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Effect of Naira/Us Dollar exchange rate volatility on the performance of the stocks market in Nigeria

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Abstract
Purpose: This study investigates the influence of various macroeconomic factors, including the exchange rate, interest rate, inflation rate, and Gross Domestic Product, on the performance of the Nigerian Stock Exchange NSE 100 index. Utilizing a decade of annual data spanning from 2011 to 2021, this research employs the Augmented Dickey-Fuller test to explore the impact of these macroeconomic variables on stock market performance.
Research methodology: Within this context, the time series Autoregressive Distributed Lag (ARDL) model is employed to discern the ramifications of naira/US dollar exchange rate volatility on Nigeria's stock market performance.
Results: Multiple regression analysis results indicate a significant negative effect of the exchange rate on share returns, revealing that a 10% increase in the real exchange rate correlates with a 0.15% decrease in the ASPI. Similarly, the inflation rate is associated with a negative coefficient, suggesting an adverse effect on stock prices. In contrast, interest rates and GDP exhibit positive coefficients, with 5% and 10% impacts on the ASPI, respectively.
Limitation: All data used in this study were secondary. However, data from previous years were not readily available. This is the main limitation of this study.
Contribution: Ultimately, this study underscores the importance of forecasting the exchange rate as a pivotal determinant of business success, offering recommendations for future endeavors.
Keywords: *Exchange rate, Inflation rate, Interest rate, GDP, Stock prices*
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1. Introduction

Stock Exchange Markets play a pivotal role in global economic development. Long-term funds are provided to firms and businesses (Aggarwal 2003). Similarly, investors are investing in the world's stock markets as international investment is rapidly flourishing and capital is traveling around the globe. Hence, foreign investors' profitability is determined by foreign exchange rates when investing in international stock markets. Thus, the exchange rate and its volatility may create uncertainty or build confidence.

Furthermore. Stock market performance and exchange rate stability are dual economic activities that every nation cherishes. Consequently, the financial objectives of every state, either developed or developing, can be assessed based on the stability of its exchange rate. Therefore, a strong exchange rate guarantees a viable and robust economy, whereas a weak currency indicates a vulnerable and weak economy (Sani and Hassan, 2018). Moreover, more resources are required to meet the rapid expansion of a nation's economy. The stock market serves as a conduit for the aggregation of savings and their

effective allocation in pursuit of economic expansion, as posited by Chikwira and Mohammed (2023). Khalid (2017) observed that uncertainty is created due to the variability in stock prices among international investors. Hence, factors such as leakage of information, abnormal returns, and ownership of a company have been regarded as overreaction factors (Afifah et al., 2023). Significant and long-term capital resources are pooled by issuing shares and stocks by industry in dire need of finance for expansion purposes. Interested stakeholder categories, such as managers, shareholders, creditors, and tax authorities, need to analyze economic variables before making investment decisions (Olayinka & Mustapha, 2022).

Theories in finance imply an association among such variables (Dang, Le, Nguyen, & Tran, 2020). For example, when banks increase the bank rate from the last level, this policy allows investors to look for other investment markets if other variables do not change. Ultimately, when the apex bank reduces the interest rate from its previous level, this could motivate investors to inject funds into the stock market to reap better rewards, provided that such needs are in close substitutes in the long run. More so, a significant and positive relationship has been identified in the work conducted by M. K. Khan (2019). The interest rate also shows a negative relationship with stock price performance.

Similarly, Al-Abdallah and Aljarayesh (2017) identified the inflation rate as a variable that negatively influences stock return performance. The study proved with empirical evidence that persistent inflation is deemed bad news by investors, leading to dire conditions for a country's economy. Consequently, investor confidence is zero in such a scenario. However, when inflation declines, the promise of good economic conditions invites investments in the stock market. Furthermore, persistent inflation (Amansa, Akhyar, Ilham & Adhan, 2020) also reduces the stock price. Similarly, Inflationary situations depict gloomy economic conditions that result in insecure investment opportunities in the stock market. Hence, the government would be forced to control the money supply, leading to firms struggling to obtain finance from financial institutions due to higher borrowing costs and tight credit terms (Dimitrova, 2005; Khan, Khan, & Rukh, 2012).

Empirical evidence from the works of Khalid (2017) discovered that several variables influence stock price performance, specifically the interest rate and exchange rate. The development level of an economy's stock market is dictated by domestic currency value and interest rate level. Several studies have investigated the effect of behavior on equity market performance. Among these factors, the currency rate and interest rate are the most widely identified economic factors as major stock market performance indicators (M. K. Khan, 2019). For this reason, stock market connections, either in the short- or long-run, comprising the exchange rate, interest rate, and inflation rate have been a core area of investigation by financial researchers' economists and prospective investors, especially for their pivotal role in providing input in terms of reforms for the development and smooth running of the equity market.

Money supply plays a pivotal role in the economy. Individual employment opportunities help him meet his daily needs. Z. Khan et al. (2012) recommended for future research to include more variables in the study of stock performance, such as Gross Domestic Product (GDP), actual money supply, and balance of payments) needed to be carry out to realize the influence of other variables on stock market performance.

Hence, little attention has been paid to the effect of gross domestic product (GDP) as an economic variable that can influence stock price performance as an economic variable. Hence, this study introduces this variable to investigate the behavior of share price performance. To maintain a moderate level of these factors, the exchange rate, interest rate, inflation rate, and GDP may control or trigger All Share Price index fluctuations. Therefore, in this study, a crucial survey was conducted on time series data for ten years to determine the factors that influence the share price index. Yearly time series data of the Lagos Stock Exchange prices in Nigeria (NSE-100 Index) and the exchange rate of Nigeria (Naira against US Dollar) from January 2011 to December 2021 were used. The augmented Dickey–Fuller (ADF) test was applied to test for stationarity.

This study highlighted the challenges faced by exchange rate volatility in the country and spelled out the processes to follow in curbing them, considering the recent fluctuation in the exchange rate in the country's currency compared to the U.S. dollar. The greater yearn for the foreign investors to come to this country for investment purposes (Gavin, 1989).

The objectives of this study are to investigate the effects of the exchange rate, interest rate, inflation rate, and gross domestic product on the stock price performance of NSE 100.

1.1. Hypothesis

1. Exchange rate has a significant effect on share price performance
2. Inflation rate has a significant effect on share price performance
3. Interest rate has a significant effect on share price performance
4. GDP has a significant effect on share price performance

Stock market performance is crucial to investors, and they study stock performance by examining the macroeconomic variables that affect it (Z. Khan et al., 2012). exchange rate, interest rate, inflation rate, and affectfthe ect markleading to predominatleoleseirsdecision-makingking. As a result, annual data for ten years of independent variables from 2011 to 2021 were selected. Stock returns are calculated by identifying the changes in the NSE 100 index points.

All data used in this study were secondary. However, data from previous years were not readily available. This is the main limitation of this study.

2. Literature review

Exchange, interest, and inflation rates influence stock market performance. Moreover, the dynamic relationship between exchange rates and stock market index prices plays a crucial role in an economy. According to Egbunike and Oranefo (2023), inflation is a persistent increase in general price levels. However, changes in stock market index prices may influence exchange rate movements through portfolio adjustments (Mroua & Trabelsi, 2020). Similarly, a lower interest rate means lower capital costs and, consequently, better stock market value. As such, policy changes cause stock market changes owing to anticipated profits and actual interest rates. As Khan et al. (2012) identified, policy announcements lead to profit changes and discount rates, affecting stock market performance. The researcher concludes that flexible policies change the stock market due to their effect on nominal money.

Mroua and Trabelsi (2020) investigated the causality and dynamic interrelationship between exchange rates and stock market indices in the BRICS countries. Their research revealed a noteworthy relationship, with exchange rates significantly influencing the volatility of BRICS stock indices. The principal aim of this study is to examine the repercussions of exchange rate fluctuations on stock market returns. To accomplish this, a dataset encompassing the exchange rates between the USD and BRICS currencies, including the real (BRL), ruble (RUB), rupee (INR), Yuan Renminbi (CNY), and Rand (ZAR), was employed in conjunction with the daily closing prices of the BRICS countries' stock market indices, such as IBOVESPA, MICEX, ENSEX, SHCOMP, and JALSH, representing the BRICS nations. The data span from January 1, 2008, to February 23, 2018. Employing both the dynamic panel GMM model and the ARDL method, the findings indicate that alterations in exchange rates significantly impact the past and current volatility of the BRICS stock market index returns.

Furthermore, the ARDL estimations reveal that exchange rate movements substantially influence all BRICS countries' short- and long-term stock market indices. These discoveries have significant implications for policymakers, highlighting that interventions should be tailored differently depending on whether the currency depreciates or appreciates. These results underscore the importance of considering frequency-varying exchange rates and stock returns for investors, while regulatory authorities should devise robust policy measures to mitigate financial risk (Rahmawati & Hadian, 2022).

Bala Sani and Hassan (2018) stated an inverse relationship exists between the exchange rate and other macroeconomic variables on stock market performance. This study examines the linkage between exchange rates and the stock market in Nigeria using annual data from 1985 to 2015. The Autoregressive Distributed Lag (ARDL) model and Granger Causality tests were applied to the analysis. The model encompasses variables such as the exchange rate, economic growth, money supply, and stock market, specifically the all-share indexes. The findings revealed that both the exchange rate and economic growth exert a positive and statistically significant influence on the stock market in Nigeria.

By contrast, money supply has a negative and statistically significant influence on the stock market over the study period. The Granger causality results indicate unidirectional causality from the exchange rate to the stock market. He further suggests that policymakers need to guarantee the effective implementation of existing monetary policy instruments and formulate substantial ways of harmonizing monetary and fiscal policies to sustain a stable exchange rate and avoid structural breaks that will affect the entire system, including the stock market. As such, the federal government needs to reduce the money in circulation, which will reduce the prices of commodities in the market.

M. K. Khan (2019) investigated the impact of exchange rate fluctuations on the stock returns of the Shenzhen stock exchange, spanning from January 2008 to December 2018. The study employed the ARDL model to examine the short- and long-term relationships among the variables under scrutiny. The results derived from the ARDL analysis indicate a noteworthy negative effect of the exchange rate on the stock returns of the Shenzhen Stock Exchange. Furthermore, the study reveals that inflation and interest rates exhibit a negative and statistically significant impact on stock returns. Given these findings, the researcher suggests that policymakers at the Central Bank should consider implementing policies to enhance the exchange rate's stability.

Furthermore, the foreign exchange rate is among the significant financial and economic factors affecting standard stock values and cash flows. The researcher further identified that the exchange rate's significance is that it can be adjusted continuously relative to the market force for foreign exchange in a given economy. This generates an equilibrium between demand and supply by affecting the exchange rate without influencing the reserve level.

Al-Abdallah and Aljarayesh (2017) studied the influence of interest rate, exchange rate, and inflation on ASE Free float index stock returns. Ten years' monthly data from 2005 to 2015 were collected for examination. Multiple regression models are applied to the data, where firms are negatively correlated to interest rates and positively correlated to inflation, with zero relationship with exchange rate and stock returns. In addition, the R-squared value shows a weak relationship between the independent and dependent variables. A fast inflation boost negatively affects the stock market performance. Growing inflation is deemed bad news by investors because it represents terrible economic conditions in the country. For future research, it is recommended that more variables be taken as (GDP, actual money supply, and balance of payments) in other studies to determine the influence of different variables on stock returns.

Yunita and Robiyanto (2018) studied how exchange rate changes, BI rate, and inflation rate as macroeconomic variables affect the financial sector stock price index in the Indonesian stock market IDX from 2011 to 2017. Generalized autoregressive Conditional Heteroscedasticity (GARCH) was employed in the analysis. Such findings include identifying that the exchange rate has a significant effect on the stock price index performance of the financial system sector. Furthermore, the inflation rate and BI rate have no significant impact on stock market performance.

Simbolon and Purwanto (2018) investigated the level to which economic factors such as inflation rate, interest rate, and GDP growth rate influence the stock price performance of property and real estate listed on the Indonesian stock exchange. Market capitalization was the largest in 2012 and was more volatile. Consequently, the researcher discovered that all listed macroeconomic variables are composite,

significantly influencing stock performance. However, a partial least squares result revealed that interest and inflation rates significantly affect stock performance, whereas the GDP growth rate is insignificant.

Zhang and Zhang (2023) conducted a study to assess the predictive accuracy of realized fluctuations in the stock markets of G7 countries. Utilizing two decades of daily data spanning 2000 to 2020, their empirical findings established that the realized volatility of the stock market holds significant importance in predicting the realized volatility of exchange rates across all G7 countries. Furthermore, their research unveiled consistent stability in the performance differential concerning the predictability of stock market performance and exchange rate volatility in G7 countries.

Jamil, Rasheed, Maqbool, and Mukhtar (2023) embarked on an investigation focused on the influence of macroeconomic variables, encompassing GDP growth, GDP per capita, inflation rate, foreign direct investment, exports, imports, interest rates, foreign debt, and foreign reserves, on exchange rate regimes. Their study spanned five countries, each from the MSCI developed markets index, emerging markets index, and frontier markets index, covering 1970 to 2020. This research offers predictions and contributes significantly to the understanding of the economic and financial landscapes of these selected countries by employing advanced statistical frameworks to identify and evaluate the impact of macroeconomic variables on stock market performance. Their results highlight that specific markets such as Australia, Hong Kong, Japan, New Zealand, and Singapore make timely and accurate decisions regarding exchange rate regimes, leading to market development. However, emerging and frontier markets tend to avoid adopting exchange rate regimes three, four, and six, a factor significantly impacts their growth compared to developed markets. Challenges, such as foreign debt, inflation, and foreign reserves, remain substantial obstacles for emerging and frontier markets.

Athari, Kirikkaleli, and Adebayo (2023) conducted an in-depth analysis of the repercussions of the world pandemic uncertainty index on the German stock market index (DAX index) from 1996Q1 to 2020Q3. In this comprehensive examination, they considered variables such as the real effective exchange rate, the industrial production index, and the consumer price index. Employing a suite of robust statistical tests, including the Fourier Augmented Dickey-Fuller Unit Root, Fourier Engle-Granger Co-integration, Bayer-Hanck Co-integration, and Markov switching regression, their findings uncovered a durable co-integration relationship between the stock market index and critical factors, including the world pandemic uncertainty index, the real effective exchange rate, the industrial production index, and the consumer price index in Germany. These results signify the substantial influence of this amalgamation of factors on the German stock market index over the long term. Moreover, it was observed that during periods of high and low volatility, the world pandemic uncertainty index and real effective exchange rate negatively impacted the German stock market index. In contrast, industrial production and consumer price indices demonstrated a positive effect.

Yoda (2019) emphasizes the vital importance of companies in establishing share prices that align with prevailing market trends to pique investor interests in the capital market. His study assessed and analyzed the influence of exchange rates and the interest rate of Bank Indonesia Certificates on the share price of a Property and Real Estate company listed on the Indonesia Stock Exchange (IDX).

Quantitative descriptive research, with a study population comprising all 48 company properties and real estate listings in IDX. Purposive sampling techniques of 30 property and real estate companies on a Stock Exchange. Data analysis techniques were classical assumption test and multiple linear regression test consisting of the partial test (T-test), simultaneous test (F test), and the determination coefficient (R-Square) were employed to analyze the influence of partial and simultaneous exchange rate and interest rate variables on the performance of stock and real estate property companies during the Stock Exchange Period of 2014-2017. The results reveal that exchange and interest rates significantly impact the interpretation of these entities, with a notable adverse effect observed between exchange rates and stock prices, as evidenced by the significant p-value of 0.048. Furthermore, a significant positive impact was found for Bank Indonesia, although the continuation of this sentence appears to be missing. Certificate rates and stock prices, with a substantial value of 0.000. Exchange

and Interest Rates significantly impact stock market performance and real estate property companies on the Stock Exchange.

Olugbenga (2012) proved the short and long-run im----pact long-timpactects expansioeffect The study used qusingseries data, Johansen co-integration, and Granger causality techniques. The results show that the study found a positive relationship between stock market prices and exchange rates in the short run and a negative relationship in the long run. Similarly, the Granger causality test discovered causation between exchange rates and stock market prices. Finally, it was concluded that in Nigeria, volatility in the exchange rate could lead to variability in stock market prices, which also affects performance.

3. Research methodology

This study investigates the effects of the exchange rate, interest rate, inflation rate, and GDP on Nigeria's stock exchange all-share price performance. Multiple regression is applied to test the hypotheses with exchange rate, interest, inflation rate, and GDP as independent variables against the dependent variable, and stock returns as the dependent variable. For the exchange rate, the Nigeria Naira/US dollar rate is selected; for the interest rate, yearly data from the central bank rate is selected; for inflation, CPI is used; and for GDP, real GDP data from the World Bank from 2012 to 2021 are used for the analysis.

3.1. Theoretical Framework

The Nigeria Stock Exchange 100 index is one of the largest in Africa and is a benchmark for investors to assess share prices. Twelve sectors of companies can be listed on the Nigerian stock exchange NSE 100. The share prices are adjusted to 1000 points, compared to the base year points, to reach market performance. Microeconomic variables affect market efficiency, including exchange, interest, inflation, and gross domestic product levels. Hence, it becomes paramount for investors to consider such variables before making an investment decision (Amanda, Akhyar, & Ilham, 2023) Failure to consider such pivotal variables such an investment is at higher risk of surviving and meet its targated objectives (Olayinka, 2022). Variability in exchange and interest rates affects the investment value. As such, the federal government needs to control money supply to stabilize the economy. Similarly, foreign investors use foreign currency for their returns on investment because higher exchange drives them away to a more secure economy for their investment. To empirically test the effect of these variables, the exchange rate, interest rate, inflation rate, and GDP are selected as independent variables, while stock market returns are the dependent variables.

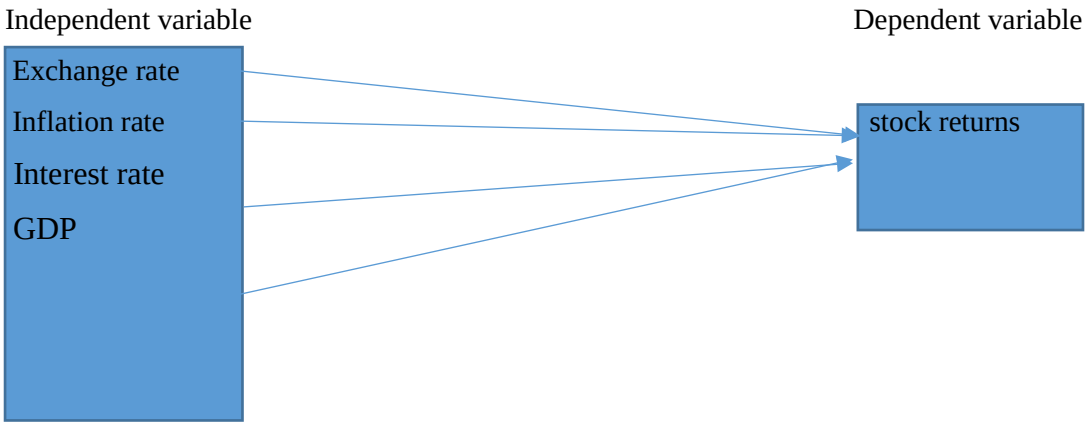

Figure 1: Relationship between Independent and Dependent variable
Source: authors formulation

3.2. Methodology

This section discusses the research methodology used in this study and the model adopted.

Model and Variables to be Used

A time-series Autoregressive Distributed Lag (ARDL) model was used. The following variables were included in the model. The variables are the share price index (ASPI), Inflation Rate (InfR),

Government Debt (DEBT), Gross Domestic Product (GDP), Interest Rate (IntR), and Exchange Rate (XR) for a period of ten years (2012–2021). The model to be estimated is given as

$ASPI_t = a_0 + a_1XR_t + a_2InfR_t + a_3IntR_t + a_4GDP_t + \ldots\ldots\varepsilon_t$

Augmented Dickey-Fuller Test

Given an observed time series Y_1, Y_2, ..., Y_N, Dickey and Fuller examined three differential-form autoregressive equations to discern the existence of a unit root, as documented by Johansen (1991).

$$(1) \qquad \Delta Y_t = \gamma Y_{t-1} + \sum_{j=1}^{p} \left(\delta_j \Delta Y_{t-j} \right) + e_t$$

$$(2) \qquad \Delta Y_t = \alpha + \gamma Y_{t-1} + \sum_{j=1}^{p} \left(\delta_j \Delta Y_{t-j} \right) + e_t$$

$$(3) \qquad \Delta Y_t = \alpha + \beta t + \gamma Y_{t-1} + \sum_{j=1}^{p} \left(\delta_j \Delta Y_{t-j} \right) + e_t$$

Where

"t" represents the time index,

"α" signifies the intercept constant known as a drift component,

"β" denotes the coefficient pertaining to a time trend,

"γ" stands for the coefficient indicative of the process's root, which is the primary focus of the testing,

"p" denotes the lag order of the first-differences autoregressive process,

"et" represents an independent and identically distributed residual term.

The distinction among the three equations lies in the presence of deterministic elements such as "α" (the drift term) and "βt" (a linear time trend).

The central focus of our investigation is to assess whether the coefficient "γ" is equal to zero, which would suggest the presence of a unit root in the original process. As such, we test the null hypothesis, denoted as "γ = 0" (implying a random walk process), against the alternative hypothesis, "γ < 0,", signifying stationarity. To provide further details, the null and alternative hypotheses associated with the aforementioned models are as follows:

$$(h1) \qquad H_0 : Y_t \text{ is random walk } OR \quad \gamma = 0$$
$$H_1 : Y_t \text{ is stationary process } OR \quad \gamma < 0$$

$$(h2) \qquad H_0 : Y_t \text{ is random walk around a drift } OR \ \{ \gamma = 0, \alpha \neq 0 \}$$
$$H_1 : Y_t \text{ is level stationary process } OR \ \{ \gamma < 0, \alpha \neq 0 \}$$

$$(h3) \qquad H_0 : Y_t \text{ is random walk around a trend } OR \ \{ \gamma = 0, \beta \neq 0 \}$$
$$H_1 : Y_t \text{ is trend stationary process } OR \ \{ \gamma < 0, \ \beta \neq 0 \}$$

The ADF test operates on the principle of accepting the null hypothesis, unless compelling evidence emerges to reject it in favor of the alternative hypothesis of stationarity. This testing technique employs the Ordinary Least Squares (OLS) method to derive model coefficients. To assess the significance of these coefficients, the modified T (Student)-statistic, commonly referred to as the Dickey-Fuller statistic, is computed and juxtaposed with the pertinent critical value. If the test statistic falls below the critical threshold, then the null hypothesis is rejected. It is worth noting that the specific critical value varies for each test version and is contingent on the sample size (Phillips and Harrison, 1984; Phillips and Perron, 1988). To see the relationship between all share prices and exchange rates, yearly time-

series data from January 2012 to December 2021 were used. The closing values of the Nigeria Stock Exchange index (NSE-100 index) at the end of the month and the exchange rate (Naira against the US Dollar) and some proxies will be used for analysis. Various measures of variability have been used in the literature, such as percentage change (Dickey & Fuller, 1981), Fourier Augmented Dickey-Fuller Unit root, Engle-Granger co-integration, Markov switching regression tests (Zhang & Zhang, 2023), and Binary Logit Quadratic Hill Climbing (Jamil et al., 2023). Autoregressive distributed lag (ARDL) (M. K. Khan, 2019), augmented Dickey - fuller test is to test for stationery, and a STATA statistical package will be used for estimating the regression model to find the relation between the volatilities in stock market prices and exchange rate.

4. Results and discussions

Table 1. Unit Root Test

Variable	ADF at Level	ADF at first Difference	Order of Integration
ASPI	1.1245	-3.6422	I (1)
XR	0.2568	-2.9527	I (1)
InfR	-1.4850	-3.6356	I (0)
IntR	-0.0177	-2.6356	I (1)
GDP	-1.9403	-5.6526	I (0)

Note: ASPI = All Share Price Index, XR = Exchange Rate, InfR = Inflation Rate, IntR = Interest Rate, GDP Gross Domestic Product. **= Significance at 5%

Unlike other cointegration tests, an ARDL bounds-testing approach to cointegration does not require the same order of integration for all variables. However, because the bounds test is developed on the basis that the variables are I(0) or I(1), before applying the bounds test procedure, the implementation of unit root tests might still be necessary to ensure that all variables satisfy the underlying assumption. Moreover, ARDL cannot be used for the I(2) variables. Hence, the augmented Dickey (ADF) test was applied to examine the order of integration. The ADF test in Table 1 implies that, except InfR and GDP, all variables are found to be non-stationary at the level and stationary at the first difference at the conventional 5% significance level. This means that while InfR and GDP are I(0), all other variables are I(1). In addition, the unit root tests ensure that no I(2) variables exist. Therefore, an ARDL procedure for the cointegration test can be applied in this study. The co-integration test is used to examine the existence of long-run equilibrium relationships among the variables included in the model. When co-integrated, variables do not drift too much apart and are tied together by long-run equilibrium relationships.

Table 2. F-static of the cointegration relationship.

Test static	Value	Lag	Significance level (%)	Bound critical values* (Restricted intercept and no trend)		Bound critical values* (Restricted intercept and trend)	
				I(0)	I(1)	I(0)	I(1)
			1	3.505	5.121	3.800	5.643
F-static	5.3113	1	5	2.618	4.342	2.797	3.117
			10	2.218	3.314	2.353	3.599

Note: * Based on Narayan (2004)

From the ARDL estimates shown in Table 2, we first test the null hypothesis of no co-integration (that is) against the alternative using the F-test with critical values tabulated by Narayan (2004). The null hypothesis positing no cointegration was rejected when the computed F-statistic surpassed the upper-bound critical value. Conversely, when the calculated F-statistic was lower than the lower-bound critical value, it did not provide sufficient grounds for rejecting the null hypothesis of no cointegration. In cases where the computed F-statistic fell within the range demarcated by the lower- and upper-bound critical

values, the result remained inconclusive. As indicated in Table 2, the computed F-statistic, which stands at 5.3113, exceeded the upper-bound critical values (4.342 and 3.117) at the 5% significance level, both under the scenarios of restricted intercept and no trend, as well as with restricted intercept and trend. This outcome substantiates the rejection of the null hypothesis of no cointegration at the 5% significance level. Therefore, cointegration exists among the variables used in this study. In other words, a relationship exists between these variables. Moreover, the results of a few diagnostic tests in Table 4 indicate no error or conditional autocorrelation.

Table 3. Regression Result on Short run and long run coefficient

Variable	Coefficient	Robust Std. Err.	T-Value	P-Value
XR	-0.177	0.145	-1.910*	0.056
InfR	-2.785	1.210	-2.300**	0.021
IntR	0.288	0.146	1.970**	0.048
GDP	1.513	0.828	1.830*	0.067
CONS	2.702	1.316	2.050**	0.040
R^2 Adjusted	0.57			
DW Stat	2.20			
F Stat	25.23			
Correctly classified				

Note: ASPI = All Share Price Index, XR = Exchange Rate, InfR = Inflation Rate, IntR = Interest Rate, GDP Gross Domestic Product. **= Significance at 5%

Table 3 provides a comprehensive overview of both short- and long-term estimations. In the short term, the real exchange rate exhibits a negative coefficient, and its influence is statistically significant. This result is consistent with the findings of Endri, Rinaldi, Arifian, Saing, and Aminudin (2021) **that t**otal asset turnover and exchange rate have negative and significant effects on stock returns; specifically, a 10% increase in the real exchange rate corresponds to a 0.15% decrease in the ASPI. The inflation rate also shows a negative coefficient and exerts a significant impact on the dependent variable which was also inline with the findings of Endri (2020) that there is a significant influence between inflation variables on the movement of the Composite Stock Price Index.

Conversely, interest rates and GDP display positive coefficients, both statistically significant at the 5% and 10% levels, respectively, with respect to their influence on the ASPI.

Additionally, some diagnostic statistics related to the short-term model are presented on the right side of the estimation output. The R-squared value, which serves as an indicator of the overall goodness of fit of the model, demonstrates that approximately 57% of the variation in the ASPI can be explained by the other explanatory variables within the model. Furthermore, the Durbin-Watson (DW) test statistic registers at 2.02, suggesting an absence of autocorrelation in the estimated model. F=stat is relatively large, indicating that the model is an overall fit and indicates a good fit.

5. Conclusions

This study investigated the effects of the exchange rate, interest rate, inflation rate, and GDP on the stock returns of NSE 100. The results of the multiple regression showed the outcome of a long- and short-run estimate, providing a weak variation of the dependent variable to some extent. International trade plays an important role in Indonesia and especially for companies listed on the stock markets (Endri, Abidin, Simanjuntak, & Nurhayati, 2020). The traditional approach also states that exchange rate depreciation can increase a country's external competitiveness and improve its trade balance and real output, and vice versa. This is inline with this study that, the independent variable exchange rate negatively but significantly impacted share returns; an increase in exchange rate invariably decreased stock returns. Consequently, the reason for that is that foreign investors traded in

the stock. An increase in exchange rates implies a decrease in income. However, this will decrease their currency by getting a smaller amount as a result.

Similarly, the inflation rate has a negative coefficient, which indicates a negative effect on stock performance. An increase in the inflation rate also decreases stock performance behavior. Interest rate and GDP have positive coefficients and significantly affect stock price performance.

5.1. Recommendations

Investors must adhere to our suggestion that analyzing the pattern and variability of exchange rates is pivotal to their success before investing in NSE 100. As such, forecasting the future exchange rate is a predominant factor in business success. Inflation rate, as a microeconomic variable, is also a crucial factor. For an economy to move smoothly and motivate foreign investors to patronize the economy, a stable and low inflation rate is indispensable.

Recommendations for further studies are made on the need to add more variables and increase the period of studies to determine whether different impacts will be ascertained on stock market returns.

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