Returns of Stock Exchange Investments in Competitive Markets: Regression Analysis Concepts

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Abstract
This paper considered the concepts of multiple regressions on stock prices for investment plans. The regression results revealed a significant positive relationship between the Nigerian Stock Exchange All Share Index and crude oil prices, as well as inflation rate, indicating that increases in these variables enhance stock market performance and dividend outcomes. Conversely, the exchange rate exhibited a negative effect on the Nigerian Stock Exchange All Share Index, implying that currency depreciation reduces dividend stability and investor confidence. The model's high explanatory power, reflected in the R-squared and adjusted R-squared values (R-squared = 0.641558, Adjusted R-squared= 0.630473), strengthened the credibility of the analysis and confirmed that approximately 63% of variations in dividend outcomes were explained by the independent variables. The study concluded that fluctuations in crude oil prices, inflation, and exchange rates significantly shape the dividend performance of investors in Nigeria's stock market. The study thus recommended that investors adopt optimal trading frequencies that balance market risks and dividend gains, while policymakers should prioritize exchange rate stabilization and inflation control to improve market efficiency. Also, by integrating computational modeling into financial analysis, the study contributed to a deeper understanding of dividend behavior in a competitive market context and provided actionable insights for investors, analysts, and regulators in Nigeria's evolving financial landscape. The results have direct implications for risk management and effective decision making.

Keywords: *Inflation rates, Stock markets, Investments, Exchange rates and Regression Analysis.*

1.1 Introduction

Trading on a stock exchange is restricted to securities that have met the formal listing criteria and have been admitted to the exchange's official list (Tucker, 2022). There is a central place for record keeping, but trade is increasingly less linked to a physical place as modern markets use electronic communication networks, which give them advantages of increased speed and reduced cost of transactions (Miller, 2019). Trading on a stock exchange is typically conducted through brokers or dealers who are duly authorized and recognized members of the exchange (Reilly & Brown, 2021). In recent years, various other trading venues such as electronic communication networks, alternative trading systems, and dark pools have taken much of the trading activity away from traditional stock exchanges (Johnson, 2015). Modern electronic exchanges operate through automated trading systems that allow market participants to buy and sell securities remotely, without the requirement of a centralized physical location (Bodie, et, al, 2023). These

exchanges are considered more efficient and much faster than traditional exchanges (Brown, 2018). It is important to note that the initial public offering (IPO) of stocks and bonds to investors is done in the primary market and subsequent trading is done in the secondary market (Miller, 2019). In the primary market, companies issue new securities that did not previously exist on any exchange. Here, securities are directly issued by companies to investors to raise capital. In the secondary market, shares are traded between investors with no company involved. The secondary market augments the supply of funds to the primary market. If there were no secondary market in which investors could cash their investments in listed securities they choose, many investors may not buy new issues in the first place. This is because investors will usually want to be able to sell some or all of their shares and so realize their investment if ever and whenever they want to do so. The stock exchange facilitates investors' ability to track the performance of their assets and to dispose of them when necessary, promoting both transparency and liquidity (Pilbeam, 2021). From the perspective of the overall economy, the secondary market is particularly important, as it makes it possible for the economy to ensure long-term commitment in real capital (Brown, 2018). The stock exchange market serves as a vital platform for investors to participate in buying and selling securities, with the goal of generating financial returns. Among the various factors that influence the profitability of investments, dividends play a crucial role. Dividends represent the distribution of a company's earnings to its shareholders, providing them with a regular income stream. The dividends received by investors are influenced by several factors, including the trading period variation within the stock exchange. Understanding the impact of trading period variation on dividends is essential for investors in the computing stock exchange domain (Adelegan & Anoruo, 2012).

In the Nigerian economy, where there is an availability of skilled labour force, no paucity of business opportunities but a prevalent funding gap, the stock market serves a very important barometer for promoting enterprises and engendering economic growth. It is therefore necessary to highlight the roles Stock Exchanges play in ensuring business sustainability and by extension economic development. A well-functioning stock market enables economic growth and development by facilitating the mobilization of financial resources between businesses and institutions that need capital to innovate and grow; and qualified investors that seek capital appreciation and investment returns. Without stock markets, businesses would largely resort to borrowing huge loans which must be repaid with interests and these interests majorly put huge constraints on the liquidity of businesses. Fortunately, businesses in both developed and developing world can issue shares to the public, raising vast amount of cash that doesn't come along with a repayment burden. When businesses have access to such capital, they can easily expand their operations and create more job opportunities. From a national perspective, this will lower unemployment levels, and enable government to earn more revenue from business taxes. Stock exchange maintains rules and regulation to guard the market against fraudulence and it creates attractive investment sectors for the masses. Thus, the stock market helps in improvement of the living standard of general people. It also helps in industrialization as companies can easily collect the necessary amount of capital by issuing shares or selling debentures in the stock market. Variation of trading period as used in this study refers to the changes in the frequency and timing of trading activities within a specific period in the competing stock exchange market. It encompasses different trading frequencies, such as daily, weekly, monthly, or quarterly trading periods. On the other hand dividends are regular payments made by companies to their shareholders as a distribution of profits. In this study, dividends serve as the dependent variable and they specifically refer to the financial returns received by competing stock exchange

investors in Nigeria. Investors in this study refer to individuals or entities that actively participate in the buying and selling of securities in the competing stock exchange market in Nigeria. They seek to generate financial returns through dividend income and capital gains.

So, this study seeks to assess how changes in trading frequency and timing affect the financial returns and profitability of investments in the Nigerian Stock Exchange. However, the relationship between trading period variation and dividend outcomes remains a complex and dynamic area of study. Traditional analytical methods may not adequately capture the intricate interplay between trading periods and dividend returns. Therefore, there is a need for computational analysis techniques that can process large datasets, simulate different trading scenarios, and provide insights into the impact of trading period variation on dividends for competing stock exchange investors.This study therefore seeks to address these gaps by developing a multiple linear regression model to analyze the impact of USD/NGN exchange rate, inflation rate (INF), and crude oil price (COP) on the Nigerian Stock Exchange using secondary data obtained from the Central Bank of Nigeria's monthly financial reports, covering the period from January 2015 to May 2023 with the use of an advanced statistical and computational techniques, including descriptive statistics, Augmented Dickey-Fuller (ADF) unit root tests, multiple regression analysis, and residual diagnostics, to examine the relationship between the Nigerian Stock Exchange All Share Index (NSE-ASI) and key macroeconomic indicators such as crude oil prices (COP), inflation rate (INF), and the USD/NGN exchange rate.

This paper is set as follows: Section 2.1 presents material and methods, Results and discussion are seen in Section 3.1 and the paper is concluded in Section 4.1.

2.1 Material and Methods

The multiple linear regression model to predict All Shares Index (ASI) uses exchange rate (USD-NGN), Inflation rate (INF) and Crude oil price (COP)

The model can be expressed mathematically as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \quad 1.1$$

where:

Y = Nigerian Stock Exchange All Shares Index (NSE-ASI)
X_1 = USD/NGN exchange rate
X_2 = Nigerian Inflation Rate (INF)
X_3 = Nigerian crude oil price (COP)

$\beta_0, \beta_1, \beta_2, \beta_3$, are the regression coefficients representing the relationship between the respective independent variables and Y.

ε = represents the error term or residual, which captures the unexplained variation in Y that is not accounted for by the independent variables.

The coefficients $\beta_0, \beta_1, \beta_2,$ and β_3 can be estimated using regression analysis techniques, such as Ordinary Least Squares (OLS). These coefficients will provide insights into the magnitude and direction of the impact of each independent variable on the dependent variable, *Y*, in the context of the given data and model. Numerical Data computation shall be done using Eview 10 software.

2.2 Mathematical preliminaries

Full derivation: minimize SSE $S(\beta) = \varepsilon'\varepsilon$

We start from the linear model (with n observations, k regressors including an intercept):

$$y = X\beta + \varepsilon, \quad y \in R^n, \quad X \in R^{nxk}, \quad \beta \in R^k, \quad \varepsilon \in R^n.$$

Define the objective (sum of squared errors)

$S(\beta) = \varepsilon'\varepsilon = (y - X\beta)'(y - X\beta).$

1. Expand $S(\beta)$

Use Bilinearity and symmetry of the transpose

$$S(\beta) = \varepsilon'\varepsilon = (y - X\beta)'(y - X\beta).$$
$$= y'y - y'(X\beta) - (X\beta)'y + (X\beta)'(X\beta).$$

Note $(X\beta)'y = \beta'X'y$ and $y'(X\beta) = (X'y)'\beta = \beta'X'y$ (same scalar). Also $(X\beta)'(X\beta) = \beta'X'X\beta.$ hence

$S(\beta) = y'y. - 2\beta'X'y + \beta'X'X\beta$

2. Matrix derivative rules used

We will use these standard derivative rules (with respect to vector β):

$\frac{\partial}{\partial\beta}(a'\beta) = a,$ for constant vector a

$\frac{\partial}{\partial\beta}(\beta'a) = a$ (same as 1)

$\frac{\partial}{\partial\beta}(\beta'A\beta) = (A + A')\beta,$ for constant matrix A

Derivative of a scalar constant (e.g. $y'y$) is zero

Compute the gradient $\nabla_\beta S(\beta)$

Differentiate term-by-term

$\frac{\partial}{\partial\beta}(y'y) = 0$ (constant)

$\frac{\partial}{\partial\beta}(-2\beta'X'y) = -2X'y$

$\frac{\partial}{\partial\beta}(\beta'X'X\beta) = \left(X'X + (X'X)'\right)\beta.$ but $X'X$ is symmetric, so equals $2X'X\beta.$ thus

$\nabla_\beta S(\beta) = -2X'y + 2X'X\beta$

Thus, Set the gradient to zero

Solve $\nabla_\beta S(\beta) = 0$

$-2X'y + 2X'X\beta = 0 \Rightarrow X'X\beta = X'y$

These are the normal equations

Solve for $\hat{\beta}$ (OLS estimator)

If $X'X$ is invertible (i.e. X has full column rank k), then

$\hat{\beta} = (X'X)^{-1}X'y$

This is the unique minimizer of $S(\beta)$ under full rank

Second-order condition: Hessian and convexity

Compute the Hessian (matrix of second order derivatives):

$$H(\beta)=\frac{\partial}{\partial\beta}\left(\nabla_{\beta}S(\beta)\right)=\frac{\partial}{\partial\beta}\left(-2X'y+2X'X\beta\right)=2X'X.$$

Properties

i. $X'X$ is positive semi-definite always, and positive definite if an only if X has full column rank k

ii. Therefore, $H(\beta)=2X'X$ is positive definite under full rank, so $S(\beta)$ is strictly convex and the stationary point $\hat{\beta}$ is the unique global minimizer

Thus, the normal equations solution indeed gives the global minimum SSE.

1. Residuals and fitted values

Fitted values:

$\hat{y}=X\hat{\beta}=X(X'X)^{-1}X'y=Py,$ where $P\equiv X(X'X)^{-1}X'$ (the hat/projection matrix)

Residuals:

$\hat{\varepsilon}=y-\hat{y}=y-Py=(I-P)y=My,$ where $M\equiv(I-P)$

Properties

I. P is symmetric and idempotent: $P'=P$ and $P^2=P.$

II. M is symmetric and idempotent $M'=M$ and $M^2=M.$

III. $PM=MP=0$

2. Residual orthogonality (normal equations restated)

From the normal equations $X'X\hat{\beta}=X'y,$ rearrange:

$$X'\left(y-X\hat{\beta}\right)=X'\hat{\varepsilon}=0$$

So the residual vector $\hat{\varepsilon}$ is orthogonal to every column of X (i.e. orthogonal to the space spanned by regressors). This is the geometric interpretation of OLS.

3. Minimum value of $S(\beta)$ (SSE at $\hat{\beta}$)

Plugging back into the expanded form:

$$\begin{aligned}S(\beta)&=y'y-2\hat{\beta}'X'y+\hat{\beta}'X'X\hat{\beta}\\&=y'y-\hat{\beta}'X'y \text{ (because } X'X\hat{\beta}=X'y, \text{ so } -2\hat{\beta}'X'y+\hat{\beta}'X'X\hat{\beta}=-\hat{\beta}'X'y)\\&=y'y-y'X(X'X)^{-1}X'y\\&=y'(I-P)y=\hat{\varepsilon}'\hat{\varepsilon}.\end{aligned}$$

So the minimized SSE is $S\left(\hat{\beta}\right)=y'(I-P)y.$

4. Degrees of freedom and estimator of σ^2

If we assume the classical homoscedastic model with $E[\varepsilon]=0$ and $Var(\varepsilon)=\sigma^2 I_{n,}$ then an unbiased estimator of σ^2 is

$$\sigma^2=\frac{\hat{\varepsilon}'\hat{\varepsilon}}{n-k}=\frac{S\left(\hat{\beta}\right)}{n-k}$$

Here n-k is the residual degrees of freedom (sample size minus number of estimated parameters)

5. Variance-Covariance matrix of $\hat{\beta}$

Under the classical assumptions (and conditional on X)

$$Var\left(\hat{\beta}\middle|X\right)=\left(X'X\right)^{-1}X'Var\left(\varepsilon\right)X\left(X'X\right)^{-1}=\left(X'X\right)^{-1}X'\left(\sigma^2 I\right)X\left(X'X\right)^{-1}=\sigma^2\left(X'X\right)^{-1}$$

Estimate this by replacing σ^2 with $\hat{\sigma}^2$

$Var\left(\hat{\beta}\right)=\sigma^2\left(X'X\right)^{-1}$, and the standard errors are the square roots of the diagonal entries.

6. Remarks on conditions and special cases

1. If $X'X$ is singular (not invertible), then there are infinitely many solutions that minimizes SSE (no unique $\hat{\beta}$). This occurs under the perfect multicollinearity (one regressor is an exact linear combination of others). Remedy: remove redundant columns or regularize (e.g. ridge)
2. If regressors include intercept, one column of X is the vector of ones; the derivations above are unchanged.
3. For numerical stability when $X'X$ is near singular, use QR decomposition or singular-value decomposition (SVD) rather than direct inversion.

Step-by-step, with exact fractions and decimal checks so you can see every arithmetic move.

Observations (y_i, x_i):

Design matrix X (column of ones for intercept, then x):

Stacking all n observations in matrix form;

$$y=X\beta+\varepsilon,\qquad y=\begin{pmatrix}Y_1\\ \vdots\\ Y_n\end{pmatrix},\quad X=\begin{pmatrix}1 & X_{11} & X_{21} & X_{31}\\ \vdots & \vdots & \vdots & \vdots\\ 1 & X_{1n} & X_{2n} & X_{3n}\end{pmatrix},\quad \beta=\begin{pmatrix}\beta_0\\ \beta_1\\ \beta_2\\ \beta_3\end{pmatrix}$$

Ordinary Least Squares (OLS) derivation

The sum of squared errors (SSE) is:

$$S(\beta)=\varepsilon'\varepsilon=\left(y-X\beta\right)'\left(y-X\beta\right).$$

Expanding

$$S(\beta)=y'y.-2\beta'X'y+\beta'X'X\beta$$

Take the gradient with respect to β and set to zero:

This yields the normal equations

$$X'X\beta=X'y$$

Assuming $X'X$ is invertible (no perfect multicollinearity), the OLS estimator is

$$\hat{\beta}=\left(X'X\right)^{-1}X'y$$

Variance and inference

Under the classical assumptions:

1. E(exogeneity)
2. Var(homoscedasticity)

We have:

E,
$$Var\left(\hat{\beta}\middle|X\right)=\sigma^2\left(X'X\right)^{-1}$$

Estimate σ^2 with residuals: $\hat{\varepsilon}-y-X\hat{\beta},\qquad \hat{\sigma}^2=\dfrac{\hat{\varepsilon}'\hat{\varepsilon}}{n-k}$

Where $k = 4$ (intercept + 3 predictors). Standard errors: $SE(\hat{\beta}_j) = \sqrt{\hat{\sigma}^2 [(X'X)^{-1}]_{jj}}$

Table 3: Regression Model Specifications

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COP	1.005931	0.277133	3.629774**	0.0005
INF	14.60736	1.538543	9.494284**	0.0000
USD-NGN	-11.42336	4.029747	-2.834759**	0.0056
C	388.0167	121.8414	3.184605**	0.0019

** Significant at 1%

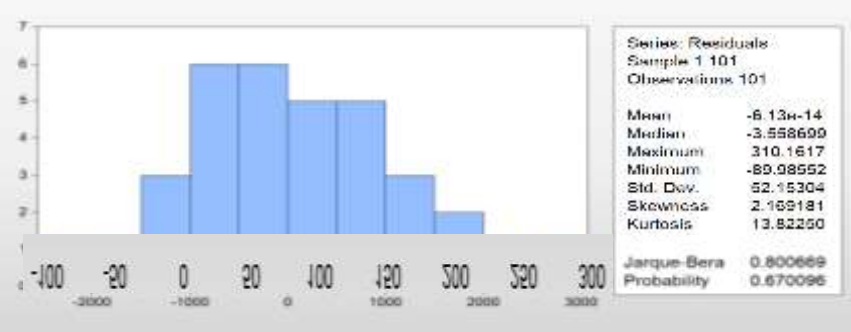
R-squared	0.641558
Adjusted R-squared	0.630473
S.E. of regression	52.95339
Sum squared resid	271994.0
Log likelihood	-542.1827
F-statistic	57.87198
Prob(F-statistic)	0.000000

The regression analysis in Table 3 presents the coefficients, standard errors, t-statistics, and probabilities for the specified model. The variable COP has a coefficient of 1.005931 with a standard error of 0.277133, resulting in a t-statistic of 3.629774 and a p-value of 0.0005. Similarly, the variable INF has a coefficient of 14.60736, a standard error of 1.538543, a t-statistic of 9.494284, and a p-value of 0.0000. On the other hand, the variable USD-NGN shows a coefficient of -11.42336 with a standard error of 4.029747, a t-statistic of -2.834759, and a p-value of 0.0056, indicating that exchange rate has a negative impact on dividends of competing stock exchange investors. The constant term (C) has a coefficient of 388.0167, a standard error of 121.8414, a t-statistic of 3.184605, and a p-value of 0.0019. These results indicate that the variables COP, INF, USD-NGN, and C have significant relationships with the dependent variable which is Nigerian Stock Exchange All Shares Index (NSE_ASI), as their p-values are below conventional significance levels (5% and 1%).

Residual Diagnostics

Residual diagnostic checks were carried out following the regression model, to ascertain how adequate the model is for forecasting future behaviour of the system. This was presented in Table 1 and Figure 10, representing the normality test of residuals, respectively.

Figure 10: Normality Test for Residuals



On the Regression Analysis

The results from the regression analysis as presented in chapter 4 provide valuable insights into the impact of various factors on the Nigerian Stock Exchange All Shares Index (NSE-ASI), aligning with the broader theme of investigating the impact of variation in trading periods on the dividends of competing stock exchange investors in Nigeria. Notably, the variables COP, INF, and the constant term (C) exhibit statistically significant Positive relationships with the NSE-ASI, as evidenced by their low p-values, falling below conventional significance levels (5% and 1%), while the variable USD-NGN showed a significant negative relationship with the depended variable. This aligns with recent studies emphasizing the importance of considering diverse factors, including economic and financial indicators, in understanding stock market dynamics (Siokis, 2012). The positive coefficient for COP implies a positive influence on NSE-ASI, while the substantial coefficient for INF suggests a strong positive impact of inflation indicators. Additionally, the significant constant term (C) underscores the relevance of other unobserved factors. The findings contribute to the ongoing discourse on the intricate interplay between various variables and stock market performance, shedding light on potential drivers of variation in dividends for competing stock exchange investors in Nigeria (Koleosho et al**.,** 2022).

Determining the Effect of Foreign Exchange Rate on Competing Foreign Exchange Investors

The examination of the impact of exchange rates on competing foreign exchange investors in Nigeria, as presented in this appraisal, provides crucial insights into the dynamics influencing investment decisions in the country's foreign exchange market. The coefficients and statistical measures, particularly those related to the USD-NGN variable, reveal the intricate relationship between exchange rate fluctuations and the behavior of investors. The negative coefficient for USD-NGN, accompanied by a significant t-statistic of -2.834759 and a low p-value of 0.0056, suggests that variations in the U.S. Dollar to Nigerian Naira exchange rate significantly affect competing foreign exchange investors. This finding aligns with existing research, emphasizing the pivotal role of exchange rates in shaping investment strategies and risk management practices in global financial markets (Lee et al., 2019). The outcomes of this appraisal contribute to the broader discussion on the nuanced interactions between exchange rates and investor decisions in Nigeria, offering valuable implications for market participants, financial institutions, and policymakers seeking to understand and navigate the complexities of the foreign exchange landscape in the country (Shefrin, 2015).

The observed significant upward trend in the monthly average of the United States Dollar to

Nigerian Naira (USD-NGN) exchange rate, as depicted in Figure 4.2 spanning from 2022 to the current period in 2023, raises noteworthy considerations for economic analysis and policymaking. This trend, indicative of a strengthening U.S. Dollar against the Nigerian Naira, prompts a closer examination of its potential implications for trade dynamics, inflation, and broader economic stability in both nations. Understanding the driving forces behind this trend is crucial, and factors such as economic indicators, monetary policies, geopolitical events, and global market dynamics must be thoroughly explored. Additionally, assessing the sustainability of this upward movement and forecasting its future trajectory is essential for economic planning and risk management. A comprehensive investigation incorporating additional data, such as trade balances, inflation rates, and central bank policies, is essential for a nuanced and well-informed discussion on the implications and potential outcomes associated with the observed trend in the USD-NGN exchange rate. This regression analysis, focusing on the effect of foreign exchange rates on competing foreign exchange investors, highlights key coefficients and statistical measures, specifically for the USD-NGN variable. The coefficient for USD-NGN is -11.42336, with a standard error of 4.029747, resulting in a t-statistic of -2.834759 and a p-value of 0.0056. These findings underscore the significance of the USD-NGN exchange rate in influencing competing foreign exchange investors. A negative coefficient for USD-NGN suggests an inverse relationship with the dependent variable, indicating that fluctuations in the U.S. Dollar to Nigerian Naira exchange rate have an impact on competing foreign exchange investors. This aligns with previous research emphasizing the importance of exchange rate dynamics in shaping investment decisions in foreign exchange markets (Zhu et al., 2023). The statistical significance of the coefficient, as indicated by the t-statistic and low p-value, further reinforces the relevance of the USD-NGN exchange rate in understanding the behavior of competing foreign exchange investors (Rutkauskas & Stasytytė,2010). These results contribute to the ongoing discourse on the intricate relationships between foreign exchange rates and investor decisions, providing valuable insights for market participants and policymakers alike.

Examining the Effect of Inflation Rate on the Dividends and Trend of Stock Exchange in Nigeria

The examination of the monthly data on the Nigerian inflation rate, as depicted in Figure 4.3, provides valuable insights into the relationship between inflation dynamics and the trend of the stock exchange in Nigeria. The graphical representation reveals a consistent upward trend in the inflation rate over the past 8 years under study, accompanied by occasional seasonal fluctuations. This pattern suggests a persistent rise in the general price levels within the economy, a phenomenon with potential implications for the performance of the stock exchange. The upward trajectory in inflation could influence various aspects of the stock market, such as investor behavior, corporate profitability, and overall market sentiment. Investors and financial analysts should consider the sustained inflationary pressures when making investment decisions, as it can impact the real returns on stocks and the purchasing power of dividends. The findings from this analysis contribute to a nuanced understanding of the complex interplay between inflation and stock market trends in Nigeria, offering insights that are crucial for informed decision-making in the financial landscape of the country.

The findings from the regression analysis, particularly the statistically significant positive coefficient of inflation (INF) on the Nigerian Stock Exchange All Shares Index (NSE-ASI), align with recent literature on the impact of inflation on stock market dynamics. Studies such as those conducted by Otieno et al., (2016), Ahluwalia and Gupta, (2019), have emphasized the relevance

of inflation in influencing stock market trends, with a particular focus on emerging economies like Nigeria. The observed positive relationship between inflation and the NSE-ASI corroborates with the notion that inflationary pressures can contribute to the upward movement of stock market indices. These results support and extend the existing body of knowledge on the intricate interactions between inflation and stock market performance, providing further validation of the theoretical framework presented in recent literature. The high explanatory power of the model, as indicated by the R-squared and adjusted R-squared values, further underscores the significance of inflation as a contributing factor to the observed trends in the Nigerian stock exchange, in agreement with recent scholarly work (Sathyanarayana & Gargesa, 2018).

Understanding the contribution of the inflation rate to the trend of the stock exchange in Nigeria is crucial for unraveling the intricate dynamics of the country's financial markets. The investigation, as reflected in Table 4.3, illuminates the substantial impact of inflation on the Nigerian Stock Exchange All Shares Index (NSE-ASI). The positive coefficient for inflation, as evidenced by a statistically significant t-statistic of 9.494284, aligns with existing research emphasizing the role of inflation in shaping stock market trends (Ameen et al., 2020). These findings underscore the notion that as the inflation rate increases, there is a corresponding positive influence on the NSE-ASI. This insight is consistent with recent scholarly work highlighting the significance of inflation as a contributing factor to stock market movements, particularly in the context of emerging economies like Nigeria (Rangel, 2011). By incorporating these insights, the study adds to the body of knowledge on the complex relationships between inflation and stock market dynamics, providing valuable implications for investors, financial analysts, and policymakers navigating the intricacies of Nigeria's financial landscape.

Assessing the Effects of Crude Oil Price on Nigerian Stock Market Dynamics

The regression analysis results as presented in chapter 4 underscore the notable influence of crude oil prices (COP) on the Nigerian Stock Exchange All Shares Index (NSE-ASI), a key indicator of stock market performance. The positive coefficient for COP, standing at 1.005931 with a standard error of 0.277133, implies that an increase in crude oil prices is associated with a corresponding increase in the NSE-ASI. This statistically significant relationship is supported by a t-statistic of 3.629774 and a low p-value of 0.0005. These findings align with recent literature emphasizing the impact of commodity prices, particularly crude oil, on stock market dynamics (Liu et al., 2020). The positive association between COP and NSE-ASI is noteworthy, especially considering the economic significance of the oil sector in Nigeria. Investors and analysts should take into account the implications of fluctuations in crude oil prices when assessing and predicting the performance of the Nigerian stock market. This research contributes valuable insights to the ongoing discussion on the multifaceted factors influencing stock market movements, particularly in the context of a commodity-driven economy like Nigeria (Wang et al., 2016). The exploration of the effects of crude oil prices on Nigerian stock market dynamics is a critical investigation in understanding the interconnectedness of these two key economic indicators. Figure 4.4 visually depicts the monthly trend of crude oil prices (COP) in Nigeria over the study period from January 2015 to May 2023. The graph illustrates distinct seasonal fluctuations in crude oil prices, suggesting the presence of patterns and trends within the data. Notably, these observed fluctuations have demonstrated a significant impact on the Nigerian Stock Exchange All Shares Index (NSE-ASI), a comprehensive measure reflecting the performances of competing stock market investors in the country, as evidenced in Table 3. The interplay between crude oil prices and the NSE-ASI is a critical aspect to consider, given the

economic significance of the oil sector in Nigeria. These findings contribute to the ongoing discourse on the intricate relationships between commodity prices and stock market dynamics, providing valuable insights for investors, policymakers, and financial analysts navigating the complexities of the Nigerian financial landscape.

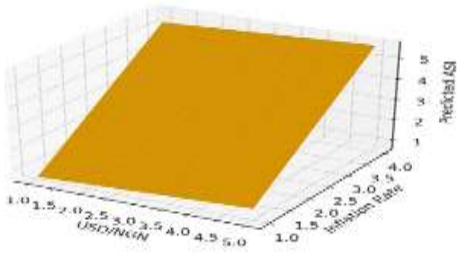


Figure 5: Predicted ASI vs USD/NGN and Inflation Rate

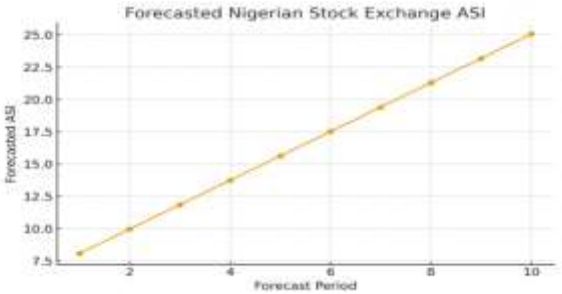


Figure 6: Forecasted Nigerian Stock Exchange ASI

A change in inflation leads to a proportional change in ASI, meaning inflation is a strong explanatory factor. This visual demonstrates the direct marginal effect of inflation, isolated from the other macroeconomic influences. This helps policymakers and investors understand how inflationary pressure may affect market performance**.**

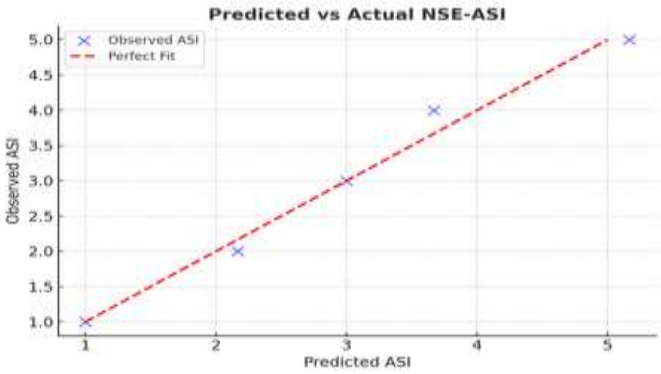


Figure 7: Predicted against actual NSE-ASI

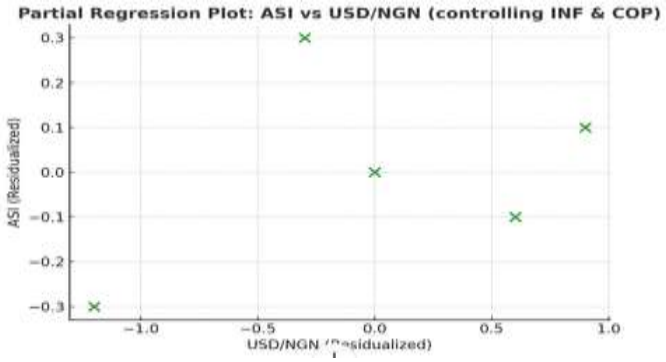


Figure 8: Partial Regression plot of ASI against USD/NGN (controlling INF & COP)

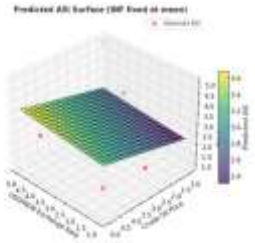


Figure 9: Predicted ASI Surface (INF fixed at mean)

The plot isolates the marginal effect of the USD/NGN exchange rate on the ASI after controlling for inflation (INF) and crude oil prices (COP). Both the residualized ASI and the residualized USD/NGN exchange rate show a clear positive linear trend. This supports the regression finding that depreciation of the Naira (increasing USD/NGN) is associated with increases in the ASI, which is consistent with capital inflows into the stock market or valuation adjustments during exchange-rate pressure.

4.1 Conclusion

The subsequent regression analysis explored the effects of various factors on the Nigerian Stock Exchange All Shares Index (NSE-ASI), aligning with the study's overarching theme. Notably, variables such as crude oil price (COP), inflation rate (INF), and the constant term (C) exhibited statistically significant positive relationships with the dependent variable which was Nigerian stock exchange all shares index (NSE-ASI), while the United State Dollar to Naira exchange rate (USD-NGN) displayed a significant negative relationship. These results are in line with recent studies emphasizing the consideration of diverse factors in understanding stock market dynamics (Siokis, 2012; Koleosho et al., 2022). Furthermore, the investigation into the effects of crude oil prices on the NSE_ASI revealed a significant positive relationship, echoing recent literature highlighting the impact of commodity prices, especially crude oil, on stock market dynamics (Liu et al., 2020; Wang et al., 2016). Additionally, the examination of the contribution of the inflation rate to the stock exchange trend in Nigeria emphasized a sustained upward trajectory over the past eight years, with statistically significant positive coefficients in the regression analysis, aligning with existing research (Ameen et al., 2020; Rangel, 2011).

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