between the domestic and international markets for a variety of products, services, and financial assets. It is defined as the value of one unit of foreign currency relative to local currency (Abubakar, 2020). Exchange rates fluctuate depending on several factors, including political situations, interest rates, monetary policy and inflation. Fluctuations are unpredictable, and the market could suddenly move against positive

tides. This will affect the price of a country's forex contract and related potential gains and losses. Forex volatility describes changes in exchange rates that result from changes in currency values. Such volatility has an impact on a company's valuation as well as its cash flow. From a theoretical standpoint, it is widely accepted that changes in exchange rates are a significant cause of macroeconomic uncertainty. The key factor of macro-economic factors which do not usually produce the same crucial value is known as exchanger rate, which deviates very frequently, which helps to measure the currency's value of the country, whose imbalance is measured by checking the nonconformities in comparative purchasing power parity (Hassan, Baksh and Abdullah 2020).

Although a wide range of factors affect the exchange rate, including interest rates, inflation, and the political and economic climate in Nigeria, fixed exchange rates are often depreciated or revalued, suggesting that they may fluctuate over time and be volatile (Lagat & Nyandema 2016). Han et al., (2019) explained that the foreign exchange risk is the probability difference of the changes in the expected the foreign currency's worth and that foreign exchange exposure was defined as the degree of the risks that companies face because of the exchange rate changes. Exchange rate volatility has however become a central issue in international trade literature. The rapid change and often inability of speculator to predict foreign exchange rate in the market explain the concept of volatility. It refers to the unpredictability nature of the value of one currency relative to another (Monhot, 2011). This rapid and unpredictable changes is usually a function of market conditions, speculation, sentiments as well as specific geographical and economic conditions. Volatility connectedness quantifies the dynamic and directional characterization of spillovers among various assets or across markets (Diebold and Yilmaz, 2015). It is often identified by high turnover in foreign exchange markets as posited by bank of international settlement (2022). Specifically, in April 2022, turnover in global foreign exchange (FX) markets got to a height of \$7.5 trillion daily. This is a volume that was about thirty times more than daily GDP worldwide.

In Nigeria, significant devaluation and volatility against major international currencies like the US Dollar (USD), Euro (EUR), Japanese Yen (JPY), and British Pound Sterling (GBP) were experienced over the past few years. The Naira has devalued significantly representing a staggering level of over 800% against the US Dollar within a short period (Olumide & Uthman 2026). This extreme volatility and devaluation of the Naira against major currencies can be attributed to several factors (CBN, 2023), such as heavy reliance of the country on reined oil exports, which are primarily and predominantly denominated in US Dollars. Also, persistent trade deficits and limited foreign exchange reserves which culminated into structural economic imbalances, political instability and policy uncertainties amongst other factors

Financial performance

Any foreign receipts to a nation entail the supply of foreign currencies in return for domestic currency, which suggests that any payments made to foreign nations entail the demand or purchase of foreign currencies using domestic currency(Lagat & Nyandema 2016). These transactions are done to seek various kinds of financial gain. Hassan, Baksh and Abdullah (2020) explained the following forms of exchange rate risks for industries functioning in international trade, which are a transactional exposure, transformational exposure, and economic exposure and went further to explain Transactional exposure as "the probability of loss and gain because of exchange rate fluctuations' effect on expected cash flows." The transactional risk is mostly

caused by movements amongst exchange rates from the transactional date and the agreement date about future payments in shapes of any foreign currency. The transformational risk some time called accounting risk is a risk instigate by the change of foreign money to another currency. The economic risk a risk which has changed in concerned foreign exchange rates which effect on the economic worth of business (Hassan, Baksh & Abdullah 2020).

Returns on Assets

Return on assets (ROA) serves as a profitability metric that reflects how well a company utilizes its assets to generate earnings prior to tax and dividend payments. Return on assets (ROA) illustrates the average profit generated from each dollar invested in assets after the production and business operations are complete. Siminica et al. (2011), describes return on assets (ROA) as a financial metric that assesses the connection between returns and the investment assets required to achieve those returns. Return on Assets demonstrates how effectively a company's owned assets can produce profits. Syamsuddin (2008) states that ROA serves as a measure of how effectively a company utilizes its financial assets to create value for its shareholders. The higher a company's ROA, the stronger its financial performance. A high ROA is drawing investors to put their money in because companies can utilize their assets for the business effectively. Return on Assets (ROA) is a metric that indicates the extent to which an asset contributes to generating a net profit (Hery, 2015).

Returns on Equity

The return on equity (ROE) ratio evaluates a company's profitability by indicating the amount of profit a business produces with the funds invested by its shareholders. Shareholders can evaluate the investment returns on their contributions through the Return on Equity ratio. Kasmir (2016) describes ROE as the ratio that assesses net profit after tax in relation to capital. ROE growth indicates that the company's future looks brighter as it is able to boost its earnings. ROE shows how effectively personal capital is utilized. Return on Equity (ROE) is an additional element that can influence the company's value. ROE reflects the company's capability to generate profit after tax by utilizing its capital effectively (Sudana, 2015). An increase in ROE will lead to a rise in the company's share price. This will enhance the profits experienced by shareholders. Brigham and Houston (2007) state that the Return on Equity, calculated as net income divided by common equity, assesses the return rate on investments made by common stockholders. Gitman and Zutter (2002) states that Return on Equity assesses the profit generated from the investment made by common stockholders in the company. Typically, the greater this return, the more advantageous it is for the owners.

Empirical Review

The study of Ali et al., (2020) is drawn towards performance as it identified the impact of forex fluctuations on international construction projects. The results of this study, which employed a quantitative approach via a randomly distributed questionnaire survey, came from top management and non-top management in the construction hierarchy with varying degrees of expertise. Even if the study's conclusions showed that financial and technical business management are helpful as guidelines for global construction project companies, the reliance of the study on primary data weakens its scientific stand hence providing a niche for an econometric analysis of forex fluctuation on financial performance.

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Abubakar (2020) investigated how one Nigerian deposit money bank's financial performance was impacted by exchange rate fluctuation. Ex-post facto research design was incorporated in the study. For the study, secondary data were gathered, and the population size consisted of all 9 deposit Money banks that are listed under the Nigerian Exchange Group and have international authorization. Exchange rate has no discernible impact on return, according to the study, which used multivariate regression statistical analysis to assess variations in the reported values of the variables on ROCE and Assets. Meanwhile, this study is restricted to the deposit money banks. Recent developments in Nigeria indicate that much is desired with respect to industrial goods firm hence the need to study of forex volatility may have affected their performance. Hussain, Hassan, Bakhsh and Abdullah (2020) investigated the effects of size, age, exchange rate fluctuations, and cash conversion cycles on businesses' financial choices. In this study, the estimator employed pooled OLS, random effects, and fixed effects methods of static panel data analysis. The impact of the exchange rate was examined using interaction approaches. Despite the study's primary focus on working capital management, the results show a strong negative link between return on assets and exchange rate during the evaluation period.

Asadullah and Ahmad (2020) aimed to predict the USD exchange rate's future values. The US dollar and the Pakistani rupee (PR). ARIMA model was used to predict exchange rates in the future and data used reported to five years ranging from the first day of April 2014 to 31st March 2019. Findings demonstrated that ARIMA (1,1,9) is the best model for predicting the exchange rate due to its robustness. Government employees, monetary policymakers, economists, and other stakeholders will find the model helpful in identifying and predicting the future trend of the exchange rate and adjust their policy appropriately. More so, Ozcam, Shim and Liu (2021) quantified the impact of the exchange rate fluctuations on firm leverage using firm-level data for leverage from 10 emerging market economies during the period from 2002 to 2015. By combining the leverage data with firm-level FX debt data for 4 emerging market countries, results are suggestive of financial frictions being more binding during depreciations than a possible relaxation of such frictions during appreciations the direction and outcome of these investigations offered details about the predictive capabilities of ARIMA on forex but ignored the possible impact of forex volatility may have led to the recent financial losses in the industrial goods industry in Nigeria. Rashid and Basit (2022) examined how changes in the actual effective exchange rate and its volatility affect the exporting activities of firms. The empirical analysis of the research is based on a wide panel of Pakistani nonfinancial firms listed at the Pakistan Stock Exchange during the period 2001–2016. The authors applied the robust twostep system-GMM estimator invented by Blundell and Bond (2000). The results showed that a rise in the real effective exchange rate significantly and favorably affects businesses' exports. Further results also pointed that compared to financially constrained firms, the adverse effect of EXRV on exports is weaker for financially unconstrained firms.

Rakshit and Neog (2021) examined the impact of COVID-19 cases, oil price returns, and exchange rate volatility on stock market returns and volatility for particular developing market economies. The authors used the arbitrage pricing theory to capture the asymmetric volatility spillover from the stock markets to overseas markets and to simulate the risk-return relationship between the risk-based elements (exchange rate volatility and COVID-19 instances) and stock market returns, exchange markets using the concept of exponential generalized autoregressive conditional heteroskedasticity. Findings revealed that exchange rate volatility has a substantial and detrimental impact on market returns during the coronavirus epidemic in Brazil (BOVESPA),

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Chile (S&P CLX IPSA), India (SENSEX), Mexico (S&P BMV IPC), and Russia (MOEX). Regarding the impact of oil price returns, the authors discover a favorable correlation between oil prices and stock market returns in each of the study's economies. While this study focuses on the oil and gas industry, the study of Heydari, Yanan, Li, Xiaohu, and Lai (2021) explored the relationship between the rate of fluctuation scale and index changes in Tehran Stock Exchange using the wavelet model. This research made use of data technique. The findings demonstrated that with consistent inflation rate as a controlling variable of exchange rate fluctuation scales and stock price index, from 2005 to 2016, there is a negative and very coherent coherence in long-term scales. According to the results, it can be said that one of the most fundamental issues in terms of training guidelines is the economic situation and the adoption of investment strategies

Alsharif (2024) investigated the effect of interest rate and foreign exchange fluctuations on Saudi Arabian bank stock returns and volatility. The generalized autoregressive conditional heteroscedasticity (GARCH) model is used in this study to analyze the stock returns of eight conventional Saudi banks and four fully Islamic Saudi banks. The findings demonstrated that Saudi conventional bank returns are positively impacted by the foreign exchange rate return, whereas Saudi Islamic bank returns are negatively impacted. It further found that, Saudi bank stock returns are positively impacted by greater interest rate returns, suggesting that the assets side is more susceptible to interest rate fluctuations than the liability side.

3. Methodology

Research Design

This study adopts panel design to cater for the longitudinal nature of the data. Specifically, the data contains thirteen (13) listed industrial goods firms on the Nigerian Exchange Group over a period 11 years. The data adopted for the study commenced in 2012 because it was the year Nigeria experienced an unprecedented hike in the foreign exchange occasioned by fluctuation in global crude oil market. The dataset however captured all the listed industrial goods firms on the Nigerian Exchange Group as at the end of 2024.

Listed Manufacturing firms were considered appropriate as a result of the how firms in the sector face huge losses due to foreign exchange rate volatility. Dangote Cement Plc was reported by Punch (8 May 2025) to be among the manufacturing firms to have incurred huge losses to the tune of N1.9bn in 2024. Hence, data were hand-extracted from the yearly reports of the firms so as to provide basis for variable measurement and data analysis.

Model Specification

Following the study of Han et al. (2020), the operation specification of this study model is stated below:

Performance = $f(\text{foreign exchange fluctuation})$

Meanwhile, econometric models are specified across three (3) different measures of performance namely, return on equity, return on assets and tobinQ. Return on equity and assets are book value based measures while TobinQ is based on Market Values.

$$roe_{it} = a_0 + a_1forex_{it} + a_2fsize_{it} + a_3fgrth_{it} + a_4ret_{it} + a_5lev_{it} + \varepsilon_{it}$$

$$roa_{it} = a_0 + a_1forex_{it} + a_2fsize_{it} + a_3fgrth_{it} + a_4ret_{it} + a_5lev_{it} + \varepsilon_{it}$$

$$tobinQ_{it} = a_0 + a_1forex_{it} + a_2fsize_{it} + a_3fgrth_{it} + a_4ret_{it} + a_5lev_{it} + \varepsilon_{it}$$

Table 2: Variables Measurement

Variable	Measures	Variable type	Definition	Source
Financial Performance (Dependent)	Tonin's Q	Outcome	Market value of equity, divided by total assets	Hosny & Elgharbawy (2021)
Financial Performance (Dependent)	Return on Equity	Outcome	Profit after tax scaled by shareholders' equity	Syam et al. (2025)
Financial Performance (Dependent)	Return on Assets	Outcome	Profit after tax scaled by total asset	Das (2020)
Foreign Exchange Fluctuation (Independent)	Forex	Predictor	Change in pretax profit scaled by change in foreign exchange	Han et al., (2020).
Firm size	Fsize	Control	Logged Total Assets	Abubabkar (2020)
Firm Growth	Fgrth	Control	Change in assets scaled by previous year assets	Abubabkar (2020)
Retained Earnings	Ret	Control	Retained earnings scaled by number of shares outstanding	Abubabkar (2020)
Leverage	lev	Control	Total debt scaled by total equity	Abubabkar (2020)

Source; Author's Compilation (2025)

4. Results and Discussion

Table 3: Descriptive Analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
Id	134	6.925926	3.752869	1	13
Year	134	2016.926	3.050886	2012	2022
Roe	134	4.277677	10.15141	-14.9087	4.81128
Roa	134	0.0488086	0.2335222	-1.79917	1.088969
Tobinq	134	1.309594	0.8367173	-0.89838	3.181799
Fgrth	134	0.1976871	1.17159	-1	13.10812
Fsize	134	9.990708	1.447134	0	12.41758
Ret	134	0.7165005	0.8929617	-1.68431	2.635979
Lev	134	4.573703	3.65126	0	15.90234
Forex	134	0.8497197	1.197277	-2.25806	3.990052

Source; Author's Computation (2025)

Table 3 presents the descriptive analysis of the data with respect to the study variables. ID was used to enumerate the number of listed firms included in this study. As indicated by the maximum value, all the 13 firms in the industrial sector were employed in the study. More so, the year showed that data were collected from 2012 to 2022 making it 11 years in all. However, the total observation was 134 instead of 143 due to missing data adopted from sources that are

available to the public. Specifically, data were gathered from annual reports retrieved from respective companies' websites and African financials repository.

Table 3 revealed that the return on equity (roe) has a mean of 4.277677, indicating an average profitability in terms of equity of 42.8%. Suggesting a low level of profitability from shareholders' investments in these firms. However, the high standard deviation of 10.15141 indicates significant variation in ROE across industrial goods firms, with some firms performing exceptionally well and others struggling to generate returns for their shareholders. The minimum value of -14.9087 and the maximum value of 45.81128 highlight the existence of industrial goods firms that incurred substantial losses (negative ROE) and firms that achieved exceptionally high profitability levels, potentially due to factors such as operational efficiency, market conditions, or competitive advantages.

Similarly, the return on assets (ROA) has a mean of 0.048809, indicating a low profitability in terms of asset utilization of 4.88%. This suggests that, on average, industrial goods firms in the sample generated a relatively low return on their total assets, indicating potential inefficiencies in asset utilization or challenges in generating revenue from their asset base. However, the standard deviation of 0.233522 indicates moderate variation in ROA across industrial goods organizations, with some being more efficient in utilizing their assets compared to others. The minimum value of -1.79917 and the maximum value of 1.088969 highlight the presence of industrial goods firms with negative returns on assets (potentially due to losses or inefficient asset management) and firms with relatively low, but positive, returns on assets. TobinQ, being a market-based performance measurement has a mean of 0.8387173, indicating a high profitability in terms of market value of stocks of 83.9%. This suggests that, on average, investors in the financial assets of industrial goods firms in the sample generated a relatively high return on their investments, indicating good stock market performance for industrial goods firms.

Firm size, retained earnings, leverage and foreign exchange have relatively high mean values suggesting favourable use of financial advantage by industrial goods firms in Nigeria. Specifically, leverage of over 4.5 mean is suggestive of an average of 450% use of borrowed funds for industrial goods services business in Nigeria. Similar interpretation holds for firm size retained earnings. Meanwhile, the foreign exchange of 84% is an indication of upward trend of forex in the country.

Fig 1: Exchange (US Dollar) Ratio to Naira Fluctuation 2012 - 2022

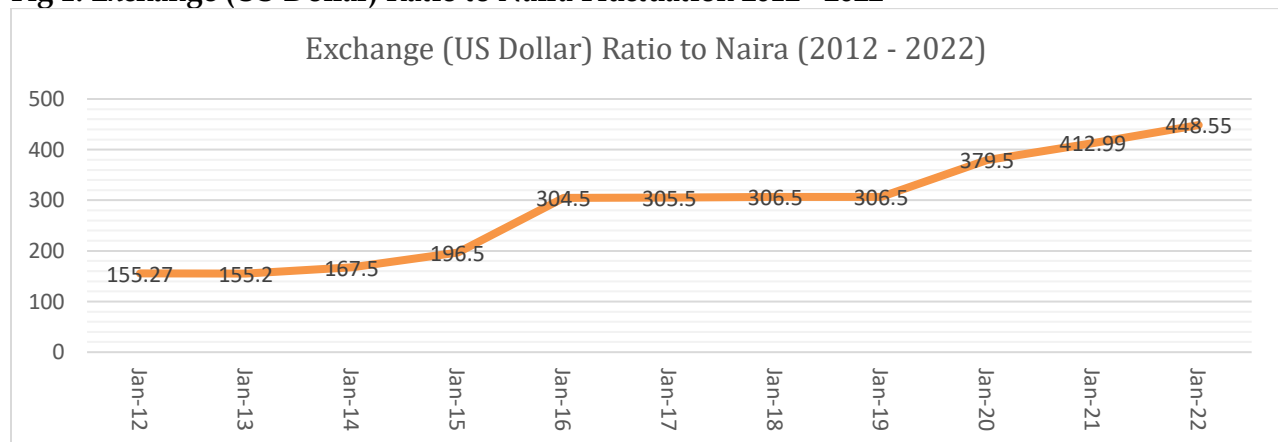


Fig 1 shows the trend of foreign exchange fluctuation over 10 years. It shows an upward trend of the ratio of naira to dollar which is an indication of a stable and upward weakness of naira in relation to dollar. This trend has connection with the performance as it is proxied as change in pretax profit scaled by change in foreign exchange over the number of years affected for industrial goods firms.

Correlation Analysis

Table 4 Correlation Analysis and Collinearity Diagnostics

	roe	roa	tobinq	fgrth	fsize	ret	Lev	Forex
roe	1							
roa	0.5841*	1						
tobinq	-0.2667*	-0.3217*	1					
fgrth	0.003	-0.0239	0.019	1				
fsize	0.4274*	0.4312*	-0.2995*	0.1598	1			
ret	0.3640*	0.3954*	-0.7756*	-0.0764	0.3375*	1		
lev	0.3357*	0.6545*	-0.3327*	-0.0343	0.6537*	0.4407*	1	
forex	-0.0621	-0.0929	-0.0104	0.0971	-0.1286	-0.0659	-0.1672	1
VIF	Nil	Nil	Nil	1.08	1.87	1.26	2.00	1.04
1/VIF	Nil	Nil	Nil	0.92	0.54	0.79	0.5	0.95

* p<0.05

Source; Author's Computation (2025)

Table 4 shows the correlation coefficients on the relationship among the explanatory variables. Firm size, retained earnings and leverage positively and significantly correlate with roe, roa and tobinQ. These relationships indicate that performance, across all measures, associate positively. Meanwhile, forex does not associate with the any of the performance measurements. More so, the VIF and Tolerance value in indicate that collinearity problem does not exist been any two variables as no VIF is higher than 10 in the model while the tolerance of all the variables is higher that 0.2. According to Myers (1990), a value of VIF of above 10 and tolerance below 0.2 calls for serious worry regarding multicollinearity. More so, no two variables have more than 0.8 correlation coefficient among the independent variables.

Model Parameters and Hypothesis Testing

Table 5: Regression Output and Test of Hypothesis

	ROE	ROA	TOBINQ
forex	0.00437 -0.01	0.496 -0.34	-0.0523* (-2.14)
fgrth	-0.307 (-1.06)	0.208 -0.15	-0.0167 (-0.82)
fsize	2.482*** -4.18	-0.213 (-0.15)	-0.0369 (-0.76)
ret	2.791*** -7.09	4.870** -3.04	-0.710*** (-19.02)

lev	-0.0174 (-0.06)	5.443*** -8.43	0.00191 -0.16
_cons	-22.36*** (-4.46)	2.083 -0.18	2.238*** -5.13
Model Parameters and Diagnostics			
N	134	134	134
Rsq	23.77	44.42	61.1
Wald X ²	147.82	263.7	733.69
Prob	0.000	0.000	0.000
Hausman	X ² = 5.35 (p>0.05)	X ² = 0.73 (p>0.05)	X ² = 45.47 (p<0.05)*
BPLM	218.12 (p<0.01)***	157.56 (p<0.01)***	Nil
Year	Nil	Nil	1.00 (p>0.05)
Het	45.47 (P<0.01)***	45.47 (P<0.01)***	1699.98(P<0.01)***
Auto	8.493 (P<0.05)P	2.066 (P>0.05)	4.905 (P<0.05)*
Est Tech	PCSE -(nmk option)	PCSE -(nmk option)	PCSE -(nmk option)

t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Source; Author's Computation (2025)

Some Diagnostic examinations were carried out to ensure the reliability of the outcomes generated by the data. These tests help assess the appropriateness of the model assumptions and guide the selection of suitable estimation methods. The models outputs shown in table 5 show the results of hypotheses testing. The table comprises of three (3) panels with mixed outputs for financial performance as proxied with Return on Equity, Return n Asset and Tobin's Q respectively. The Hausman tests revealed $x^2=5.35$, $p>0.05$; $x^2=0.73$, $p>0.05$; and $x^2=45.47$ ($P<0.05$) for the three models respectively. This suggests the adoption of random effect method for the estimation of ROE and ROA panels. Further the BPLM test (Chibar²=218.12, $P<0.01$; & Chibar²=157.56; $P<0.01$) confirms estimation of the model using random effect for ROE and ROA models. Meanwhile, the Husman test ($x^2=45.47$ ($P<0.05$)) revealed that for Tobin's Q Model, fixed effect model is more appropriate to estimate the regression but with the exclusion of year effect ($f = 1.00$ ($P>0.05$)).

Meanwhile, the presence of heteroscedasticity ($x^2=45.47$, $p<0.01$; $x^2=45.47$, $p<0.01$, % 1699.98 $p<0.01$) and serial correlation ($f=8.493$, $P>0.05$; $f=2.066$; & 4.905, $P<0.05$) suggests the use of panel corrected standard error for the estimation of all the three (3) models. The model parameters signals good result with model statistics ($Wald= 147.82$, $P<0.01$; 263.7, $P<0.01$ & 733.69, $P<0.01$) respectively for the three models as well as R² of 2.77%, 44.42% & 61.1% respectively. More so, the three models present non-significant effects of firm growth on ROE, ROA and Tobin's Q as a control variable. Firm size significantly affects return on equity but has no significant effect on ROA and Tobin's Q. Retained earnings significantly has negative effect across all the measures of dependent variable while leverage affects on ROA significantly. The results of ROE and ROA models are consistent with respect to foreign exchange effect. In other words, forex has no significant effect on financial performance ($Z=-0.01$, $p>0.0$; $Z=-0.34$, $p>0.05$)

indicating that financial performance is not significantly affected by foreign exchange with respect to ROE and ROA. However, forex significantly affected Tobin's Q ($Z=-2.14$, $p<0.05$) implying that foreign exchange volatility affects the performance of industrial firms stock performance negatively. That is, the more volatile foreign exchange, the poorer the performance of listed industrial goods firms in Nigeria.

Discussion of Findings

Financial performance variations in reaction to fluctuations in foreign exchange is the primary goal of this study. Foreign exchange was found to significantly affect stock market performance as measured by Tobin's Q even though it presents no significant effect on Returns on Assets (ROA) and Returns on Equity (ROE). This result provides evidence to support that foreign exchange volatility for industrial goods firms negatively affected stock market financial performance. Bani et al (2024) who discovered that forex significantly affected financial performance in relation to ROE and ROA. Although their findings were restricted to MENA banks, this study result isolated stock market performance for significant effect in respect of industrial goods firm Nigeria. To the contrary, this study's discovery contradicts the results of Parlak and Ilhan (2016); Dae & Wamugo (2022) who find out that in Turkey's corporate entities, foreign exchange risk increases financial performance. Moreover, their study focused on foreign exchange risk as opposed to volatility examined in this study. The work of Maratani and Shiundu (2025) on the volatility of foreign exchange and bond market performance found inverse effect between the both with respect to Kenya bond market. It conforms with the submission of this study unless that the performance of the stock market could not necessarily suggest relevance to the performance of stock market in Nigeria. With respect to the control variable adopted in this study, Bani et al (2024) found firm size can greatly enhance performance in relation to return on equity. This indicated conformity with previous study with respect to control variable as this study found important positive effect of forex on return on equity. This is similar to the outcome of Oshim and Nze (2024) even though their study examines foreign exchange income and financial performance of deposit money banks in Nigeria against industrial goods firms examined in this study.

5. Conclusion and Recommendations

Foreign exchange volatility in Nigerian is notable with influencing financial performance of listed companies. This study documented specifically that forex specifically influence financial performance of industrial goods firms in Nigeria. The conclusions are specifically notable with regards to Return on equity, being the performance estimation with respect to the residual owners of the entities and current shareholders indicated no significant influence by foreign exchange volatility. It holds therefore that; Volatility in foreign exchange does not influence performance with respect to returns expected from investment by shareholders. Financial performance with regards to assets of listed industrial goods firms in Nigeria is not influenced by the volatility of foreign exchange. It thus informs the implication that forex volatility have no influence financial performance because most assets have previously been acquired before the volatility and thus would naturally not affect the performance with respect existing assets of the firm. Meanwhile, the study submits that foreign exchange volatility significantly affects stock market performance negatively with financial performance measure using Tobin's Q. This informs the implication that stock market participants' decision would be influenced by the outcome of this study as the financial performance of stock market is negatively influenced by foreign exchange volatility.

Tijani R. E. (2026). Effect of foreign exchange rate volatility and corporate performance: Evidence from Nigeria's Manufacturing sector. *Malete Journal of Accounting and Finance*, 7 (1), 502 – 515

The conclusions drawn from the results of this study provides opportunities to make recommendations for concerned stakeholders including stock market participants, shareholders as well as managers.

Based on conclusions drawn from the study, management and board members of industrial goods firms are required to invest extra effort on how to further maximize the use of total asset to drive improved financial performance during foreign exchange volatile situations. More so, shareholders are advised to keep up investment during foreign exchange crisis as it is noted that foreign exchange volatility does not have an influence on financial performance as anticipated by current shareholders. Meanwhile, prospective shareholders may have to be cautious regarding prospective investors. The sensitivity of foreign exchange to stock market is notably negative probably because of information sensitivity of foreign exchange volatility. Government and policy makers are also enjoined to harp on the importance foreign exchange management as it is capable of dissuading investors in the stock market. This may require sensitizing investors as to the effect on current investors, of foreign exchange volatility as well as its effect the total assets of the firm.

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