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EFFECT OF CRUDE OIL PRICE ON STOCK MARKET PERFORMANCE IN NIGERIA

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Abstract *This study examined the impact of crude oil price changes on stock market performance in Nigeria over the period 1981–2024. The primary objective was to investigate whether positive and negative crude oil price shocks exert asymmetric effects on key stock market indicators, namely the All-Share Index (ASI), Market Capitalization (MCAP), and total volume of shares traded (VOL). The study employed the Nonlinear Autoregressive Distributed Lag (NARDL) model to capture both short-run and long-run asymmetries, alongside unit root tests, bounds cointegration tests, and Wald asymmetry tests. The bounds test results confirmed the existence of long-run relationships among the variables. Long-run results revealed that positive oil price shocks significantly reduced ASI (coefficient = -0.1756, p = 0.0372) and MCAP (coefficient = -0.1716, p = 0.0037),the negative sign reflects Nigeria's fiscal dominance including the exchange rate pass through, implying that higher oil prices lead to naira appreciation pressure, CBN tightening and higher discount rates. While negative shocks significantly increased MCAP (0.3324, p = 0.0006) and VOL (1.0413, p = 0.0001), indicating strong asymmetry. In the short run, negative oil price shocks significantly increased trading volume (1.0091, p = 0.0388), while most positive shocks were statistically insignificant. The error correction terms were negative and significant across the three models, confirming adjustment toward the long-run equilibrium. The study concludes that crude oil price changes exert significant and asymmetric effects on stock market performance in Nigeria, with negative shocks generating stronger market responses, particularly in trading activity. It recommends economic diversification, exchange rate stabilization policies, enhanced risk management and portfolio diversification strategies for investors and financial institutions to mitigate exposure to oil price volatility in an oil-dependent economy.*

Keywords Crude Oil, Oil Price, Stock Market, Asymmetry

1. Introduction

Prior to independence, agriculture was the mainstay of Nigeria economy (Izuchukwu, 2011). However, the discovery of large deposits of crude oil in 1956 at Oloibiri in Bayelsa State by Shell BP marked the beginning of Nigeria's oil industry. The oil boom of 1970s, triggered by global price shocks in 1973 and 1979, led to a major shift in economic priorities (Emmanuel & Ekpenyong, 2021). Crude oil remains a fundamental input in transportation, power generation, and industrial production across the global economy (Ozuomba & Ogujiofor, 2025).According to Kutu and Ohonba (2024), the upward and downward swing in the price of oil on worldwide level is known as volatility. Oil prices are influenced by various factors, such as OPEC policies, armed conflicts, geopolitical tensions, natural disasters, and imbalances between global supply and demand (Ozuomba & Ogujiofor, 2025). These factors are exogenously determined, which is beyond the country's control. Nigeria's economy depends heavily on crude oil revenue which has made it vulnerable to the negative impacts of fluctuations in oil prices (Musa, Awolaja, Jerry, Okedina, Uduakobong & Olayinka, 2022).Changes in crude oil prices are often transmitted through various channels, including exchange rates, inflation rate and interest rate all of which can influence stock market performance (Ighoroje, Okorie & Egberi, 2024; Kutu & Ohonba 2024).The stock market is an important component of the capital market because it facilitates capital mobilization, investment, and economic growth (Emmanuel & Ekpenyong, 2021). However, its performance is highly susceptible to external and domestic economic shocks, particularly those associated with fluctuations in crude oil prices.

This study provides useful insights for policymakers, investors, and researchers. The findings are relevant for designing fiscal and monetary policies aimed at reducing the adverse effects of oil price volatility on the economy and financial market. The study covers the period 1981–2024 to capture major economic events, policy reforms, and periods of oil price volatility. It examines the effects of crude oil price, exchange rate, interest rate, and inflation rate on stock market indicators such as All Share Index, market capitalization, and volume of shares traded using secondary data obtained from the Central Bank of Nigeria, Nigerian Exchange Group, Nigerian National Petroleum Company Limited, and the National Bureau of Statistics. The remaining sections of the paper consist of the statement of the purpose, Objectives of the study and the research questions, including literature review, methodology, empirical results, conclusion, as well as recommendations.

Statement of the Problem

Crude oil plays a dominant role in the Nigerian economy, serving as the principal source of government revenue, foreign exchange earnings and gross domestic product (Martinez, Schmidt & Thompson, 2024).Given Nigeria's heavy dependence on oil exports, fluctuations in international

crude oil prices have significant implications for the country's macroeconomic performance and capital markets. While economic theory suggests that rising oil prices should improve stock market performance in oil-exporting countries such as Nigeria through increased revenue, stronger external reserves, and improved investor confidence, the empirical evidence remains inconclusive.

Existing studies have reported conflicting findings regarding the relationship between crude oil prices and stock market performance in Nigeria. For instance, Emmanuel and Ekpenyong (2021) found that oil price changes positively influence stock market performance, whereas Nwude, Eluyela, Agbo, and Iyoha (2021) reported that the impact of oil price changes on stock market indicators is weak and statistically insignificant. These divergent findings create uncertainty regarding the nature, magnitude, and direction of the relationship between crude oil price fluctuations and stock market performance in Nigeria.Furthermore, most previous studies have concentrated on aggregate measures of stock market performance, with limited attention given to specific indicators such as the All-Share Index (ASI), Market Capitalization (MCAP), and Volume of Shares Traded (VOL). Similarly, insufficient consideration has been given to the possibility that stock market performance may respond differently to increases and decreases in crude oil prices. This issue has become increasingly important in light of recent global developments, including the post COVID-19 period, geopolitical tensions,global supply disruptions and the ongoing transition toward alternative energy sources, all of which have contributed to heightened volatility in global oil markets.

The absence of clear empirical evidence on how crude oil price fluctuations affect different dimensions of stock market performance poses challenges for policymakers, investors, and market regulators in formulating appropriate policies and investment strategies. Consequently, there is a need for a comprehensive re-examination of the effect of crude oil price changes on stock market performance in Nigeria, while also accounting for the potential asymmetric effects of positive and negative oil price shocks.

Objectives of the Study

The broad objective of this study is to examine the effect of crude oil price changes on stock market performance in Nigeria.

The specific objectives are to:

i. Examine the effect of crude oil price changes on the All-Share Index in Nigeria.

ii. Examine the effect of crude oil price changes on Market Capitalization in Nigeria.

iii. Examine the effect of crude oil price changes on the Volume of Shares Traded in Nigeria.

iv. Determine whether asymmetric effects exist in the relationship between crude oil price changes and stock market performance in Nigeria?

Research Question:

i. What is the effect of crude oil price changes on the All- share index (ASI) in Nigeria?

ii. What is the effect of crude oil price changes on Market Capitalization (MCAP) in Nigeria?

iii. How do changes in crude oil prices influence the volume of share traded in Nigeria?

iv. Do asymmetric effects exist in the relationship between crude oil price changes and stock market performance in Nigeria?

2. Literature Review

Empirical studies examining the relationship between crude oil prices and stock market performance have reported diverse findings across countries and regions. The nature of the relationship often depends on whether an economy is an oil exporter or oil importer, the structure of its financial market, prevailing macroeconomic conditions, and the methodology employed. To provide a clearer understanding of the existing evidence, the empirical literature is reviewed under the following themes: oil-exporting economies, oil-importing economies, African studies, Nigerian studies, and asymmetry studies.

2.1 Studies on Oil-Exporting Economies

The relationship between crude oil prices and stock market performance is often expected to be positive in oil-exporting economies because higher oil prices increase export earnings, government revenue, and overall economic activity. Empirical evidence largely supports this expectation, although the magnitude of the effects varies across countries.

Bilal, Abdalla and Alam (2025) investigated the effect of oil price shocks on stock prices of listed firms in the Muscat Stock Exchange between 2008 and 2020. The study found that oil price fluctuations exerted a significant positive effect on stock prices across sectors, suggesting that oil-exporting economies benefit from rising oil prices. Similarly, Amri-Asrami and Jamkhane (2024), using a nonlinear ARDL framework for Iran, reported significant asymmetric short-run effects of oil prices on stock market performance. Their findings further revealed that while short-run responses differed between positive and negative oil price shocks, the long-run effects were largely symmetric.

At a broader level, Bagirov and Mateus (2026) examined petroleum price volatility in seven net oil-exporting and nineteen net oil-importing countries using VAR-GARCH techniques. The study found significant volatility spillovers between oil prices and stock sector indices, with oil-exporting economies generally exhibiting stronger transmission effects. Likewise, Chen, Msofe, Wang and Chen (2025) found that countries heavily dependent on oil exports, including Nigeria, experienced greater vulnerability to oil price shocks than less oil-dependent economies.

Overall, the evidence from oil-exporting economies suggests that crude oil price changes significantly influence stock market performance, although the effects are often conditioned by the level of economic diversification and the degree of dependence on oil revenue.

2.2 Studies on Oil-Importing Economies

In contrast to oil-exporting countries, oil-importing economies often experience adverse effects from rising crude oil prices because higher energy costs increase production expenses and inflationary pressures.Bilal, Ahmed, Zada, Thalassinos and Nawaz (2025) examined oil-importing and oil-exporting countries using asymmetric quantile regression and found that positive oil price shocks generated stronger effects in oil-importing economies, particularly at higher quantiles. Similarly, Bhat, Yadav, Kumar, Amar, Rakesh and Kumar (2024) reported that oil price volatility negatively affects banking, transportation, and manufacturing sectors in oil-importing countries.

Using India as a case study, Gopal, R and RV (2025) employed linear and nonlinear ARDL models and found that negative oil price shocks produced stronger short-run effects than positive shocks across several stock market sectors. In Bangladesh, Shen, Khandoker, Saha and Bhuyan (2024) utilized a Vector Error Correction Model and found that oil-related shocks negatively influenced stock prices, while improvements in global economic activity enhanced stock market performance.

Similarly, studies from Pakistan by Tabash, Babar, Sheikh, Khan and Anagreh (2022) and Hashmi, Chang, Huang and Uche (2022) revealed that the effects of oil prices on stock market returns varied across market conditions and became more pronounced during periods of economic uncertainty such as the COVID-19 pandemic.Collectively, these studies suggest that oil-importing economies are generally more vulnerable to rising oil prices due to increased production costs and inflationary pressures, although the magnitude of the effects varies across sectors and market conditions.

2.3 African Studies

Empirical evidence from Africa highlights the importance of oil dependency in shaping the relationship between crude oil prices and stock market performance. Essayem, Çıkıryel and Tekdoğan (2026) investigated ten African stock markets between 2014 and 2024 using wavelet coherence analysis and MGARCH-DCC techniques. Their findings indicated that the relationship between oil prices and stock markets was generally weak during normal market conditions but became stronger during periods of market stress. The study further revealed that oil-exporting African countries experienced higher volatility due to their dependence on oil revenues.

Similarly, Chen, Msofe, Wang and Chen (2025) found strong time-frequency connectedness between oil prices and African stock markets, particularly during bearish market conditions. The study identified Nigeria, Egypt, and Tunisia as among the most vulnerable countries to oil price shocks.

Within West Africa, Seraphin and Valery (2024) examined oil price volatility and ECOWAS stock markets using MSGARCH and GARCH-BEKK models. The study reported significant volatility spillovers from oil returns to regional stock markets, with the Nigerian Stock Exchange recording the highest transmission effects.

These findings suggest that African stock markets are increasingly exposed to fluctuations in international oil prices, although the degree of exposure differs according to each country's level of oil dependence and market development.

2.4 Nigerian Studies

Given Nigeria's status as one of Africa's largest oil-producing economies, several studies have examined the relationship between crude oil prices and stock market performance. However, the findings remain inconclusive.

Emmanuel and Ekpenyong (2021) examined the effects of oil price changes, exchange rate, interest rate, and inflation on stock market performance in Nigeria. Their findings showed that oil price changes and exchange rate instability positively affected stock market performance, while interest rate and inflation exerted negative effects.

In contrast, Nwude, Eluyela, Agbo, and Iyoha (2021) found that oil price changes had a weak and statistically insignificant effect on stock market indicators in Nigeria. This finding challenges the conventional expectation that oil price increases should automatically improve stock market performance in an oil-exporting economy.

Similarly, Okere, Muoneke and Onuoha (2021) investigated the asymmetric impact of oil price movements on financial market performance in Nigeria and found evidence that positive and negative oil price shocks affected market outcomes differently. Their findings suggest that linear models may underestimate the true effects of oil price changes.

Furthermore, evidence from Seraphin and Valery (2024) indicates that the Nigerian stock market experiences stronger volatility transmission from oil markets than other ECOWAS stock exchanges, reflecting the country's heavy reliance on crude oil revenue.

Although existing Nigerian studies provide valuable insights, most focus on aggregate stock market indicators and often rely on relatively short sample periods. Moreover, limited attention has been given to simultaneously examining All Share Index, Market Capitalization, and Volume of Shares Traded within a nonlinear framework capable of capturing asymmetries in oil price movements.

2.5 Studies on Asymmetry

Recent literature increasingly recognizes that stock markets may respond differently to oil price increases and decreases. This has led to growing application of nonlinear and asymmetric modelling approaches.

Gopal, R and RV (2025), using nonlinear ARDL techniques, found that negative oil price shocks generated stronger short-run effects than positive shocks. Similarly, Amri-Asrami and Jamkhane (2024) reported asymmetric short-run effects of oil prices on stock market performance in Iran.

Alao (2023) concluded that the oil price-stock market relationship is asymmetric, time-varying, and influenced by macroeconomic variables such as exchange rate, inflation, and interest rates. Likewise, Hashmi, Chang, Huang and Uche (2022) showed that the effects of oil prices on stock returns differ across bullish, bearish, and normal market conditions.

Furthermore, Mokni, Nakhli, Mnari and Bougatef (2021) found that the causal relationship between oil prices and G7 stock markets was asymmetric and varied over time. Hwang and Kim (2021) and Prabheesh and Kumar (2021) also reported that oil price uncertainty significantly affects stock market returns, particularly during periods of economic and financial crises.

The growing evidence on asymmetry suggests that positive and negative oil price shocks do not affect stock markets in the same manner. Consequently, nonlinear approaches such as the NARDL model are more appropriate for capturing these differential effects than conventional linear models.

2.6 Empirical Gap

The reviewed literature reveals substantial evidence linking crude oil prices to stock market performance. However, findings remain mixed regarding the direction and significance of the relationship, particularly in Nigeria. While some studies report positive effects, others find weak or insignificant relationships. In addition, most Nigerian studies focus on aggregate stock market measures and pay limited attention to the potential asymmetric effects of oil price increases and decreases. This study addresses these gaps by examining the effects of crude oil price changes on the All-Share Index, Market Capitalization, and Volume of Shares Traded in Nigeria using the Nonlinear Autoregressive Distributed Lag (NARDL) framework.

2.7 Theoretical Framework

This study is anchored on the Arbitrage Pricing Theory (APT) developed by Stephen Ross in 1976. The APT posits that the expected return on a financial asset is determined by a linear function of multiple systematic risk factors rather than a single market portfolio as proposed by the Capital Asset Pricing Model (CAPM) (Ross, 1976). It assumes that asset returns respond to several macroeconomic variables that embody non-diversifiable (systematic) risk and therefore command risk premiums (Chen, Roll & Ross, 1986; Sharpe, 1992).

Unlike the CAPM, which relies on a single beta coefficient, the APT adopts a multi-factor structure in which asset returns are sensitive to various macroeconomic shocks such as inflation, interest rate, exchange rate, and crude oil price fluctuations (Ross, 1976; Emmanuel & Ekpenyong, 2021). These factors influence the discount rate, expected cash flows, and overall investment climate, thereby affecting asset valuation in the capital market (Miller & Modigliani, 1961; Kutu & Ohonba, 2024).

The APT model is formally expressed as:

$$E = f(R, RP_i \ldots RP_n) \quad 3.1$$

The mathematical equation from equation 3.1 is specified below;

$$E(R_i) = R_f + \beta_1 RP_1 + \beta_2 RP_2 + \cdots + \beta_n RP_n \quad 3.2$$

Where: $E(R_i)$= Expected return on asset I; R_f= Risk-free rate; β_n= Sensitivity of asset return to factor n; and RP_n= Risk premium associated with factor n

The theory assumes that markets may temporarily deviate from equilibrium, but arbitrage activities eliminate mispricing, restoring asset prices to their fundamental values (Ross, 1976; Fama & French, 1993). Since the identified macroeconomic variables represent systematic risks, they cannot be diversified away and thus significantly influence stock market performance (Musa et al., 2022; Nwosa, 2020).

In the context of Nigeria, crude oil price constitutes a dominant macroeconomic risk factor due to the country's heavy dependence on oil revenue and foreign exchange earnings (Oloruntoba, 2024; Ozuomba & Ogujiofor, 2025). Fluctuations in oil prices affect government expenditure, liquidity conditions, exchange rate stability, corporate profitability, and investor expectations (Martinez, Schmidt & Thompson, 2024; Okere, Muoneke & Onuoha, 2021). Consequently, changes in crude oil prices are expected to influence stock market performance indicators such as All Share Index, Market Capitalization, and Volume of Shares Traded through both direct and indirect transmission channels (Emmanuel & Ekpenyong, 2021; Kutu & Ohonba, 2024).

3. Methodology

This study adopts a quantitative ex-post facto research design to examine the effect of crude oil price changes on stock market performance in Nigeria. The study employs the Nonlinear Autoregressive Distributed Lag (NARDL) model developed by Shin, Yu and Greenwood-Nimmo (2014) to capture the asymmetric effects of crude oil price increases and decreases on stock market performance in both the short run and long run. The NARDL model, an extension of the linear ARDL framework of Pesaran et al. (2001), is appropriate because it accommodates variables integrated of order I(0) and I(1), performs efficiently with small sample sizes, and allows simultaneous estimation of short-run and long-run dynamics. The choice of the model is also consistent with previous studies such as Jiang and Liu (2021), Asad, Tabash, Sheikh, Al-Muhanadi and Ahmad (2020), and Okere, Muoneke and Onuoha (2021). Specifically, the study is modeled after Emmanuel and Ekpenyong (2021), but extends the analysis by disaggregating stock market performance into All Share Index (ASI), Market Capitalization (MCAP), and Volume of Shares Traded (VOL) to provide a more comprehensive assessment of the impact of crude oil price changes on the Nigerian stock market.

The general functional relationship is expressed as:

$$TSM = f(OP, EXR, INT, INF) \quad 1$$

Where: TSM = Stock market performance at time t, proxied by alternative indicators; OP = Crude oil price; EXR = Exchange rate; INT = Interest rate; and INF = Inflation rate

Given the specific objectives of this study, stock market performance is disaggregated into three separate models to allow comparative analysis. Thus, three functional models are specified as follows:

$$ASI = f(\text{OP}, \text{EXR}, \text{INT}, \text{INF}) \quad (2)$$
$$MCAP = f(\text{OP}, \text{EXR}, \text{INT}, \text{INF}) \quad (3)$$
$$VOL = f(\text{OP}, \text{EXR}, \text{INT}, \text{INF}) \quad (4)$$

Where:
ASI = All Share Index
MCAP = Market Capitalization
VOL = Total Volume of Shares Traded
OP = Brent Crude Oil Price (US$ per barrel)
EXR = Exchange Rate (Naira/US Dollar)
INT = Interest Rate (%)
INF = Inflation Rate (%)

To ensure linearity, reduce heteroskedasticity, and interpret estimated coefficients as elasticities, the dependent variables and crude oil price are transformed into their natural logarithmic forms. However, exchange rate, interest rate, and inflation rate are retained in levels because they are measured in rates and percentages. Therefore, they couldn't be linearized further to avoid negative/zero values.

Accordingly, the econometric specifications are expressed as:

Model I:
$$\ln ASI_t = \alpha_0 + \alpha_1 \ln OP_t + \alpha_2 EXR_t + \alpha_3 INT_t + \alpha_4 INF_t + \mu_t \quad (5)$$
Model II:
$$\ln MCAP_t = \beta_0 + \beta_1 \ln OP_t + \beta_2 EXR_t + \beta_3 INT_t + \beta_4 INF_t + \varepsilon_t \quad (6)$$
Model III:
$$\ln VOL_t = \delta_0 + \delta_1 \ln OP_t + \delta_2 EXR_t + \delta_3 INT_t + \delta_4 INF_t + \nu_t \quad (7)$$

Where:
$\mu_t, \varepsilon_t, \nu_t$ are stochastic error terms assumed to be independently and identically distributed.

Where ln denotes natural logarithm. (The log of EXR, INT and INF were not taken because the data were obtained in percentage and rate).

To capture asymmetry, crude oil price (OP) is decomposed into positive and negative partial sum processes as follows:

$$OP_t = OP_t^+ + OP_t^- \quad (8)$$

Where:

$$OP_t^+ = \sum_{j=1}^{t} \max(\Delta O\, P_j, 0)$$
$$OP_t^- = \sum_{j=1}^{t} \min(\Delta O\, P_j, 0)$$

Here, OP_t^+ represents cumulative positive changes (oil price increases), while OP_t^- represents cumulative negative changes (oil price decreases).

The general NARDL (p, q) error correction representation of the models is specified as:

Model I: NARDL for All Share Index (ASI)

$$\Delta \ln ASI_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i \Delta \ln ASI_{t-i} + \sum_{j=0}^{q} \beta_j^+ \Delta OP_{t-j}^+ + \sum_{j=0}^{q} \beta_j^- \Delta OP_{t-j}^- + \sum_{k=0}^{q} \gamma_k \Delta EXR_{t-k} + \sum_{k=0}^{q} \delta_k \Delta INT_{t-k} + \sum_{k=0}^{q} \phi_k \Delta INF_{t-k} + \lambda_1 \ln ASI_{t-1} + \lambda_2 OP_{t-1}^+ + \lambda_3 OP_{t-1}^- + \lambda_4 EXR_{t-1} + \lambda_5 INT_{t-1} + \lambda_6 INF_{t-1} + \varepsilon_t \quad (9)$$

Model II: NARDL for Market Capitalization (MCAP)

$$\Delta \ln MCAP_t = \pi_0 + \sum_{i=1}^{p} \beta_i \Delta \ln MCAP_{t-i} + \sum_{j=0}^{q} \theta_j^+ \Delta OP_{t-j}^+ + \sum_{j=0}^{q} \theta_j^- \Delta OP_{t-j}^- + \sum_{k=0}^{q} \psi_k \Delta EXR_{t-k} + \sum_{k=0}^{q} \omega_k \Delta INT_{t-k} + \sum_{k=0}^{q} \xi_k \Delta INF_{t-k} + \rho_1 \ln MCAP_{t-1} + \rho_2 OP_{t-1}^+ + \rho_3 OP_{t-1}^- + \rho_4 EXR_{t-1} + \rho_5 INT_{t-1} + \rho_6 INF_{t-1} + u_t \quad (10)$$

Model III: NARDL for Volume of Shares Traded (VOL)

$$\Delta \ln VOL_t = \delta_0 + \sum_{i=1}^{p} \delta_i \Delta \ln VOL_{t-i} + \sum_{j=0}^{q} \kappa_j^+ \Delta OP_{t-j}^+ + \sum_{j=0}^{q} \kappa_j^- \Delta OP_{t-j}^- + \sum_{k=0}^{q} \eta_k \Delta EXR_{t-k} + \sum_{k=0}^{q} \chi_k \Delta INT_{t-k} + \sum_{k=0}^{q} \tau_k \Delta INF_{t-k} + \sigma_1 \ln VOL_{t-1} + \sigma_2 OP_{t-1}^+ + \sigma_3 OP_{t-1}^- + \sigma_4 EXR_{t-1} + \sigma_5 INT_{t-1} + \sigma_6 INF_{t-1} + v_t \quad (11)$$

Where:

Δ	First difference operator, used to capture short-run changes
OP_t^+, OP_t^-	Positive and negative partial sums of crude oil price changes capturing oil price increases and decreases
$\alpha_0, \beta_0, \delta_0$	Intercepts of the respective models
$\alpha_i, \beta_i, \delta_i$	Short-run coefficients of lagged dependent variables
$\beta_j^+, \theta_j^+, \kappa_j^+$	Short-run coefficients of positive changes in crude oil price
$\beta_j^-, \theta_j^-, \kappa_j^-$	Short-run coefficients of negative changes in crude oil price
γ_k, ψ_k, η_k	Short-run coefficients of exchange rate
$\delta_k, \omega_k, \chi_k$	Short-run coefficients of interest rate

ϕ_k, ξ_k, τ_k	Short-run coefficients of inflation rate
$\lambda_1, \rho_1, \sigma_1$	Coefficient of lagged dependent variable capturing the speed of adjustment toward long-run equilibrium
$\lambda_2, \rho_2, \sigma_2$	Long-run coefficients of positive oil price changes
$\lambda_3, \rho_3, \sigma_3$	Long-run coefficients of negative oil price changes
$\lambda_4, \rho_4, \sigma_4$	Long-run coefficient of exchange rate
$\lambda_5, \rho_5, \sigma_5$	Long-run coefficient of interest rate
$\lambda_6, \rho_6, \sigma_6$	Long-run coefficient of inflation rate
ε_t, u_t, v_t	Stochastic error terms assumed to be white noise

Wald tests are conducted to examine the null hypothesis of symmetry:

Long-run symmetry: $\frac{\lambda_2}{-\lambda_1} = \frac{\lambda_3}{-\lambda_1}$

Short-run symmetry: $\sum \beta_j^+ = \sum \beta_j^-$

Before estimating the NARDL models, pre-estimation diagnostic tests were conducted to ensure the reliability and validity of the econometric analysis. These tests included examining the stationarity properties of the variables, selecting the appropriate lag lengths, and testing for the existence of a long-run relationship among the variables. In addition, several post-estimation diagnostic tests, including the normality test, serial correlation test, Ramsey RESET test, and CUSUM stability test, were performed after model estimation to confirm the robustness, stability, and validity of the estimated results.

The variable measurement is given in Table 1

1.1 TABLE 1: DEFINITION AND MEASUREMENT OF VARIABLES

Variable	Definition	Measurement	Transformation
ASI (All Share Index)	Broad market index reflecting overall price performance of listed equities	Annual closing index value	Natural Log (lnASI)
MCAP (Market Capitalization)	Total market value of all listed equities	Annual aggregate value (₦)	Natural Log (lnMCAP)
VOL (Volume of Shares Traded)	Total number of shares traded in a given year	Annual total volume	Natural Log (lnVOL)
OP (Crude Oil Price)	International price of crude oil (Brent benchmark)	Annual average US$ per barrel	Natural Log (lnOP)
EXR (Exchange	Naira per US Dollar	Annual average	Level

Rate)		(₦/US$)	
INT (Interest Rate)	Monetary policy/lending rate	Annual percentage (%)	Level
INF (Inflation Rate)	Consumer Price Index (CPI) based inflation	Annual percentage (%)	Level

Source: Researcher's compilation (2026)

4. Empirical Results

1.2 TABLE 2: VARIANCE INFLATION FACTOR (VIF) TEST RESULTS

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LNOP	0.021850	1.442889	2.346780
EXR	1.04E-06	4.747829	3.345837
INT	0.001296	2.84317	1.422415
INF	0.001458	1.830445	2.287968
C	0.616671	3.323494	NA

Source: Researcher's computation using Eviews (2026)

The Variance Inflation Factor (VIF) test results in Table 2 assess the degree of multicollinearity among the explanatory variables in the study. Considering the centered VIF values, which are more reliable, all independent variables, crude oil price (LNOP), exchange rate (EXR), interest rate (INT), and inflation rate (INF), have VIFs below the commonly used threshold of 5, with values of 2.35, 3.35, 1.42, and 2.29, respectively. This indicates that multicollinearity among these predictors is not severe, and the estimated coefficients are likely to be stable and reliable. The results suggest that the independent variables can be used in the regression models without serious multicollinearity concerns, supporting robust estimation of the effect of crude oil price and macroeconomic factors on stock market performance in Nigeria.

1.3 TABLE 3: ADF AND PP UNIT ROOT TEST RESULTS

Variables	ADF Unit Root Result				
	At Level		At First Difference		Order of integration
	T – statistics	P-value	T – statistics	P-value	
LNASI	-1.3408	0.6019	-5.2629	0.0001	I(1)
LNMCAP	-0.3516	0.9082	-5.0630	0.0001	I(1)
LNVOL	-1.7596	0.3950	-6.3605	0.0000	I(1)
LNOP	-2.0673	0.2584	-6.9354	0.0000	I(1)
EXR	-1.3149	0.6141	-5.4898	0.0000	I(1)
INT	-3.5604	0.0109	-8.8531	0.0000	I(0)
INF	-3.1757	0.0284	-6.7701	0.0000	I(0)

PP Unit Root Result

Variables	At Level		At First Difference		Order of integration
	T – statistics	P-value	T – statistics	P-value	
LNASI	-1.3206	0.6115	-5.2173	0.0001	I(1)
LNMCAP	-0.3715	0.9049	-5.0824	0.0001	I(1)
LNVOL	-1.7753	0.3874	-6.3604	0.0000	I(1)
LNOP	-2.0658	0.2590	-6.9354	0.0000	I(1)
EXR	-1.3241	0.6098	-5.4898	0.0000	I(1)
INT	-3.5364	0.0116	-9.0089	0.0000	I(0)
INF	-3.2613	0.0231	-8.8190	0.0000	I(0)

Source: Researcher's computation using Eviews (2026)

The results of the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests in Table 3 indicate the stationarity properties of the variables used in the study. For the stock market indicators, LNASI (All Share Index), LNMCAP (Market Capitalization), and LNVOL (Volume of Shares Traded), as well as the main explanatory variable LNOP (crude oil price) and EXR (exchange rate), the tests show non-stationarity at levels, with p-values greater than 0.05, but become stationary after first differencing, indicating they are integrated of order one, I(1). This means these variables exhibit a stochastic trend and require differencing to achieve stationarity. On the other hand, the macroeconomic control variables INT (interest rate) and INF (inflation rate) are stationary at levels, with significant p-values less than 0.05, and are therefore integrated of order zero, I(0). The PP test results corroborate the ADF findings, showing consistent order of integration across all variables. Overall, these results justify the use of the NARDL model, as it can accommodate a mixture of I(0) and I(1) variables, but not I(2), ensuring reliable estimation of both short-run and long-run dynamics in the relationship between crude oil price changes and stock market performance in Nigeria.

1.4 TABLE 4 OPTIMAL LAG SELECTION CRITERIA FOR THE THREE MODELS

Model	LogL	AIC	BIC	HQ	Adj. R^2	Selected NARDL Specification
Model 1: LNASI	5.812586	0.199401	0.613132	0.351049	0.985931	ARDL (1, 1, 0, 1, 0, 1)
	4.705465	0.204502	0.576859	0.340986	0.985619	
	6.498516	0.214356	0.669460	0.381170	0.985944	
	6.357098	0.221091	0.676195	0.387904	0.985849	
Model 2: LNMCAP	7.837328	0.055365	0.427723	0.191849	0.994997	ARDL (1, 0, 0, 1, 0, 1)
	8.564611	0.068352	0.482083	0.220001	0.995016	
	8.434521	0.074547	0.488277	0.226195	0.994985	
	9.431755	0.074678	0.529782	0.241492	0.995064	
Model 3: LNVOL	-44.914989	2.472142	2.761754	2.578296	0.823935	ARDL (1, 0, 0, 0, 0, 0)
	-44.151495	2.483405	2.814389	2.604723	0.825227	
	-44.616338	2.505540	2.836525	2.626859	0.821315	
	-44.689202	2.509010	2.839994	2.630329	0.820694	

Source: Researcher's computation using Eviews (2026)

The lag selection results presented in Table 4 indicate that lag 1 is the optimal lag length for all three NARDL models based on the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), Hannan-Quinn (HQ) criterion, and adjusted R^2 values. However, this study adopts the AIC criterion because it is more suitable for small sample sizes and dynamic models such as NARDL, as it allows adequate lag inclusion to capture both short-run and long-run asymmetric relationships among the variables. The selected lag structures with the minimum AIC values are ARDL(1,1,0,1,0,1) for Model 1 (LNASI), ARDL(1,0,0,1,0,1) for Model 2 (LNMCAP), and ARDL(1,0,0,0,0,0) for Model 3 (LNVOL). These specifications are considered optimal because they maintain model parsimony while adequately capturing the dynamic interactions among crude oil prices, macroeconomic variables, and stock market performance indicators within the NARDL framework.

1.5 TABLE 5: NARDL F-BOUND TEST RESULTS

Model	F-Statistic	Lower bound				Upper bound				Decision
		10% I(0)	5% I(0)	2.5% I(0)	1% I(0)	10% I(1)	5% I(1)	2.5% I(1)	1% I(1)	
Model 1: LNASI	5.682788	2.08	2.39	2.70	3.06	3.00	3.38	3.73	4.15	Cointegration
Model 2: LNMCAP	8.874291	2.08	2.39	2.70	3.06	3.00	3.38	3.73	4.15	Cointegration
Model 3: LNVOL	6.275636	2.08	2.39	2.70	3.06	3.00	3.38	3.73	4.15	Cointegration

Source: Researcher's computation using Eviews (2026)

The NARDL F-Bounds test results presented in Table 5 confirm the existence of a long-run cointegration relationship among the variables in all three models. The computed F-statistics for Model 1 (LNASI), Model 2 (LNMCAP), and Model 3 (LNVOL) are 5.682788, 8.874291, and 6.275636 respectively, all exceeding the upper bound critical values at conventional significance levels. This indicates that crude oil price changes, exchange rate, interest rate, and inflation maintain a stable long-run relationship with the All Share Index, market capitalization, and volume of shares traded in Nigeria. The findings imply that stock market performance in Nigeria is strongly linked to crude oil price movements and macroeconomic conditions over time, reflecting the dependence of the Nigerian economy on the oil sector. The existence of cointegration further justifies the suitability of the NARDL framework for estimating both short-run and long-run dynamics among the variables.

1.6 TABLE 6: NARDL ESTIMATION RESULTS

Long-run NARDL Estimation Results						
	Model One: LnASI		Model Two: LnMCAP		Model Three: LnVOL	
Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
LNOP_POS	-0.175615	0.0372	-0.171607	0.0037	-0.431445	0.0155
LNOP_NEG	0.529130	0.2523	0.332438	0.0006	1.041346	0.0001
EXR	-1.427069	0.0000	-1.937203	0.0017	-0.894687	0.0000
INT	-0.616919	0.3958	-2.348078	0.0578	-4.917497	0.1767
INF	0.374968	0.4551	-0.587243	0.4982	0.417415	0.8208
Short-run NARDL Estimation Results						
	Model One: LnASI		Model Two: LnMCAP		Model Three: LnVOL	
Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
LNOP_POS	0.175615	0.0967	0.003978	0.9606	0.043293	0.8528
LNOP_POS(-1)	0.125362	0.1975	-	-	-	-
LNOP_NEG	0.171629	0.2538	0.083049	0.5493	1.009091	0.0388
EXR	-0.062217	0.6547	0.028093	0.8226	0.494494	0.0690
EXR(-1)	-0.400667	0.0175	0.304344	0.0273	-	-
INT	-0.200104	0.4287	-0.402947	0.1067	-1.046860	0.1379
INF	-0.163944	0.2300	-0.171968	0.1651	0.088861	0.8138
INF(-1)	0.285569	0.0416	0.272743	0.0313	-	-
ECT	-0.324361	0.0000	-0.171607	0.0000	-0.212885	0.0027
R-squared	0.989020		0.896211		0.856809	
Adjusted R-squared	0.985931		0.785320		0.832944	
F-statistic	320.2568		1117.565		35.90218	
Prob(F-statistic)	0.000000		0.000000		0.000000	
Durbin-Watson stat	2.125105		2.200568		2.184840	

Source: Researcher's computation using Eviews (2026)

Crude Oil Price and All Share Index (ASI) in Nigeria

The long-run NARDL results in Table 6 reveal a statistically significant asymmetric relationship between crude oil prices and the All Share Index (ASI) in Nigeria. Specifically, positive oil price changes (LNOP_POS) exert a significant negative effect on ASI (β = -0.176, p = 0.0372), implying that a 1% increase in crude oil price leads to a 0.176% decline in stock market performance. In addition, Negative shocks trigger portfolio rebalancing and speculative trading in oil-sensitive stocks, consistent with loss-aversion. Positive shocks induce wait-and-see, reducing turnover. From a theoretical standpoint, this outcome is consistent with the Transmission Mechanism Theory, which posits that external commodity price shocks are transmitted into the domestic economy through cost-push pressures, liquidity constraints, and heightened macroeconomic uncertainty. In the Nigerian context, rising oil prices may increase production costs, distort investment expectations, and tighten financial conditions, thereby reducing equity valuations. This finding contrasts with the conventional expectation in oil-exporting economies but aligns with recent evidence of structural dependence and macro-financial fragility in oil-driven markets.In contrast, negative oil price changes (LNOP_NEG) have a positive but statistically insignificant effect on ASI (β = 0.529, p = 0.2523), suggesting that reductions in oil prices do not reliably

stimulate stock market performance. This asymmetry implies that the Nigerian stock market is more sensitive to adverse oil price increases than to oil price declines, reflecting a non-linear adjustment process consistent with asymmetric shock transmission literature (Muhammad et al., 2023; Okere et al., 2021).

Among macroeconomic controls, the exchange rate (EXR) exhibits a strong and statistically significant negative effect ($\beta = -1.427$, $p < 0.001$), indicating that currency depreciation substantially weakens stock market performance. This result is theoretically consistent with the Arbitrage Pricing Theory (APT), which emphasizes that macroeconomic risk factors such as exchange rate instability influence asset pricing through investor expectations and capital flow adjustments. Interest rate and inflation, however, are statistically insignificant in the long run, suggesting that their effects are either indirectly transmitted through other channels or subsumed within oil-driven macroeconomic dynamics.

In the short run, oil price changes remain statistically insignificant, reinforcing the notion that oil-market transmission to equities operates primarily through long-run structural channels rather than immediate adjustments. The error correction term (ECT = -0.3244, $p < 0.001$) confirms a stable long-run equilibrium, with approximately 32% of short-run disequilibria corrected annually. The high explanatory power ($R^2 = 0.989$) indicates strong model fitness, while the Durbin-Watson statistic confirms the absence of serial correlation, validating the robustness of the estimates.

Crude Oil Price and Market Capitalization (MCAP) in Nigeria

The long-run results for market capitalization reveal a pronounced asymmetric effect of crude oil price changes. Positive oil price shocks marginally andsignificantly reduce market capitalization ($\beta = -0.172$, $p = 0.0037$), suggesting that increases in global oil prices are associated with a contraction in aggregate equity valuation. This counterintuitive outcome reflects structural inefficiencies in the Nigerian economy, where rising oil prices may not translate into productive capital formation but instead generate inflationary pressures, exchange rate instability, and reduced investor confidence. Within the Transmission Mechanism framework, oil price increases propagate through cost channels and financial uncertainty, ultimately depressing firm valuation.

Conversely, negative oil price changes significantly increase market capitalization ($\beta = 0.332$, $p = 0.0006$), confirming strong asymmetry in market response. This suggests that oil price declines may ease production costs, improve liquidity conditions, and enhance investor sentiment, thereby stimulating equity market expansion. This finding aligns with asymmetric adjustment theories and empirical evidence from oil-exporting economies (e.g., Amri-Asrami and Jamkhane, 2024), where financial markets respond more strongly to negative than positive shocks.

Among control variables, exchange rate depreciation significantly reduces market capitalization ($\beta = -1.937$, $p = 0.0017$),

reinforcing the sensitivity of equity valuations to currency instability. Interest rates show a marginally significant negative effect, indicating that tighter monetary conditions may constrain market expansion through higher discount rates and cost of capital effects. Inflation remains statistically insignificant, suggesting limited direct influence on aggregate market value in the presence of stronger external shocks.

In the short run, oil price shocks remain insignificant, further supporting the dominance of long-run structural relationships. The error correction mechanism (ECT = -0.1716, $p < 0.001$) indicates slower adjustment dynamics, with approximately 17% of disequilibrium corrected annually. This slower convergence relative to ASI suggests that market capitalization adjusts more gradually to macroeconomic shocks. The model exhibits strong explanatory power ($R^2 = 0.896$), confirming robustness.

Crude Oil Price and Volume of Shares Traded in Nigeria

The long-run estimates for trading volume reveal a highly significant asymmetric relationship between crude oil prices and market liquidity. Positive oil price changes significantly reduce trading volume ($\beta = -0.431$, $p = 0.0155$), indicating that rising oil prices dampen market activity. Theoretically, this reflects the Transmission Mechanism Theory, whereby oil price increases generate macroeconomic uncertainty and reduce portfolio rebalancing incentives, thereby lowering transaction intensity. This finding is consistent with liquidity-based explanations of market behavior, where uncertainty discourages trading participation.

In contrast, negative oil price changes exert a strong positive effect on trading volume ($\beta = 1.041$, $p = 0.0001$), suggesting that oil price declines stimulate market activity. This reflects increased speculative behavior, portfolio reallocation, and liquidity expansion during periods of declining energy prices. The strong asymmetry confirms that market participants respond more aggressively to negative oil price shocks, consistent with behavioral finance explanations of loss-driven trading adjustments.

Exchange rate depreciation significantly reduces trading volume, indicating that currency instability suppresses market participation. Interest rate and inflation remain statistically insignificant, suggesting limited direct influence on liquidity conditions once oil price dynamics are accounted for.

Short-run results further confirm asymmetric dynamics, with negative oil shocks significantly increasing trading activity, while positive shocks remain insignificant. The error correction term (ECT = -0.2129, $p = 0.0027$) confirms a stable long-run equilibrium, with 21% speed of adjustment toward equilibrium annually. The model demonstrates strong explanatory power ($R^2 = 0.857$), and diagnostic statistics confirm the absence of autocorrelation, validating model reliability.

Comparative Analysis of the Effects of Crude Oil Price Changes on Stock Market Performance in Nigeria

The long-run comparative results across the three NARDL models consistently confirm the existence of asymmetric effects of crude oil price changes on stock market performance in Nigeria. In Model 1 (LNASI), positive oil price shocks significantly reduce the All Share Index, while negative shocks are positive but insignificant, indicating that rising oil prices exert a contractionary effect on overall market performance. Similarly, Model 2 (LNMCAP) reveals that positive oil price shocks significantly depress market capitalization, whereas negative shocks significantly enhance it, suggesting that equity valuations respond more favorably to oil price declines. Model 3 (LNVOL) further strengthens this pattern by showing that positive oil price shocks significantly reduce trading volume, while negative shocks strongly stimulate market activity. Across all models, the exchange rate consistently exhibits a significant negative effect, underscoring the vulnerability of the Nigerian stock market to currency depreciation, while interest rate and inflation remain largely insignificant in the long run. Notably, trading volume displays the strongest magnitude of response, indicating that market liquidity is the most sensitive channel through which oil price shocks are transmitted.

Collectively, these findings provide strong empirical support for asymmetric transmission effects consistent with the Transmission Mechanism Theory, as well as the Arbitrage Pricing Theory and Portfolio Theory, which emphasize heterogeneous investor responses to macroeconomic shocks. The results align with existing literature (Muhammad et al., 2023; Asafo-Adjei et al., 2021; Okere et al., 2021), confirming that crude oil price movements and exchange rate fluctuations are key determinants of stock market dynamics in Nigeria. In the short run, however, the three models reveal weaker and more selective effects. For ASI, both positive and negative oil price shocks are insignificant, indicating limited immediate impact on broad market performance. For MCAP, negative oil price shocks exert a small positive effect, while positive shocks remain insignificant, suggesting mild short-run valuation adjustments. In contrast, LNVOL exhibits a strong and significant positive response to negative oil price shocks, highlighting that falling oil prices stimulate trading activity, while positive shocks remain negligible. The error correction terms across all models are negative and significant, confirming adjustment toward long-run equilibrium, with varying speeds across indicators. Overall, the short-run results reinforce the presence of asymmetry in market behavior, particularly in trading activity, and are consistent with evidence from Amri-Asrami and Jamkhane (2024) and Muhammad et al. (2023), which emphasize heightened market sensitivity to adverse oil price movements.

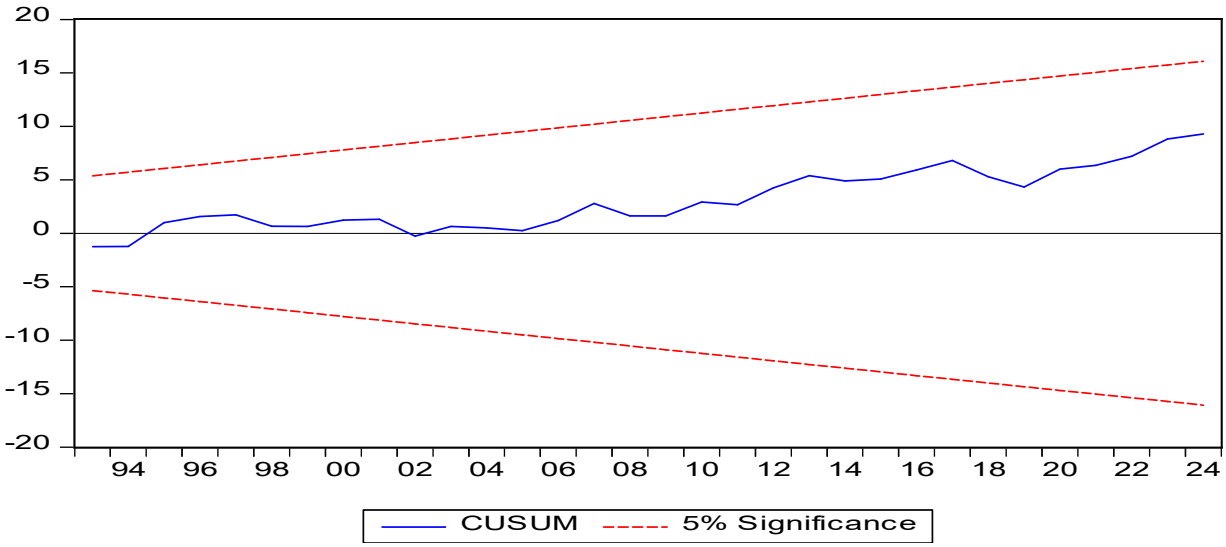
1.7 TABLE 7: SUMMARY OF DIAGNOSTIC TESTS FOR THE THREE NARDL MODELS

Model	Test	Test Statistic	p-value	Decision
Model 1	Histogram Normality Test	0.3175	0.8532	Residual is normally distributed
	Serial Correlation (Breusch-Godfrey)	2.4582	0.1027	No serial correlation (p > 0.05)
	Heteroskedasticity (BP-Godfrey)	0.6159	0.7744	Homoskedastic (p > 0.05)
	Ramsey RESET	0.1336	0.7172	Model correctly specified (p > 0.05)
Model 2	Histogram Normality Test	1.2529	0.5345	Residual is normally distributed
	Serial Correlation (Breusch-Godfrey)	2.6191	0.0546	No serial correlation (marginal)
	Heteroskedasticity (BP-Godfrey)	0.7132	0.6782	Homoskedastic (p > 0.05)
	Ramsey RESET	0.8355	0.3673	Model correctly specified (p > 0.05)
Model 3	Histogram Normality Test	0.5848	0.7464	Residual is normally distributed
	Serial Correlation (Breusch-Godfrey)	1.0773	0.3519	No serial correlation (p > 0.05)
	Heteroskedasticity (BP-Godfrey)	1.2868	0.2880	Homoskedastic (p > 0.05)
	Ramsey RESET	0.1635	0.6885	Model correctly specified (p > 0.05)

Source: Researcher's computation using Eviews (2026)

The diagnostic tests summarized in Table 4.7 indicate that all three NARDL models are statistically well-behaved and reliable for inference. For Model 1 (LNASI), the residuals are normally distributed (p = 0.8532), there is no evidence of serial correlation (p = 0.1027), and the model is homoskedastic (p = 0.7744), while the Ramsey RESET test confirms correct model specification (p = 0.7172).Similarly, Model 2 (LNMCAP) shows normally distributed residuals (p = 0.5345), no significant serial correlation (p = 0.0546, marginal), homoskedasticity (p = 0.6782), and proper specification (p = 0.3673), confirming that the model assumptions are largely satisfied.

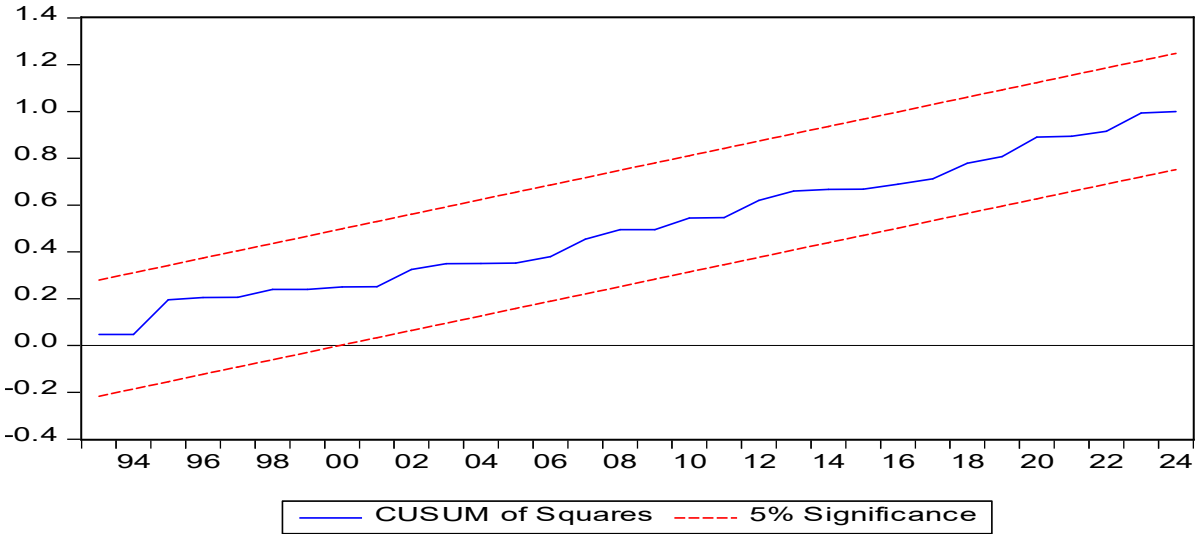
For Model 3 (LNVOL), the residuals are also normally distributed (p = 0.7464), no serial correlation is detected (p = 0.3519), homoskedasticity holds (p = 0.2880), and the model is correctly specified (p = 0.6885). Furthermore, the CUSUM and CUSUM of squares plots for all three models presented in figures 4.2, 4.3, and 4.4respectively, remain within the critical boundaries, indicating that the models are structurally stable over the study period. Collectively, these results validate the robustness of the estimated NARDL models and support the reliability of the long-run and short-run inferences.



1.8 FIGURE 1: CUSUM TEST FOR MODEL ONE

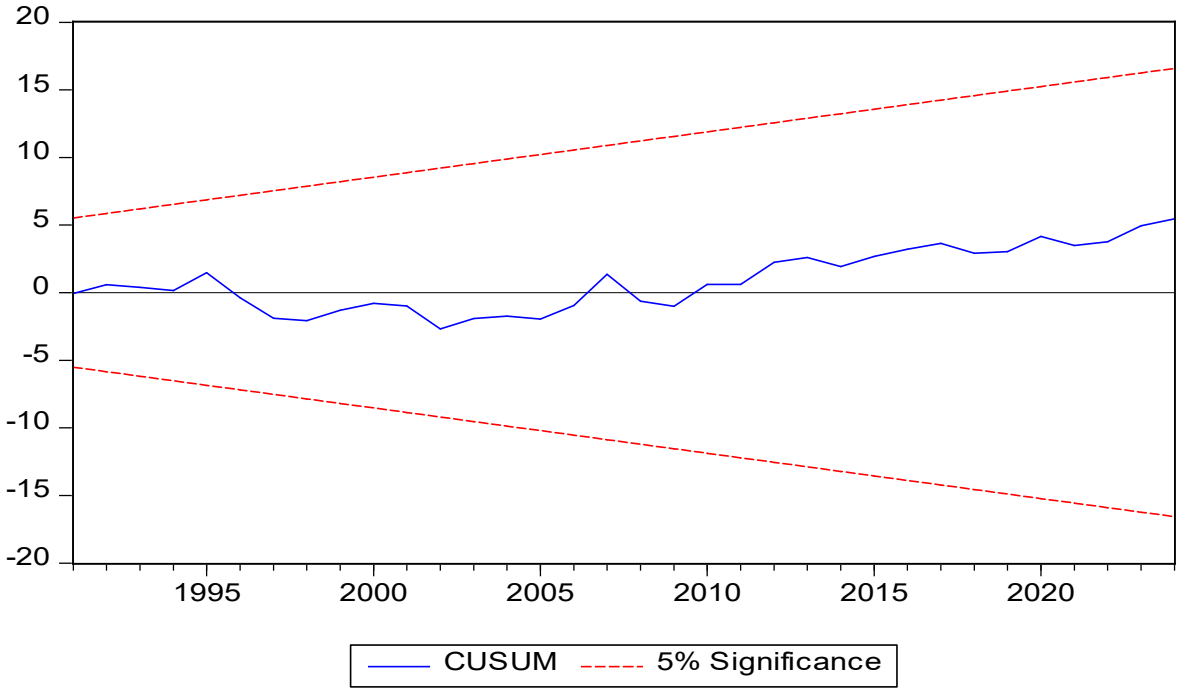
Source: Researcher's computation using Eviews (2026)

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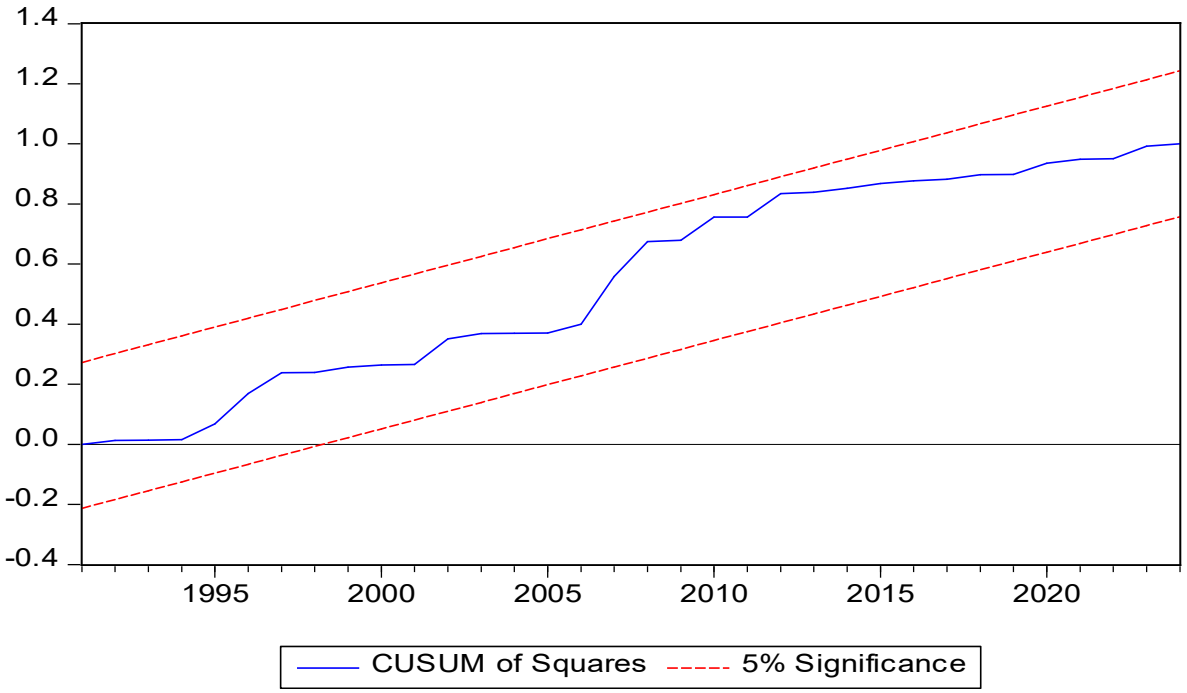
1.9 FIGURE 2: CUSUM OF SQUARES TEST FOR MODEL ONE

Source: Researcher's computation using Eviews (2026)



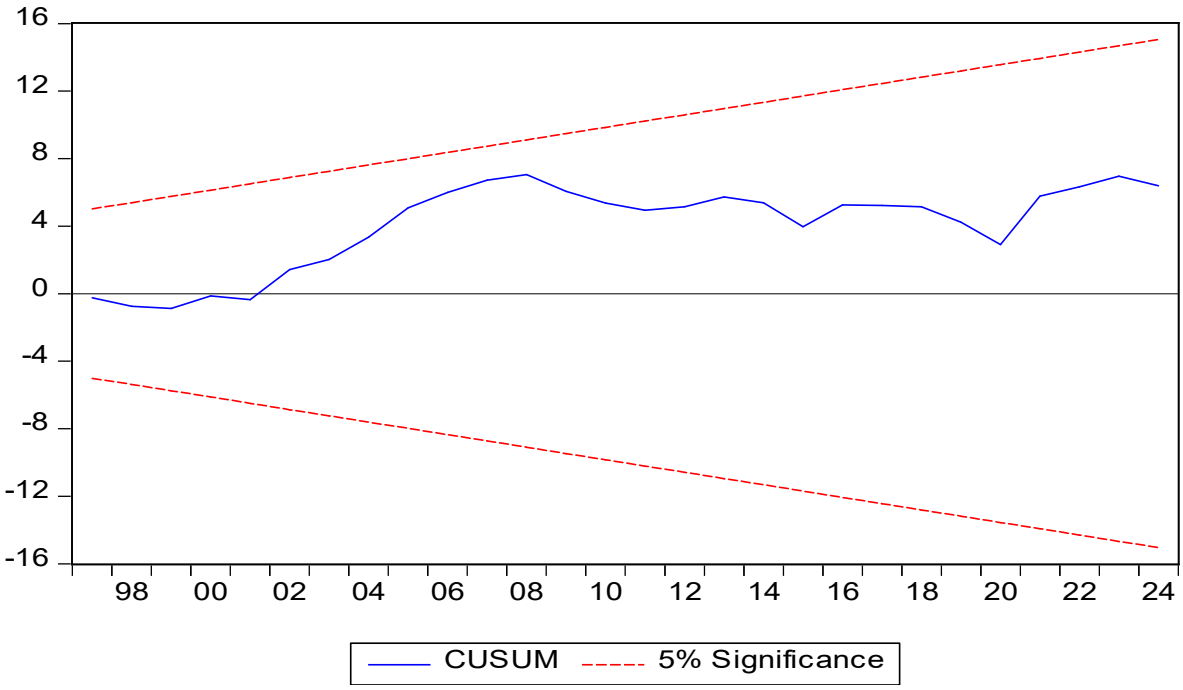
1.10 FIGURE 3: CUSUM TEST FOR MODEL TWO

Source: Researcher's computation using Eviews (2026)



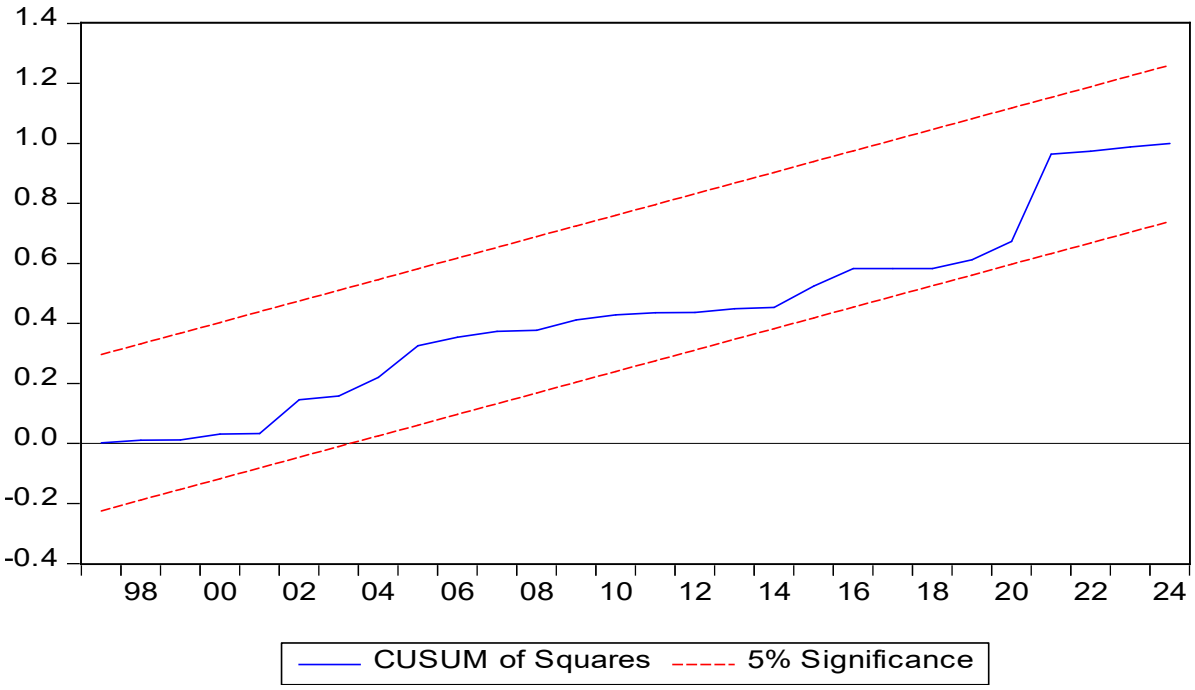
1.11 FIGURE 4: CUSUM OF SQUARES TEST FOR MODEL TWO

Source: Researcher's computation using Eviews (2026)



1.12 FIGURE 5: CUSUM TEST FOR MODEL THREE

Source: Researcher's computation using Eviews (2026)



1.13 FIGURE 6: CUSUM OF SQUARES TEST FOR MODEL THREE

Source: Researcher's computation using Eviews (2026)

1.14 TABLE 8: WALD TEST FOR LONG-RUN AND SHORT-RUN ASYMMETRY

Model	Test Type	F-Statistic	Prob	Decision
Model 1	Long-Run	5.8772	0.0190	Reject H_0 (asymmetry exists)
	Short-Run	2.9987	0.083	Do not reject H_0 (no significant short-run asymmetry)
Model 2	Long-Run	5.9873	0.0241	Reject H_0 (asymmetry exists)
	Short-Run	0.2881	0.5914	Do not reject H_0 (no significant short-run asymmetry)
Model 3	Long-Run	4.3039	0.0380	Reject H_0 (asymmetry exists)
	Short-Run	8.6741	0.0004	Reject H_0 (significant short-run asymmetry)

Source: Researcher's computation using Eviews (2026)

The existence of long-run asymmetry across all three models and short-run asymmetry in the volume of shares traded suggests that stock market participants respond differently to oil price increases and decreases. This finding implies that the effects of oil price shocks are nonlinear, and therefore policy measures designed to stabilize the financial market should account for the direction of oil price movements. In particular, periods of declining oil prices may require stronger fiscal, monetary, and market-stabilization interventions than periods of rising oil prices, given that the responses of stock market indicators are not symmetric.

Discussion of Findings

The analysis of the long-run effects of crude oil price changes on Nigerian stock market performance reveals notable asymmetries across the three proxies of market activity. In Model One (LnASI), positive oil price shocks have a significant negative impact on the All-Share Index, whereas negative shocks are statistically insignificant. This suggests that sustained increases in crude oil prices may exert pressure on overall stock market valuations, potentially due to concerns over production costs, inflationary pressures, or macroeconomic constraints. The exchange rate shows a strong negative effect, indicating that a depreciating naira significantly reduces stock market performance in the long run, while interest rate and inflation are not significant drivers. These results resonate with Okere et al. (2021) and Emmanuel and Ekpenyong (2021), who observed that oil price changes and currency movements are critical determinants of long-term stock market behavior in Nigeria. The implications are clear: policymakers and investors must monitor oil price trends alongside exchange rate fluctuations to anticipate long-term market pressures.

For Model Two (LNMCAP), both positive and negative oil price shocks exhibit asymmetric effects in the long run. Positive shocks reduce market capitalization, whereas negative shocks significantly increase market capitalization, reflecting that investors may perceive falling oil prices as an opportunity to acquire undervalued shares. The strong negative influence of the exchange rate highlights that naira depreciation reduces total market value, potentially through increased uncertainty

and reduced foreign investment inflows. This aligns with Adenekan et al. (2020), who argued that structural rigidities in Nigeria's financial markets moderate the transmission of oil price shocks. The long-run implication is that strategic investment and hedging are necessary to manage exposure to both oil price surges and currency depreciation.

In Model Three (LNVOL), long-run results indicate that negative oil price shocks significantly increase trading volume, while positive shocks reduce it, suggesting that market participants respond more actively to declines in oil prices, likely due to perceived buying opportunities or risk management strategies. The exchange rate negatively affects volume, reinforcing the view that currency volatility drives market activity in Nigeria. The findings are consistent with Muhammad et al. (2023), who found that feedback effects from oil price shocks stimulate trading activity. For market regulators, this implies that periods of declining oil prices may require monitoring to ensure market stability and prevent excessive volatility driven by speculative trading.

Turning to the short-run findings, a similar pattern of asymmetry emerges but with nuances in magnitude and significance. In the short run, Model One (LnASI) shows that positive and negative oil price shocks are largely insignificant, except for the error correction term (ECT), which is negative and significant, indicating that deviations from long-run equilibrium are corrected within the short run. Exchange rate and lagged inflation terms also exert limited influence, implying that immediate responses of the All-Share Index are muted relative to longer-term adjustments.

Model Two (LNMCAP) confirms that short-run dynamics are more subdued, with only negative oil price shocks and lagged macroeconomic variables, such as inflation and exchange rate, showing limited significance. The negative and significant ECT demonstrates that market capitalization adjusts slowly toward long-run equilibrium after short-term shocks. This suggests that short-term investor behavior in Nigeria is cautious, and market capitalization is resilient to immediate oil price volatility, consistent with Nwude et al. (2021), who highlighted the slow transmission of oil price fluctuations to stock market variables.

In contrast, Model Three (LNVOL) indicates that negative oil price shocks have a significant positive effect on trading volume, while positive shocks remain insignificant, confirming that short-term market activity responds more to perceived risks or opportunities arising from declines in oil prices. This supports findings by Agbo (2021) and Oloruntoba (2024), who observed that short-term trading in Nigeria is sensitive to negative oil price movements, particularly in oil-related sectors. The significant ECT underscores that trading volume realigns toward long-run equilibrium following short-run deviations.

The comparative analysis of the three models indicates that the Nigerian stock market exhibits asymmetric responses to crude oil price changes, with negative shocks eliciting stronger reactions in both the long and short run, particularly in trading activity. Positive shocks tend to be less influential, particularly in the short run,

suggesting that investors may interpret increases in oil prices with caution, possibly due to inflationary concerns or the cost-push effect on businesses. The findings also highlight the critical role of exchange rate movements in transmitting oil price shocks to the stock market, emphasizing the interconnectedness of external shocks, macroeconomic variables, and market behavior.

Implications of these findings are multifaceted. For investors, understanding the asymmetric and lagged effects of oil price changes is essential for portfolio management and risk diversification. For policymakers, the results underscore the need for mechanisms that stabilize the exchange rate and manage oil price volatility to mitigate adverse effects on the stock market. Furthermore, market regulators may consider monitoring trading activity during periods of declining oil prices to prevent speculative-driven volatility and ensure orderly market functioning. Collectively, these results reinforce the importance of considering both long-run structural effects and short-run market dynamics when analyzing the influence of crude oil price fluctuations on financial markets in oil-dependent economies like Nigeria.

Conclusion and Recommendations

This study examined the effect of crude oil price changes on stock market performance in Nigeria over the period 1981–2024 using the Nonlinear Autoregressive Distributed Lag (NARDL) framework. Specifically, the study investigated the effects of crude oil price fluctuations on the All-Share Index (ASI), Market Capitalization (MCAP), and Volume of Shares Traded (VOL), while accounting for the potential asymmetric effects of positive and negative oil price shocks. The findings revealed that crude oil price changes significantly influence stock market performance in Nigeria, although the magnitude and direction of the effects vary across market indicators. The results further showed evidence of long-run asymmetry in the ASI and MCAP models, indicating that increases and decreases in crude oil prices do not exert identical effects on stock market performance. Similarly, the VOL model exhibited both short-run and long-run asymmetry, suggesting that investor trading activities respond differently to positive and negative oil price shocks. These findings support the theoretical argument that stock markets in oil-dependent economies are highly sensitive to commodity price fluctuations and that such responses are inherently nonlinear.The study therefore concludes that crude oil price volatility remains an important determinant of stock market performance in Nigeria, with implications for investors, regulators, and policymakers. The evidence of asymmetric effects implies that policy responses to oil price shocks should not be uniform, as the impact of rising oil prices may differ substantially from that of falling prices.

The CBN needs to strengthen exchange rate stability, control inflation, deepen the capital market, and accelerate economic diversification, which are essential for reducing the vulnerability of the Nigerian stock market to external oil market shocks. The Nigerian Stock Commission should simultaneously examine the All-Share Index, Market Capitalization, and Volume

of Shares Traded within a nonlinear framework.

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