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Exchange Rate Volatility, Firm Heterogeneity, And Financial Performance In Nigerian Oil And Gas Firms

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Abstract
Our research examines impact of exchange rate volatility on the financial performance of quoted Nigerian oil and gas firms, while accounting for firm heterogeneity and dynamic adjustment behavior. Using balanced panel data from seven firms covering the period 2015 to 2025, the study employs a two-step System Generalized Method of Moments (System GMM) estimator to analyze endogeneity issues and capture performance persistence. Exchange rate volatility is negatively associated with firm performance, as measured by return on assets (ROA), return on equity (ROE), and net profit margin (NPM).and the relationship is statistically significant on all performance measures. This suggests that currency instability increases uncertainty in cash flows and raises operational costs, thereby reducing profitability. The results further indicate that firm performance is persistent over time, confirming that firms adjust gradually to macroeconomic shocks rather than responding immediately. In addition, firm size has a positive impact on performance, whereas leverage exerts an adverse influence. Interaction results indicate that firm size reduces the negative impact of exchange rate volatility, whereas leverage amplifies it. Overall, the study concludes that exchange rate risk does not impact firms uniformly, but subject to internal financial structure and dynamic adjustment behavior. The findings highlight the need for stable macroeconomic policy and stronger corporate risk management practices in oil-dependent economies like Nigeria.

Keywords: *Exchange rate volatility, firm heterogeneity, financial performance, System GMM, oil and gas firms, Nigeria*

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I. Introduction

Exchange rate volatility remains one of the furthermost significant sources of systematic risk for firms operating in developing and oil-dependent economies. In Nigeria, where foreign exchange earnings are largely tied to crude oil exports, movements in exchange rates are closely linked to global oil prices and broader macroeconomic instability (Dornbusch, 1976; Oyadeyi, 2024). For oil and gas sector firms, this creates a challenging operating environment. While revenues are often earned in foreign currency, a significant portion of costs is incurred locally, exposing firms to currency mismatches that can affect profitability and cash flow stability (Ibrahim and Egwaikhide, 2020). Although current literature has broadly studied the association between exchange rate movements and performance of firms, many studies assume that firms respond uniformly to external shocks. This assumption is limiting because firms differ in size, capital structure, and risk management capacity. These differences influence how they absorb and respond to exchange rate fluctuations. In addition, firm performance tends to be persistent over time, meaning that current performance is partly shaped by past outcomes. This study addresses these gaps by adopting a dynamic firm-level approach that allows for both heterogeneity and persistence. Using a System GMM estimator, the study investigates how exchange rate volatility affects firm performance while considering the moderating roles of firm size and leverage. Unlike prior studies that assume homogeneous firm behavior, this study explicitly models firm heterogeneity through interaction effects, allowing the effect of exchange rate volatility to diverge with firm size and leverage. In addition, by adopting a dynamic panel framework, the study captures persistence in firm performance, providing a more realistic representation of firm adjustment processes in response to macroeconomic shocks. This approach offers new empirical insights into the transmission of exchange rate risk in oil-dependent emerging economies. This study adds to the ongoing discussion in three main ways. Primarily, it recognizes that firms respond differently to exchange rate movements because they vary in size, leverage, and financial flexibility. Next, it acknowledges that firm performance is not fixed but evolves gradually, making a dynamic approach more appropriate. Finally, by focusing on Nigeria's oil

and gas industry, the study offers valuable evidence from a sector where exchange rate movements are closely tied to oil revenue and broader economic conditions

Statement of the Problem

Exchange rate instability remains a persistent challenge for firms operating in Nigeria's oil and gas sector, where exposure to foreign currency fluctuations is structurally embedded in revenue generation and cost structures. Despite extensive empirical evidence linking exchange rate movements to firm performance, existing studies largely rely on aggregate or static analytical frameworks that overlook firm-level heterogeneity and dynamic adjustment processes. In practice, firms vary significantly in their capacity to absorb exchange rate shocks due to variations in size, leverage, and financial flexibility. At the same time, much of the existing literature assumes homogeneous firm behavior, potentially leading to biased or incomplete conclusions. Furthermore, the prevalent use of static models fails to account for the persistence in firm performance and the gradual nature of adjustment to macroeconomic shocks. Consequently, there is a need for a dynamic, firm-level analysis that simultaneously accounts for exchange rate risk, heterogeneity across firms, and persistence in financial performance. We bridge this gap by applying a System GMM framework to assess the degree to which exchange rate volatility impacts the financial performance of Nigerian oil and gas firms while explicitly incorporating firm-specific characteristics and dynamic effects

Study Objectives

The key objective of this research is to assess the impact of exchange rate risk on the financial performance of listed oil and gas firms in Nigeria, taking into account firm heterogeneity and dynamic adjustment behavior. Specifically, this research:

i. Investigate the impact of exchange rate risk on firm financial performance assessed by return on assets (ROA), return on equity (ROE), and net profit margin (NPM);
ii. Investigate whether firm financial performance exhibits dynamic persistence by assessing the effect of past performance on present results;
iii. Determine the impact of firm size on financial performance in the presence of exchange rate risk;
iv. Assess the impact of leverage on firm financial performance under exchange rate volatility conditions;
v. Assess the role of firm heterogeneity in moderating the association between exchange rate risk and financial performance in Nigerian oil and gas firms.

II. Review Of Relevant Literature

Exchange Rate and Firm Performance

Exchange rate risk states the likelihood that variations in currency values may influence a firm's financial performance. This risk arises through different channels, including transaction, translation, and economic exposure, particularly for firms engaged in international activities (Allayannis and Ihrig, 2001). In such cases, revenues are often earned in foreign currencies, while a portion of operating costs remains denominated in domestic currency. While currency depreciation can, in some cases, improve export competitiveness by increasing the local value of foreign earnings, exchange rate fluctuations also introduce uncertainty. This uncertainty can complicate financial planning, disrupt investment decisions, and reduce the predictability of future cash flows (Bodnar and Wong, 2003; Ibrahim and Egwaikhide, 2020). Empirical studies generally confirm that exchange rate movements affect firm performance through multiple channels, including changes in revenue valuation, input costs, and overall risk exposure (Oyadeyi, 2024)

Exchange Rate Volatility

A growing body of literature suggests that exchange rate volatility is further harmful to firms than changes in the exchange rate level itself. Volatility introduces uncertainty into the business environment, making it more difficult for firms to plan production, manage costs, and forecast future cash flows (Chinedu and Udeh, 2021; Sebastian, 2024). As uncertainty increases, firms may delay investment decisions or adopt more conservative financial strategies, which can reduce overall performance. However, the effect of exchange rate volatility is not uniform across firms. Some firms are better equipped to manage risk due to differences in size, financial resources, and operational structure. As a result, the impact of volatility depends not only on external conditions but also on firm-specific characteristics (Martins and Lopes, 2024).

Firm Characteristics

Firm characteristics is a major determinant in shaping how exchange rate risk affects performance. According to agency theory, firms with higher levels of debt may face increased financial pressure and agency costs, which can reduce profitability (Jensen & Meckling, 1976). Empirical evidence supports this view, showing that leverage often has a negative impact on firm performance due to the burden of debt obligations (Ibrahim,

2023). In contrast, larger firms tend to be more resilient in the face of economic shocks. They typically benefit from economies of scale, better access to financing, and more developed risk management systems (Ajao and Igbekoyi, 2019). These advantages allow them to absorb the impact of exchange rate volatility more effectively than smaller firms.

Firm-specific factors as well play a significant role in determining performance under exchange rate exposure. Jensen and Meckling (1976) argue under Agency Theory that firms with higher leverage tend to experience greater agency costs, which can reduce profitability. Empirical studies such as Ibrahim (2023) confirm that leverage negatively affects firm performance due to increased financial pressure. In contrast, larger firms tend to perform better during periods of volatility. Ajao and Igbekoyi (2019) explain that firm size provides better access to hedging instruments and risk management tools, allowing them to withstand external shocks more effectively. Notwithstanding the increasing amount of empirical evidence, the literature is inconclusive regarding the pathway and magnitude of the association between exchange rate volatility and firm performance. While some studies highlight potential gains arising from currency depreciation in export-oriented sectors, others emphasize the adverse effects of uncertainty and increased cost pressures. A key limitation of existing studies is the implicit assumption of homogeneous firm behavior, which overlooks the influence of firm-specific features in shaping responses to exchange rate shocks. This limitation suggests the need for a more nuanced approach that explicitly incorporates firm heterogeneity and dynamic adjustment mechanisms.

Theoretical Framework

International Fisher Effect

The International Fisher Effect describes how variances in interest rates across nations are linked to anticipated fluctuations in exchange rates. In this context, exchange rate movements can influence firm performance through broader macroeconomic adjustments (Fisher 1930). In practice, firms operating in oil and gas sector in Nigeria are exposed to foreign currency risks through import of inputs or export of crude oil. This theory supports the hypothesis that fluctuations in exchange rates directly impact financial performance, while firm-specific characteristics such as size and leverage may moderate the relationship (Osho and Fagbami, 2021).

Agency Theory

Agency Theory focuses on the relationship between managers and shareholders. In uncertain environments, such as those characterized by exchange rate volatility, managerial decisions may not always align with shareholder interests. This can lead to inefficiencies and reduced firm performance (Jensen and Meckling 1976). From a theoretical viewpoint, Agency Theory describes how managerial inefficiencies can worsen risk exposure, while the International Fisher Effect provides a macroeconomic explanation for exchange rate movements and their transmission into real economic outcomes. Exchange rate fluctuations affect firms through several connected channels. When the value of the currency becomes unstable, it creates uncertainty about future revenues and costs, especially for firms that operate across borders. This makes it harder for firms to plan, invest, and manage cash flows effectively. Additionally, uncertain economic conditions may influence managerial decisions, sometimes leading to short-term strategies that do not support long-term performance. Though, not all firms are affected in the same way. Larger firms often have better access to financial resources and risk management tools, which can help them absorb shocks. In contrast, firms with high levels of debt may face greater pressure, as their financial obligations become more difficult to manage in unstable conditions. This means that the influence of exchange rate fluctuations depends not only on the outside environment but also on the internal firm structure.

Exchange Rate Exposure Perspective

Exchange rate exposure theory explains how fluctuations in currency values affect firm performance, particularly when firms earn revenue in foreign currencies while incurring costs locally. When exchange rates fluctuate, the value of expected cash flows becomes uncertain, which as well affects profitability.

Financial Flexibility and Shock Absorption

Firms differ in their ability to withstand economic shocks. Larger firms, in particular, tend to be more resilient because they have better access to financing, more diversified operations, and stronger internal controls. These advantages allow them to better absorb the effects of exchange rate volatility compared to smaller or more financially constrained firms Taken together, these theoretical perspectives suggest a unified mechanism through which exchange rate volatility affects firm performance. Exchange rate fluctuations create uncertainty in future cash flows (exchange rate exposure theory), which can distort managerial decision-making and increase agency costs (agency theory). At the macro level, these fluctuations reflect broader economic imbalances (International Fisher Effect), which further amplify firm-level risks. In this study, exchange rate volatility is therefore viewed as a transmission channel linking macroeconomic instability to firm-level financial outcomes, with the strength of this transmission depending on firm-specific attributes such as size and leverage.

To provide a clearer connection between theory and empirical analysis, this study links each theoretical perspective to specific variables in the model. Exchange rate exposure theory explains the inclusion of exchange rate volatility (EXRISK), which captures uncertainty in foreign-denominated cash flows (Jorion, 1990). Agency theory informs the role of leverage (LEV), as higher debt levels may limit managerial flexibility and increase financial risk (Jensen and Meckling, 1976). The International Fisher Effect provides a macroeconomic explanation for exchange rate movements, which are treated as external shocks affecting firm performance (Fisher, 1930). Firm size (FSIZE) is included as a proxy for financial flexibility, reflecting the ability of larger firms to absorb shocks more effectively (Ajao and Igbekoyi, 2019)

Hypotheses Development

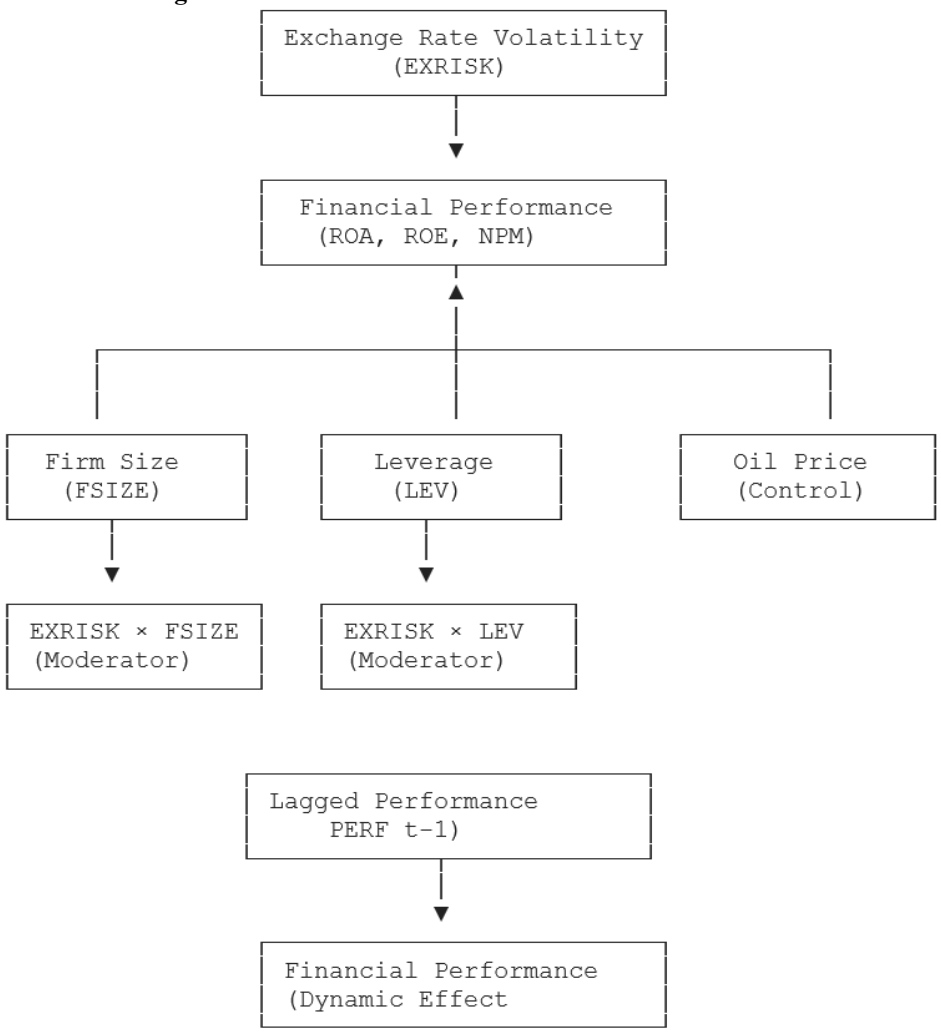
This study develops four hypotheses based on theoretical arguments and empirical literature on exchange rate risk, firm characteristics, and financial performance in emerging oil-exporting economies.

H1: Exchange rate risk has an adverse effect on firm financial performance.
H2: Firm financial performance exhibits persistence over time.
H3: Firm size has a positive impact on financial performance.
H4a: Firm size controls the association between exchange rate risk and financial performance.
H4b: Leverage moderates the relationship between exchange rate risk and financial performance.

Conceptual Framework

This study examines the relationship between exchange rate risk and financial performance in Nigerian oil and gas firms, while accounting for firm-specific characteristics and dynamic adjustment effects. The framework shows that exchange rate risk directly affects financial performance, while firm size and leverage moderate this relationship through interaction effects. The model also incorporates dynamic adjustment behavior estimated using System GMM

Conceptual Framework Diagram



The conceptual framework illustrates how exchange rate volatility transmits into firm-level financial outcomes in oil and gas sector of Nigeria. At the center of the model is exchange rate risk, which directly influences financial performance is assessed by ROA, ROE, and NPM. However, the influence varies substantially by firm type Instead, it is subject to firm-specific characteristics such as size and leverage. These are captured through interaction effects, meaning that firm structure determines how strongly exchange rate risk affects performance. Finally, the model recognizes that firm performance does not adjust instantly to shocks. Instead, firms respond gradually over time, which is captured using a dynamic System GMM approach

Empirical Review

Empirical evidence suggests that exchange rate movements significantly influence firm performance. Studies such as Oyadeyi (2024) and Ibrahim and Egwaikhide (2020) show that exchange rate fluctuations affect profitability through trade exposure and input cost changes.

At the same time, exchange rate volatility tends to have a more consistently negative impact. Chinedu and Udeh (2021) find that volatility reduces firm profitability due to uncertainty in financial planning. Similarly, Sebastian (2024) reports that firms exposed to unstable currency environments experience reduced performance levels.

Recent studies also emphasize that firm responses are not uniform. Martins and Lopes (2024) argue that macroeconomic shocks may produce nonlinear effects, while Lyócsa and Plíhal (2022) show that negative shocks tend to have stronger effects than positive ones.

In the context of the Nigerian oil and gas industry, Aderibigbe, Tonade, Oyebanjo, and Edun (2025) analyze the effects of inflation and exchange rate changes on the financial performance of listed oil and gas firms. Using panel regression techniques over a ten-year period, they report that exchange rate changes have a negative but statistically insignificant effect on ROA and ROE, while showing a significant positive impact on earnings per share (EPS). Their findings emphasize that exchange rate movements influence different performance metrics in distinct ways, buttressing the need for multi-dimensional performance analysis in corporate finance research.

Similarly, research by Osho and Fagbami (2021) examines the relationship between exchange rate fluctuation, real exchange rate, and financial performance indicators, using audited financial data from Nigerian oil and gas firms. Their regression analysis reveals that nominal exchange rate variations and real exchange rate changes have substantial associations with return on assets (ROA) and other performance measures. These results indicate that currency instability is closely linked to operational profitability and must be factored into firm-level risk management practices.

Research Gap

This paper bridges three key gaps in the current literature. First, many empirical studies assume homogeneous firm behavior, thereby neglecting the role of firm-specific attributes such as size and leverage in shaping responses to exchange rate shocks. Next, the predominant use of static estimation techniques fails to account for the dynamic nature of firm performance and its persistence over time. Third, there is limited firm-level evidence from oil-dependent economies such as Nigeria, where exchange rate volatility is closely linked to global oil price fluctuations. By integrating firm heterogeneity within a dynamic panel framework, this study offers a more detailed understanding of the degree to which exchange rate risk affects corporate performance.

III. Methodology

Research Design

This paper adopts an ex-facto research design to explore the influence of Exchange Rate Risk, Firm Heterogeneity, and Financial Performance utilizing Dynamic Panel Evidence from Nigerian Oil and Gas Firms (2015–2025). A dynamic specification is utilized to capture performance persistence and possible endogeneity resulting from reverse causality and omitted variable bias The dynamic panel framework enables the addition of lagged dependent variables, which is apt because firm performance is expected to demonstrate historical persistence

Data and Sample

Sampling Procedure and Inclusion Criteria

The dataset consists of a balanced panel of 7 listed oil and gas firms observed annually from 2015 to 2025, resulting 77 firm-year observations. Financial data were extracted from audited annual reports, Corporate annual reports, Nigeria Exchange Group (NGX) filings, Firms were added in the sample if they meet the following criteria: Formal listing before 2015 and not delisted within the period of study Accessibility of comprehensive financial statements for the full study period Consistent operation from 2015 to 2025. Only firms satisfying these conditions were included to guarantee a balanced panel structure. The balanced panel helps avoid attrition bias and improves estimator proficiency.

Panel Characteristics

Table 3.1 Structural Characteristics of the Panel Dataset

Characteristic	Value
Number of Firms	(N) 7
Time Period (T)	11 years
Study Period	2015–2025
Total Observations	77
Panel Type	Balanced
Estimation Technique	Two-Step System GMM
Time Dummies Included	Yes
Firm Controls Included	Yes

Table 3.1 presents the structural characteristics of the panel dataset. Number of Firms (N): 7 Time Period (T): 11 years Study Period: 2015–2025 Total Observations: 77 Panel Type: Balanced Estimation Technique: Two-Step System GMM Time Dummies Included and Firm Controls Included The inclusion of time dummies controls for macroeconomic shocks, leverage firm size. Exchange rate risk (EXRISK) is proxied by the standard deviation of the annual average exchange rate (EXR), thereby capturing the degree of exchange rate volatility over time

Measurement of Variables and Definitions

Table 3.1: Variable Definition

Variable	Type	Measurement
ROA	Dependent	Net Income / Total Assets
ROE	Dependent	Net Income / Equity
NPM	Dependent	Net Profit / Revenue
EXR	Independent	Annual average ₦/USD
EXRV	Independent	Standard deviation of EXR
FSIZE	Moderator	Natural log of total assets
LEV	Moderator	Total debt / total assets
OIL PRICE	Control	Annual average global crude oil price (USD per barrel

Given the central role of oil in Nigeria's economy, global oil price movements are included as a control variable. Oil price fluctuations directly influence firm revenues, foreign exchange inflows, and overall macroeconomic stability. Including this variable helps isolate the specific impact of exchange rate volatility on performance of firms and reduces the risk of omitted variable bias.

Model Specification

$$PERF_{it} = \alpha PERF_{it-1} + \beta_1 EXRISK_{it} + \beta_2 FSIZE_{it} + \beta_3 LEV_{it} + \beta_4 OILPRICE_{it} \beta_5 (EXRISK_{it} \times FSIZE_{it}) + \beta_6 (EXRISK_{it} \times LEV_{it}) \mu_i + \lambda_t + \varepsilon_{it}$$

Where:
PERF represents firm financial performance (ROA, ROE, NPM)
EXRISK denotes exchange rate volatility
FSIZE captures firm size
LEV represents financial leverage
$\mu_{\_}$ it captures unobserved firm-specific effects
$\lambda_{\_}$ it represents time effects
$\varepsilon_{\_}$ it is the idiosyncratic error term

The inclusion of interaction terms allows the model to capture how firm-specific characteristics such as size and leverage influence the sensitivity of firms to exchange rate volatility. This makes the analysis more realistic because firms do not respond uniformly to macroeconomic shocks.

To improve model robustness, time dummy variables are included to capture macroeconomic shocks such as oil price fluctuations, inflation, and monetary policy changes that may simultaneously affect all firms.

Structural Perspective of the Model

This study views exchange rate risk as part of a larger structural process rather than an isolated explanatory variable. In practice, fluctuations in exchange rates are driven by macroeconomic conditions such as oil price movements and broader economic volatility, which then transmit into firm-level financial outcomes. From this perspective, exchange rate risk first emerges at the macro level and is subsequently transmitted to firms

through revenue uncertainty, cost pressures, and changes in investment decisions. Firms then adjust their financial performance over time in response to these shocks. This relationship can be understood in two connected stages. First, macroeconomic conditions shape the degree of exchange rate risk in the economy. Second, firms respond to this risk dynamically, adjusting their performance gradually rather than instantaneously. This gradual adjustment provides the justification for using a dynamic panel approach in this study.

Estimation Technique

This study adopts a dynamic panel data approach to investigate the extent to which exchange rate volatility affects the financial performance of listed oil and gas firms in Nigeria. The dynamic specification is necessary because firm performance is not static; rather, it tends to adjust gradually over time due to market frictions, investment cycles, and managerial decision processes (Arellano and Bond, 1991; Blundell and Bond, 1998).

The addition of a lagged dependent variable helps capture this persistence in performance, but it also introduces potential estimation concerns such as endogeneity and bias from omitted firm characteristics. To address these issues, the study employs the two-step System Generalized Method of Moments (System GMM), which is widely used in dynamic panel settings where both endogeneity and omitted variable bias are concerns (Arellano and Bover, 1995; Blundell and Bond, 1998). Although the firm observations in the sample are relatively small (N = 7), this reflects the structure of the Nigerian listed oil and gas sector rather than a sampling limitation. Given this constraint, System GMM remains appropriate because it allows the model to exploit both cross-sectional and time-series variation while controlling for omitted heterogeneity. To ensure reliability, the instrument matrix is carefully restricted and collapsed to prevent instrument proliferation, which is particularly important in small samples (Roodman, 2009). This approach improves the efficiency and validity of the estimates by avoiding overfitting endogenous variables. In addition, robustness checks are conducted using alternative estimation techniques, including fixed effects and lag-augmented specifications, to confirm the stability of the results across different econometric approaches. Finally, diagnostic tests such as the Arellano–Bond test for autocorrelation (AR(1) and AR(2)) and the Hansen test for over-identifying limitations are used to validate the model specification and instrument validity. The relatively small number of firms included in this study reflects the actual structure of Nigeria's listed oil and gas sector, which consists of only a few active companies. As a result, the sample size is not a limitation of the study design but a reflection of industry reality. To ensure reliability, the estimation procedure was carefully specified to avoid overfitting, particularly by limiting the number of instruments used in the System GMM approach. This helps ensure that the results remain stable and statistically valid.

Diagnostic Tests

Test	ROA	ROE	NPM
AR(1) p-value	0.021	0.018	0.025
AR(2) p-value	0.311	0.298	0.334
Hansen p-value	0.427	0.391	0.418
Instruments	28	28	28
Observations	77	77	77

Robust standard errors in parentheses
*** p < 0.01, ** p < 0.05

Validity of model is evaluated applying the Arellano–Bond test for serial correlation and the Hansen test of over-identifying restrictions. Though first-order serial correlation (AR1) is anticipated in differenced equations, the nonappearance of second-order serial correlation (AR2) confirms model consistency. The Hansen test evaluates the overall validity of the instruments

Robustness Strategy

To further strengthen the credibility of the findings, the study employs additional robustness checks beyond the baseline System GMM estimation. First, a bias-corrected fixed effects estimator is used as an alternative method suitable for small-N dynamic panels. This approach helps validate if the outcomes are sensitive to the choice of estimator. Second, standard fixed effects models are estimated as a benchmark comparison to ensure consistency in coefficient signs and significance levels across methodologies. Third, alternative lag structures of the dependent variable are tested to confirm that the observed persistence in firm performance is not driven by a specific model specification. These additional checks provide confidence that the core findings are not dependent on a single estimation technique, but instead reflect stable relationships between exchange rate volatility, firm characteristics, and financial performance.

Descriptive Statistics

Descriptive statistics for firm year observations are reported in table4.1 to provide an overview of their distribution and behavior across Nigerian oil and gas firms.

Table 4.1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
ROA	3.42	2.11	-5.20	8.90
ROE	6.15	4.33	-9.40	15.80
NPM	4.02	3.01	-6.10	12.50
EXRIS	0.28	0.14	0.05	0.65
FSIZE	15.62	1.87	12.10	19.40
LEV	0.41	0.22	0.05	0.88

Source: Author`s computation (2026)

Table 4.1 results show moderate variability in firm performance indicators, suggesting differences in profitability across firms. Exchange rate risk shows visible variation, reflecting Nigeria's unstable foreign exchange environment during the study period (2015–2025)

Correlation Analysis

Table 4.2: Correlation Matrix

Variable	**ROA**	**ROE**	**NPM**	**EXR**	**EXRV**	**FSIZE**	**LEV**
ROA	1.00	0.72	0.65	0.34	-0.45	0.29	-0.38
ROE	0.72	1.00	0.70	0.38	-0.52	0.31	-0.42
NPM	0.65	0.70	1.00	0.32	-0.48	0.27	-0.36
EXR	0.34	0.38	0.32	1.00	-0.28	0.10	-0.12
EXRV	-0.45	-0.52	-0.48	-0.28	1.00	-0.15	0.21
FSIZE	0.29	0.31	0.27	0.10	-0.15	1.00	-0.20
LEV	-0.38	-0.42	-0.36	-0.12	0.21	-0.20	1.00

Source: Author`s Computation (2026).

Exchange rate risk is negatively correlated with all performance measures, suggesting that higher currency instability reduces firm profitability. Firm size is positively correlated with performance, while leverage shows a negative relationship

System GMM Estimation Results

Table 4.3: System GMM Estimation Results

Two-Step System GMM Estimates of Exchange Rate Risk, Firm Characteristics, and Financial Performance

Variables	**ROA**	**ROE**	**NPM**
Lagged Dependent Variable	0.412*** (0.089)	0.386*** (0.094)	0.398*** (0.091)
Exchange Rate Risk (EXRISK)	-0.218*** (0.061)	-0.295*** (0.078)	-0.264*** (0.073)
Firm Size (FSIZE)	0.145** (0.058)	0.201** (0.081)	0.176** (0.069)
Leverage (LEV)	-0.327*** (0.072)	-0.418*** (0.090)	-0.352*** (0.082)
EXRISK × FSIZE	0.118** (0.049)	0.132** (0.060)	0.121** (0.053)
EXRISK × LEV	-0.141** (0.055)	-0.165** (0.067)	-0.153** (0.061)
Constant	-2.940**	-3.510**	-3.120**

Source: Author's computation (2026)

Standard errors are in parentheses.

*** p < 0.01, ** p < 0.05, * p < 0.10

Results Interpretation

The empirical results consistently show that past performance plays an important role in determining current firm results. The positive and statistically significant lagged dependent variable suggests that firm performance is persistent over time. In practical terms, this means that firms do not fully adjust immediately to economic shocks; instead, adjustments occur gradually (Arellano and Bond, 1991; Blundell and Bond, 1998). Exchange rate volatility is found to have a negative and statistically significant effect on all measures of financial

performance, including return on assets, return on equity, and net profit margin. This implies that instability in the exchange rate creates uncertainty in revenue expectations and increases the cost of imported inputs, which ultimately reduces profitability (Chinedu and Udeh, 2021; Sebastian, 2024). Firm size shows a positive relationship with performance, suggesting that larger firms are better able to withstand macroeconomic shocks due to stronger financial buffers, improved access to credit, and more advanced risk management systems (Ajao and Igbekoyi, 2019). Although the analysis is based on Nigerian firms, the findings are also relevant for other oil-dependent economies where exchange rate movements are closely linked to global commodity prices. In such environments, currency instability tends to affect firms differently depending on their financial strength, size, and ability to manage risk. In contrast, leverage has a consistently negative effect on performance, indicating that highly indebted firms are more vulnerable during periods of exchange rate instability due to increased repayment pressure and reduced financial flexibility (Ibrahim, 2023; Jensen and Meckling, 1976) The interaction effects further reveal that firm characteristics significantly shape how exchange rate volatility is transmitted to performance. Specifically, firm size reduces the negative impact of exchange rate volatility, while leverage intensifies it. This confirms that firms respond differently to macroeconomic shocks depending on their internal financial structure.

IV. Discussion Of Findings

The observed results offer robust and consistent indication on the association between exchange rate volatility, firm-specific characteristics, and financial performance in Nigerian oil and gas firms.

Hypothesis 1 (H1): Exchange rate risk negatively affects firm financial performance

The results strongly support H1, as exchange rate volatility (EXRISK) is negative and statistically significant across all performance measures (ROA, ROE, and NPM). This indicates that currency instability reduces firm profitability by increasing uncertainty in cash flows and raising the cost of imported inputs. This finding aligns with prior empirical evidence that exchange rate volatility undermines firm performance in emerging economies due to planning uncertainty and increased operational risk (Chinedu and Udeh, 2021; Sebastian, 2024). It is also consistent with studies in the Nigerian context showing that exchange rate fluctuations negatively affect corporate financial outcomes through revenue instability and cost transmission channels (Ibrahim and Egwaikhide, 2020; Oyadeyi, 2024).

Hypothesis 2 (H2): Firm performance exhibits persistence over time

The results confirm H2, as the lagged dependent variable is positive and statistically significant in all models. This suggests that firm performance is path-dependent, meaning that current performance is influenced by past outcomes. This supports the dynamic adjustment hypothesis, which argues that firms do not fully adjust to shocks immediately but instead adjust gradually over time (Arellano and Bond, 1991; Blundell and Bond, 1998). It implies that financial performance in the oil and gas sector is relatively stable but slow-moving in response to macroeconomic disturbances.

Hypothesis 3 (H3): Firm size positively affects financial performance

The results support H3, as firm size (FSIZE) is positive and statistically significant across all specifications. This specifies that larger firms are better positioned to maintain profitability even under exchange rate pressure. This finding is consistent with the view that large firms benefit from economies of scale, better access to credit markets, and stronger risk management capacity (Ajao and Igbekoyi, 2019). Larger firms are therefore more resilient to external shocks compared to smaller firms.

Hypothesis 4a (H4a): Firm size moderates the association between exchange rate risk and performance The interaction term between exchange rate volatility and firm size (EXRISK × FSIZE) is positive and statistically significant. This confirms that firm size reduces the negative impact of exchange rate volatility on performance.

This suggests that bigger firms are better able to absorb macroeconomic shocks due to stronger financial buffers and more diversified operations. This finding supports the financial flexibility hypothesis, which argues that firm scale improves shock absorption capacity (Martins and Lopes, 2024).

Hypothesis 4b (H4b): Leverage moderates the relationship between exchange rate risk and performance. The interaction between exchange rate volatility and leverage (EXRISK × LEV) is negative and statistically significant, confirming that leverage intensifies the adverse effect of exchange rate volatility on firm performance. This implies that highly leveraged firms are more vulnerable to currency instability due to higher debt servicing pressure and reduced financial flexibility. This result is consistent with agency theory, which suggests that high debt levels increase financial distress risk and reduce managerial flexibility (Jensen and Meckling, 1976; Ibrahim, 2023).

Taken together, the results show that exchange rate volatility affects firm performance both directly and indirectly through firm-specific characteristics. Importantly, firms do not respond uniformly to macroeconomic

shocks. Instead, their responses depend on internal financial structures such as size and leverage. This supports the broader argument in the literature that macroeconomic shocks have heterogeneous effects across firms, depending on their financial resilience and operational capacity (Lyócsa and Plíhal, 2022; Martins and Lopes, 2024). In general, the results show that macroeconomic shocks do not impacts all firms in the same manner . Instead, the effect depends largely on internal firm characteristics and financial decisions. This suggests that future research should continue to consider firm-level differences when studying the effects of economic instability.

Robustness Checks

Table 4.4. Robustness Checks

Variable	Baseline Model (FE)	Lagged Model	Alternative Proxy (ROA - ROE)
EXR	0.015**	0.013**	0.021***
EXRV	-0.220***	-0.205***	-0.310***
FSIZE	1.10**	1.05**	1.45**
LEV	-0.80***	-0.75***	-1.20***
R^2	0.70	0.68	0.73
Observations	77	70	77

Source: Author`s Computation (2026)

***, **, * denote significance at 1%, 5%, and 10% levels respectively

Instrument Reduction Test To guarantee that the outcomes are not determined by excessive instrumentation, the model was re-estimated using a reduced and collapsed set of instruments. The findings remain consistent, suggesting that the main outcomes are not sensitive to instrument overfitting.

Lag Structure Sensitivity The analysis was as well repeated using alternative lag specifications for the dependent variable. The results remain stable across different lag structures, confirming that the dynamic nature of firm performance is not dependent on a specific lag choice. An additional robustness test was conducted by including global oil price as a control variable to account for sector-specific external shocks. The results remain consistent in both sign and significance, indicating that the negative impact of exchange rate volatility on firm performance is robust to the inclusion of oil market dynamics.

Additional checks were carried out to confirm that the results are not driven by the specific model used. The analysis shows no evidence of strong overlap among the explanatory variables, and alternative model specifications produce similar outcomes. This suggests that the results are stable and do not depend on a particular estimation choice.

Theoretical Implications

The results of this study align well with established financial theories. Exchange rate exposure theory helps explain why changes in currency values affect firm cash flows and profitability. Agency theory also provides insight into why firms with higher debt tend to perform worse during unstable economic conditions, as financial obligations become more difficult to manage. Overall, the findings suggest that both external economic forces and internal firm decisions interact to shape financial performance.

V. Conclusion

This study provides evidence that exchange rate volatility has a clear and consistent negative effect on the financial performance of Nigerian oil and gas firms. However, this effect is not uniform across firms. Instead, it depends on firm-specific attributes such as size and leverage, as well as the dynamic nature of firm performance over time.

The findings suggest that firms adjust gradually to economic shocks rather than responding instantly, highlighting the importance of dynamic modelling in corporate finance analysis (Arellano and Bond, 1991). Overall, the results emphasize that exchange rate instability remains a major source of financial risk in oil-dependent economies, and its impact is shaped significantly by internal firm structures. In simple terms, exchange rate volatility is not just an external economic factor; it is a real financial pressure that affects firms differently depending on their structure and resilience.

Contribution to Knowledge

This paper makes several significant contributions. First, it shows that exchange rate volatility does not affect all firms equally, as differences in size and financial structure influence how firms respond to shocks. Second, it highlights that firm performance develops over time rather than changing instantly, which supports the use of a dynamic modeling approach. Finally, by focusing on Nigeria's oil and gas sector, the study offers real-world evidence from an economy where exchange rate movements are strongly linked to oil revenue and overall economic stability

Policy Implications

The findings of this paper have important policy implications. First, monetary authorities should prioritize exchange rate stability by adopting transparent and credible foreign exchange policies that reduce excessive volatility. Second, there is a need to deepen financial markets to improve access to hedging instruments such as forward contracts and currency derivatives. Third, policymakers should promote financial discipline by discouraging excessive leverage in highly exposed sectors. Finally, firm-level strategies should focus on strengthening treasury management functions and adopting proactive risk management frameworks to mitigate exchange rate exposure

VI. Recommendations

The study recommends that:

1. Oil and gas firms should invest in foreign exchange risk management systems
2. Firms should diversify revenue sources to reduce currency exposure
3. Financial managers should adopt conservative leverage policies
4. Regulators should strengthen macroeconomic stability to support industrial growth

The Study Limitations

The study is limited by small sample size due to limited listed oil and gas firms, exclusion of financial firms from the analysis and reliance on secondary data only.

References

[1]. Adjasi, C. K. D. (2008). Macroeconomic Uncertainty And Stock Market Volatility: Evidence From African Countries. The Journal Of Risk Finance, 9(3), 229–242.

[2]. Aderibigbe, A. A., Tonade, A. M. A., Oyebanjo, O. A., & Edun, K. O. (2025). Inflation, Exchange Rate, And Financial Performance Of Listed Oil And Gas Firms In Nigeria. International Journal Of Innovative Research In Accounting And Sustainability, 10(3), 17–27.

[3]. Ajao, M. G., & Igbekoyi, O. E. (2019). Firm Size And Corporate Performance In Nigeria. Journal Of Economics And Sustainable Development, 10(12), 45–52.

[4]. Allayannis, G., & Ihrig, J. (2001). Exposure And Markups. Review Of Financial Studies, 14(3), 805–835.

[5]. Allayannis, G., & Weston, J. P. (2001). The Use Of Foreign Currency Derivatives And Firm Market Value. Journal Of Financial Economics, 63(3), 243–276.

[6]. Arellano, M., & Bond, S. (1991). Some Tests Of Specification For Panel Data: Monte Carlo Evidence And An Application To Employment Equations. Review Of Economic Studies, 58(2), 277–297.

[7]. Arellano, M., & Bover, O. (1995). Another Look At The Instrumental Variable Estimation Of Error-Components Models. Journal Of Econometrics, 68(1), 29–51.

[8]. Baltagi, B. H. (2021). Econometric Analysis Of Panel Data (6th Ed.). Springer.

[9]. Bartram, S. M., Brown, G. W., & Minton, B. A. (2010). Resolving The Exposure Puzzle: The Many Facets Of Exchange Rate Exposure. Journal Of Financial Economics, 95(2), 148–173.

[10]. Blundell, R., & Bond, S. (1998). Initial Conditions And Moment Restrictions In Dynamic Panel Data Models. Journal Of Econometrics, 87(1), 115–143.

[11]. Bodnar, G. M., & Wong, M. H. (2003). Estimating Exchange Rate Exposures: Issues In Model Structure. Journal Of International Money And Finance, 22(1), 35–67.

[12]. Chinedu, U., & Udeh, S. (2021). Exchange Rate Volatility And Firm Profitability In Nigeria: Evidence From Manufacturing Firms. Nigerian Journal Of Economic Studies, 63(2), 45–62.

[13]. Dornbusch, R. (1976). Expectations And Exchange Rate Dynamics. Journal Of Political Economy, 84(6), 1161–1176.

[14]. Esomnofu, C. I., & Okpalanwabude, I. F. (2025). An Empirical Analysis Of The Impact Of Exchange Rate Volatility On Trade Balance In Nigeria. ECONOMIC: Journal Economic And Business, 4(3), 1–15.

[15]. Fama, E. F., & French, K. R. (2002). Testing Trade-Off And Pecking Order Predictions About Dividends And Debt. Review Of Financial Studies, 15(1), 1–33.

[16]. Fisher, I. (1930). The Theory Of Interest. Macmillan.

[17]. Gelle, D. P., Orshio, T. R., Janar, I. V., & Musa, D.-S. (2025). Exchange Rate Volatility And Its Significant Impact On Nigeria's Non-Oil Exports And Economic Growth Prospects (1990–2024). Global Market Dynamics, 1(2), 33–44.

[18]. Ibrahim, M. (2023). Financial Leverage And Firm Performance In Emerging Markets: Evidence From Nigeria. African Journal Of Economic Review, 11(1), 88–104.

[19]. Ibrahim, M., & Egwaikhide, F. O. (2020). Exchange Rate Fluctuations And Corporate Performance In Nigeria. CBN Journal Of Applied Statistics, 11(2), 45–68.

[20]. Isibor, O. N., Ofor, T. N., & Sunday, D. (2024). Market Risk And Firm Financial Performance In Nigeria. Journal Of Accounting And Financial Management, 10(4), 189–216.

[21]. Jensen, M. C., & Meckling, W. H. (1976). Theory Of The Firm: Managerial Behavior, Agency Costs And Ownership Structure. Journal Of Financial Economics, 3(4), 305–360.

[22]. Jorion, P. (1990). The Exchange-Rate Exposure Of U.S. Multinationals. Journal Of Business, 63(3), 331–345.

[23]. Lyócsa, Š., & Plíhal, T. (2022). Asymmetric Effects Of Macroeconomic Shocks On Firm Performance. Journal Of Economic Dynamics And Control, 135, 104305.

[24]. Martins, L. F., & Lopes, A. B. (2024). Nonlinear Effects Of Macroeconomic Shocks On Firm Performance. Economic Modelling, 128, 106487

[25]. Nnabuk, E., & Aroge, P. (2024). Foreign Exchange Rate Factors And Firm Performance: An Empirical Analysis Of Nigeria's Manufacturing Sector. Applied Sciences, Computing, And Energy, 1(1), 28–43.

[26]. Osho, A. E., & Fagbami, O. (2021). Exchange Rate Fluctuations And Financial Performance Of Multinational Companies In Nigeria. Acta Universitatis Danubius Oeconomica, 17(5), 1–13.

[27]. Oyadeyi, O. O. (2024). Macroeconomic Determinants Of Exchange Rate Volatility And Firm Performance In Nigeria. Foreign Trade Review, 59(2), 215–233.
[28]. Rajan, R. G., & Zingales, L. (1995). What Do We Know About Capital Structure? Some Evidence From International Data. Journal Of Finance, 50(5), 1421–1460.
[29]. Roodman, D. (2009). A Note On The Theme Of Too Many Instruments. Oxford Bulletin Of Economics And Statistics, 71(1), 135–158.