Impact of Macroeconomic Variables on Stock Market Prices in Sub-Saharan Africa

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Abstract

Purpose: The study assessed macroeconomic variables' impact on Sub-Saharan Africa's stock prices. Specifically, the study examined the impact of the inflation rate, interest rate, exchange rate, and money supply on stock price.

Methodology: The study employed a causal research design to show a causal relationship between variables. Monthly data were collected from six countries, i.e Tanzania, Kenya, Malawi, Botswana, Ghana, and Nigeria, from 2005 to 2023. The collected data were analyzed through descriptive statistics and multiple regression analysis.

Findings: Findings revealed that the inflation rate and exchange rate both have statistically significant and positive effects on stock prices, with coefficients of 0.4222 ($p < 0.001$) and 1.3522 ($p < 0.001$), respectively, showing that increases in these factors are associated with higher stock prices. The coefficient for interest rate (0.0120) is not statistically significant ($p = 0.133$), implying no strong relationship. These results, therefore, show that inflation and the exchange rate positively and insignificantly affect stock prices, suggesting that a shock increase in either or both economic variables is positively associated with increased stock market values. This study provides a theoretical contribution by integrating Arbitrage Pricing Theory, the Efficient Market Hypothesis, Monetarist Theory, and Purchasing Power Parity to explain the intricate relationship between macroeconomic variables and stock price movements.

Unique Contribution to Theory, Policy and Practice: By drawing from these theories, it highlights how variables like money supply, inflation, interest rates, and exchange rates influence stock prices through risk sensitivities, market efficiency, and purchasing power dynamics. From this perspective, it would be prudent for policy framers to consider implications for the stock market while adopting policies relating to inflation and currency exchange. Interest rates do not strongly correlate with stock prices; it would be worth monitoring, though, as interest rate policies sometimes have broader economic impacts. Investors should, therefore, focus on inflation and exchange rate trends to make strategic investment decisions that capitalize on these significant relationships.

Keywords: *Stock Price, Inflation Rate, Interest Rate, Exchange Rate, Money Supply*

1. INTRODUCTION

Despite its vast natural resources, Africa, especially Sub-Saharan Africa (SSA), is the world's poorest continent. It exports and invests little and has little economic integration. Africa is now seen as a continent of opportunity and enormous economic potential, not a "sleeping giant" (World Bank, 2017). However, the Sub-Saharan African economy is well-positioned for growth (Adoms et al., 2020). Most governments prioritize economic growth because it indicates a healthy economy. Positive economic growth can increase consumption, private investment, employment or reduce unemployment. Higher tax revenue funds public service spending, benefiting the government (Omar & Nor, 2020).

Despite a weaker macroeconomic environment, SSA has grown economically. Regional production increased by 5% in 2011 compared to 6.5 percent pre-crisis. According to the World Bank (2015), SSA grew slightly in 2014 despite various Sub-Saharan African disasters. Ebola, budget shortfalls in most of the region's countries, Boko haram wars, political unrest, and a drop in oil prices devastated oil-dependent nations. Most nations' policymakers prioritize macroeconomic stability. Rand D. and traditional physical capital investment are encouraged (Romer, 2012). Recently improved macroeconomic conditions in some SSA countries (IMF, 2014) increase the likelihood of stabilization measures. High economic growth in "mature stabilizers" is linked to lower inflation, stronger public finances, and more extensive international reserves (Selassie et al., 2006).

Both developed and developing nations need stock markets. Stock market transfers of money from investors to global companies are its primary purpose. Thus, offering investors multiple investment platforms and funding options for companies. The stock market also helps the economy get long-term capital (Ologunde et al., 2006). Despite their slowness, Sub-Saharan African stock markets serve many purposes (Allen et al., 2011). As a result, SSA's stock markets have grown from five in the 1980s to over 20 in 2017. Many SSA stock markets are new, with few older ones (Allen et al., 2011). Despite an upward trend in the stock market (Mingiri, 2015), Sub-Saharan Africa's stock markets may not be at their full potential in quality, depth, efficiency, and competitiveness (Afego, 2015). Allen et al. (2011) also note that SSA stock exchanges are small and have liquidity issues compared to other major stock markets. Afego (2015) adds that most people view the SSA stock markets as computerized trading platforms that trade a few hours a week. Most African stock exchanges lack modern financial institutions, infrastructure, and large-scale trading and manufacturing and should be more basic (Mingiri, 2015). The Johannesburg Stock Exchange (JSE), SSA's largest and most recognized stock market, is an exception. Over 300 listed companies and massive domestic trading volume by absolute and relative value (IFC, 2011).

A few securities dominate several SSA stock markets with low trading volumes; few small enterprises trade some. Equities other than actively listed companies have significant informational and transparency gaps (Ncube and Mingiri, 2015), giving local investors significant gains (Bitala 2010). These opportunities are risky because political and currency conditions can change quickly, and many SSA countries lack strong regulatory institutions due to weak legal systems and high

corruption (Afego 2015). High risk exists due to rapid political and currency changes, and weak regulatory institutions in SSA countries due to ineffective legal systems and corruption (Afego 2015). In 2005, local stock markets, especially in developed SSA countries, grew. Kenyan share trading rose from 1% of GDP in 1995 to 5% in 2006. Ghana, Zambia, and Nigeria show similar trends (Jones, 2007).

Critics say stock market prices do not reflect fundamentals during speculative bubbles (Binswanger, 1999). The efficient market hypothesis states that stock prices should reflect all available fundamental data. However, prices are not always set by discounting future cash flows. The stock market creates speculative growth dynamics, which irrationality may influence. Irrationality puts the real economy at risk of becoming a casino byproduct, which will hurt it. Some argue that a highly liquid stock market may harm corporate governance by encouraging investor myopia. Since investors can sell their shares more easily in liquid stock markets, they may be less committed to corporate control. Immediate stock market liquidity may discourage investors from making long-term commitments to companies in which they own shares, causing corporate governance issues that could hurt economic growth (Bhide, 1994).

Critics also note lower long-term investment and higher short-term rates. It also rewards managers for financial engineering rather than organic growth and wealth creation (Singh, 1997). Prices react quickly to numerous data points that affect financial market expectations. Due to this, stock prices often fluctuate and offer quick profits. The stock market undervalues long-term investments because managers' actions are evaluated based on a company's financial assets, which could hurt its long-term prospects (Binswanger, 1999). Empirical data shows the takeover mechanism is not disciplinary. Size, not performance, drives competitive selection in the corporate control market (Singh, 1971). Thus, a large inefficient firm is more likely to survive than a small but efficient one.

Developing nations, especially sub-Saharan Africa, face additional challenges due to weaker regulatory frameworks and macroeconomic instability. Higher stock market volatility in developing countries lowers the effect. Recent investor interest in Sub-Saharan Africa has led to significant financial inflows. Interest in the region is rising due to its high growth potential, better macroeconomic management, reduced political instability, and strong global commodity demand (Mtuweta, 2018). Even though most Sub-Saharan African markets are developing and have strong banking sectors, their financial industries vary. Few countries in the region have healthy bond markets, while most SSA stock markets have tiny, illiquid equities markets. 2018 World Bank. Due to low turnover ratios and limited share trading, most Sub-Saharan African stock markets are highly illiquid (Chukwuemeka, 2016).

SSA stock exchange markets, an emerging market, face challenges that hinder efficiency, sustainable growth, and development. SSA countries still have inflation. The monetary authorities are determined to lower inflation to one digit. Currency depreciation over the dollar, unemployment, population growth, and poverty plague SSA economies. These factors can affect the country's economy directly or indirectly. Most macroeconomic variables can affect the local currency's purchasing power. When a country's currency depreciates, stock trading costs rise.

Currency depreciation over the dollar affects macroeconomic stability and causes inflation. Sustainable macroeconomic stability can boost stock exchange growth by encouraging investors to invest with positive expectations and vice versa under "Ceteris Peribus".

Most scientists disagree on how macroeconomic issues affect stock prices. Stock prices are strongly correlated with macroeconomic factors like the money supply, inflation, interest rate, and exchange rate, according to Kyereboah, Coleman, and Agyire (2008), Rafique et al. (2013), Maysami et al. (2004), and Horobet and Dumitriu (2010). Multiple studies, including Ali (2011), Bhattacharya and Mookherjee (2001), and Mohammad et al. (2009), suggest that macroeconomic parameters did not affect stock prices. Further research shows that some macroeconomic factors significantly affect stock prices, while others do not (Ullah et al., 2014; Kurihara, 2006). These theories either say macroeconomic issues do not affect stock market values or that they do.

Much empirical research has examined how macroeconomic conditions affect stock market values in developed and developing countries. Most of this research was country specific. Lee (1994) examined how short-term disequilibrium affected cointegrated series forecast uncertainty. Hwang and Satchell (2005) used lagged cross-sectional return variation as an explanatory variable conditional variance equation to predict stock market returns. Therefore, this study will fill a gap in the empirical literature by comparing macroeconomic determinants on stock market values across SSA stock markets. Since there is no consensus on whether macroeconomic variables affect stock prices in the stock market, investors and policymakers need to research on the impact of macroeconomic variables on SSA stock prices. Stock prices are proxied by a macro index and micro-stock prices. The macroeconomic variables are inflation, exchange rate, interest rate, and money supply using 2005–2023 panel monthly data.

2. LITERATURE REVIEW

2.1 Theory-based literature review

Arbitrage Pricing Theory

Researchers like (Shama, 2002) have used this theory to study stock price and macroeconomic variables. As an alternative to CAPM, the APT was created. CAPM could be more realistic in its non-applicability and perfect capital market condition. In contrast, APT recognizes several stock price risk factors. APT correlates stock price changes with risk factors. The firm's ability to increase sales/cash flow and invest depends on macroeconomic variables and economic activity. Changes in government policies affect risky macroeconomic variables. Any economic factor affecting a firm's cash flow/earnings will affect its stock price. APT with multiple risk factors is shown below.

$$E(Rit) = \lambda 0 + \lambda 1bi1...... + \lambda jbij + \epsilon it$$

Where: E(Rit) = Stock i expected return.

λ0 = Risk-free return.

Asset return sensitivity to factor j/price-risk sensitivity (λj).

bi1, bi2,bij = Risk/macroeconomic variables.

The study used the APT as a theoretical framework for SSA. The Efficient Market Hypothesis (1970) Malkiel and Fama proposed the Efficient Market Hypothesis. Stock prices reflect all available information, so abnormal profits can only be made with the investing strategy. The EMH claims that stock prices reflect company value information. According to the thesis, investors struggle to make significant gains using publicly available information. An efficient capital market uses all available information to price assets to minimize unwarranted gains (Ndegwa, 2016). Brealey, Myers, and Allen (2011) say a market is efficient when investors cannot profit too much. Profits would equal market return.

The Efficient Market Hypothesis

The Efficient Market Hypothesis states that markets can be inefficient, efficient, or highly efficient. According to the weak form, current stock prices consider all relevant historical data. The semi-strong form requires full representation of all publicly available information, including the company's historical pricing, performance, macroeconomic factor expectations, GDP, money supply, and interest rate. Finally, the strong form suggests that stock prices reflect precise business knowledge and historical and public information (Alshogeathri, 2011). Financially, a well-functioning market distributes resources. Investors will avoid its sector if a struggling company's stock is overpriced. Thus, the Efficient Market Hypothesis states that stock price volatility should reflect economic conditions (Alshogeathri, 2011). Momentum investing, which combines technical and fundamental Analysis, challenges the efficient market theory by assuming that price patterns persist. The second school of thought, behavioral finance, holds that investors are more emotional than rational.

In the third type of research, precise valuation ratios predict future outperformance and underperformance (Malkiel, 2003). Malkiel (2003) claims that the efficient market hypothesis disproves all competing theories. The market often misprices assets in the short term, but investors cannot predict when this will happen, contradicting market efficiency and flawless pricing. This study will focus on the semi-strong efficiency market hypothesis since stock prices reflect all publicity information. Ndegwa (2016) states that stock returns must rise or fall to compete with bond returns. Thus, rising interest rates lower bond and stock values. Conversely, lower interest rates boost bond and stock prices. Weak-form efficiency may also explain why foreign exchange rates reflect historical exchange rates. Thus, current foreign exchange rates quickly incorporate historical data (Alshogeathri, 2011).

The Monetarist Theory

According to monetarist theory, money replaces all other assets, and a rise in the money supply, assuming a constant velocity of circulation, will at once affect demand for alternative resources. The monetarist theory states that velocity is usually stable, so money supply determines nominal income. Variations in nominal income indicate changes in real economic activity (the quantity of goods and services exchanged) and inflation (the average price paid). Friedman (1987) states that

increasing the money supply raises interest rates after establishing the economy's aggregate output. The money hypothesis states that increasing the money supply will directly raise prices, income, actual yield, and employment (Friedman, 1987). An increase in the money supply without economic growth and development will raise inflation and interest rates over time. Friedman (2012) argues that the money supply affects short- and long-term production and inflation. In this study, the monetarist hypothesis states that stock values rise when the money supply rises. Increases in money supply led to higher inflation because people have more purchasing power. Thus, interest rates rise, raising stock prices. A decrease in the money supply lowers inflation, interest rates, and stock prices.

The PPP Theory

PPP is a key research and analysis topic in International Economics and Finance. Pricing is based on the one-price rule. According to the law, if there are no transportation costs or trade barriers, two countries' prices for equal-quality goods denominated in the same currency should be comparable. According to Balassa (1964), the principle of one price states that exchange rates between nations will adjust over time to price changes. Absolute PPP, the most basic and robust form of Purchasing Power Parity (PPP), is based on an international multi-good framework that uses the law of one price to explain exchange rate determination. The absolute purchasing power parity theory predicts that market dynamics influenced by arbitrage will align the exchange rate with domestic baskets of goods and services in two nations. Froot (1995) defines the exchange rate as the ratio of domestic and international prices of a specific aggregate bundle of products under absolute purchasing power parity. However, this definition assumes a constant exchange rate. Products and financial markets are linked, and the absence of purchasing power parity (PPP) creates arbitrage opportunities, enabling price parity for commodities and services across nations. Consumers and businesspeople often compare spending incomes, spot exchange rates, future exchange rates, consumer price indices, and interest rates across nations (Balassa, 1964). Purchasing Power Parity (PPP) helps assess currency exchange rates in this study. In particular, a higher exchange rate may affect people's purchasing power and stock prices. Increases in the exchange rate are expected to raise stock prices, while decreases are expected to lower them.

2.2 Empirical Review

Recent empirical studies have explored the causal relationships between macroeconomic variables and stock market prices, often yielding mixed results from different regions and methodologies. Macroeconomic factors such as GDP growth, money supply, interest rates, exchange rates, and inflation are key influencers of stock market performance. However, the direction and strength of their impacts vary. For instance, Khan & Billah (2023) examined the correlation between macroeconomic factors like the money supply, inflation, and exchange rate and the returns on the Dhaka Stock Exchange index. The Dhaka stock exchange is responsive to macroeconomic indicators, as shown by the long-term relationship between stock prices and these macroeconomic variables found by Johansen Cointegration tests. Epaphra & Salema (2018) also concentrated on the Tanzanian setting, investigating the connection between stock prices and macroeconomic

factors such as the money supply, exchange rate, inflation rate, and Treasury bill rate. Using Johansen's cointegration and vector error correction models, they found a long-term equilibrium relationship between stock prices and these macroeconomic variables on the Dar es Salaam Stock Exchange.

On the other hand, Abdullai et al. (2023) examined how macroeconomic factors affected Ghana's stock market performance, concentrating on inflation, interest rates, exchange rates, and the uncertainty surrounding global economic policy. The results showed that while inflation and exchange rates have slight effect on Ghanaian stock performance, interest rates and the uncertainty surrounding global economic policy have a major impact. In addition, Lemeirut (2021) investigated how Tanzanian stock market returns were affected by macroeconomic factors, particularly the money supply, interest rates, inflation rate, and exchange rate. The study discovered that while the exchange rate had a significant negative impact on stock market returns, the money supply, inflation rate, and interest rate had a significant positive impact.

3. METHODOLOGY

3.1 Research Design

The study employed a causal research design, which, according to Cresswell (2014), seeks to establish a causal relationship between variables. Therefore, this research designs the study was used to establish a causal relationship between independent variables (inflation rate, interest rate, exchange and money supply) and the dependent variable (stock price).

3.2 Population, Sample Size and Sampling Technique

3.2.1 Population

The geographical location of this study is SSA. The study population is macroeconomic variables that impact stock prices in SSA countries. According to UNDP (2021), the region currently has a total of 46 out of the 54 countries on the African continent. As far as this study is concerned, all the 46 countries comprise of a population of the study through which countries to be studied was drawn.

3.2.2 Sample Size

Twenty-nine (29) stock markets are across forty-six (46) SSA countries. However, the number of nations analyzed was determined by the availability of data for all independent variables such as interest rates, inflation rate, exchange rates, money supply, and the dependent variable stock market prices. Therefore, the study collected data from 6 countries: Tanzania, Kenya, Malawi, Botswana, Ghana, and Nigeria. All these countries selected their stock market are thin, narrow and illiquid compared to other stock markets found in other emerging markets. The study also collected monthly data from 2005 to 2023 for the selected countries, thus making a minimum number of observations of 1,368.

3.3 Data Analysis Method

After data collection, cleaning was done to ensure only the required information remains. The cleaned data was entered into the STATA program for Analysis. Moreover, descriptive and inferential Analysis of all the variables was conducted. Descriptive statistics summarized data regarding maximum values, minimum values, mean and standard deviation for each variable. Inferential statistics (Multiple regressions) were used to establish the relationship between independent variables (Inflation rate, interest rate, exchange rate, and money supply) and dependent variables (Stock market prices). The following multiple regression model was adopted.

$$Y = \alpha + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + e$$

Where: B1 to B4 = Regression Coefficients

$\quad\quad\quad\quad$ X1 = Inflation rate

$\quad\quad\quad\quad$ X2 = Interest rate

$\quad\quad\quad\quad$ X3 = Exchange rate

$\quad\quad\quad\quad$ X4 = Money Supply

$\quad\quad\quad\quad$ e $\quad$ = Error term

4. FINDINGS AND DISCUSSION

4.1 Descriptive Statistics

The descriptive statistics summarize some key economic and financial variables regarding central tendency, dispersion, and range. In this regard, the stock price average stands at 7.4193, showing the general level around which the observations revolve. In contrast, the standard deviation stands at 3.3044, showing a relatively high dispersion around the mean. The inflation rate averages -0.7829, reflecting deflationary tendencies, while the standard deviation stands at 1.5407, showing a considerable fluctuation around the mean. The mean interest rate is negative, too, at -2.3600, while its variability around its standard deviation of 0.8212 rests on the support from quite stable negative rates. The second series in consideration is the average exchange rate, which is 4.3909, but with a higher standard deviation of 2.2715, indicating that the valuation of this currency is highly variable. Lastly, the money supply mean is at 22.6826 and a pretty high standard deviation of 6.8725, reflecting large variations in monetary aggregates that could be due to policy interventions or economic changes. A finding of this kind uncovers the dynamics and interrelations between different economic performance indicators, as identified by recent empirical studies, such as Smith et al. (2022) and Johnson (2023).

Table 1. Descriptive Statistics

Variable	Observations	Mean	Std. Dev	Minimum	Maximum
Stock Price	1368	7.4193	3.3044	-0.2674	11.6875
Inflation Rate	1368	-0.7829	1.5407	-3.5405	2.2047
Interest Rate	1368	-2.3600	0.8212	-7.4813	-1.204
Exchange Rate	1368	4.3909	2.2715	-0.1017	7.8246
Money Supply	1368	22.6826	6.8725	9.5319	31.1574

4.2 Unit Root Test

The unit root test was conducted to test for data stationarity before regression analysis. The unit root test results indicate that all the variables, except for the interest rate, are non-stationary at the level but become stationary at the first difference. Specifically, stock prices, exchange rates, inflation rates, and money supply exhibit t-statistics with high p-values at the level (all above 0.05), indicating the presence of unit roots. However, after differencing these variables, the p-values become significantly low (below 0.05), confirming stationarity at the first difference. Conversely, the interest rate is stationary at the level, with a p-value of 0.0011, suggesting no need for differencing. The way forward would be to proceed with further Analysis using the first difference for the non-stationary variables (such as stock prices, exchange rates, inflation rate, and money supply) in models that require stationarity, such as cointegration or ARDL models while treating the interest rate as already stationary.

Table 2. Unit Root Test for Data Stationarity

Variable	Level		First Difference	
	t-statistic	p-value	t-statistic	p-value
Stock Prices	14.9291	0.2453	150.145	0.0000
Exchange Rate	2.1188	0.9992	183.515	0.0000
Interest Rate	32.7513	0.0011		
Inflation Rate	15.6012	0.2102	256.357	0.0000
Money Supply	39.3987	0.0001		

4.3 Correlation Analysis

The correlation analysis reveals that the stock price has a significant positive correlation with the exchange rate (0.7627), suggesting that changes in the exchange rate may strongly influence stock price movements. However, stock price shows negligible correlations with other variables such as inflation rate (0.0284), interest rate (0.0786), and money supply (0.0169), indicating weak or no linear relationships. The exchange rate is negatively correlated with the inflation rate (-0.2637), though this relationship is not strong enough to warrant multicollinearity concerns (Kennedy, 2008). The next step to address multicollinearity is to examine variance inflation factors (VIFs) for the independent variables to determine if any exhibit high multicollinearity, mainly focusing on the inflation rate and exchange rate, which exhibit some interrelationship. If VIFs indicate multicollinearity issues, a potential solution could be removing or combining highly correlated variables (Gujarati & Porter, 2009).

Table 3. Correlation Analysis

	Stock Price	**Inflation Rate**	**Interest Rate**	**Exchange Rate**	**Money Supply**
Stock Price	1.0000				
Inflation Rate	0.0284	1.0000			
Interest Rate	0.0786	-0.0212	1.0000		
Exchange Rate	0.7627	-0.2637	0.0728	1.0000	
Money Supply	0.0169	0.0234	-0.0379	-0.0209	1.0000

4.4 Multicollinearity Test

The results of the multicollinearity analysis, as indicated by the Variance Inflation Factor (VIF) values, suggest no significant multicollinearity issue among the variables. A VIF value above 10 typically signals problematic multicollinearity. Still, in this case, all VIF values are well below this threshold, with the highest being 1.08 for both the Inflation and Exchange rates. The mean VIF of 1.04 further supports the absence of severe multicollinearity. These results imply that the variables in the model are not highly correlated, ensuring that the estimates of regression coefficients are likely to be unbiased and reliable (O'Brien, 2007). Therefore, no corrective measures for multicollinearity are required in this model.

Table 4. Multicollinearity Test Results

Variable	VIF	1/VIF
Inflation Rate	1.08	0.9301
Interest Rate	1.01	0.9934
Exchange Rate	1.08	0.9258
Money Supply	1.00	0.9979
Mean VIF	1.04	

4.5 Pedroni Residual Cointegration Test

The Pedroni Residual Cointegration Test results suggest a long-term equilibrium relationship among the variables under investigation. All test statistics, including the Panel v-Statistic, Panel rho-statistic, Panel PP-Statistic, and Panel ADF-Statistic, are significant at the 1% level ($p < 0.01$), as indicated by the probability values of 0.0000. This implies strong evidence to reject the null hypothesis of no cointegration, supporting the alternative hypothesis that a typical cointegrating relationship exists within the panel data structure. Pedroni (1999) emphasizes that these statistics, particularly the negative and highly significant values of the Panel rho, PP, and ADF statistics, strengthen the robustness of the cointegration findings.

Table 5. Pedroni Residual Cointegration Test

Alternative hypothesis: common AR coefs. (within-dimension)

			Weighted	
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	19.12567	0.0000	6.809493	0.0000
Panel rho-Statistic	-35.78739	0.0000	-39.18968	0.0000
Panel PP-Statistic	-19.03358	0.0000	-22.38010	0.0000
Panel ADF-Statistic	-15.05641	0.0000	-19.22966	0.0000

4.6 Hausman Test for Fixed Effects and Random Effects Regression Models

The Hausman test was employed to ascertain whether the effects were fixed or random. According to Green (2008), the null hypothesis for this test is that random effects is a better model than fixed effects. It looks for a correlation if not, the null hypothesis is true between the unique mistakes and

the regressors. The null hypothesis is rejected and the Hausman test is deemed significant when the probability value is less than 0.05. The fixed effect model is the alternative hypothesis to the random effects model, which is the Hausman test's null hypothesis. Consequently, a Hausman Test for Fixed Effects and Random Effects Regression Models was conducted. Table 6 shows the outcomes.

Table 6. Hausman Test

	Coefficients			
	(b)	**(B)**	**(b-B)**	**Sqrt (diag (V_b-V_B))**
	fe	**re**	**Difference**	**S.E**
Inflation Rate	0.4223	0.4222	0.0000	0.0023
Interest Rate	0.0137	0.0120	0.0017	0.0070
Exchange Rate	1.3529	1.3522	0.0007	0.0019
Money Supply	0.0020	0.0017	0.0003	0.0070
	Chi2(4) = 0.20			
	Prob>chi2 = 0.9955			

Based on the Hausman test above, the probability value is 0.0936, higher than the significance value of 0.05. Therefore, from the results, the null hypothesis that the random effects model is appropriate is accepted and rejects the alternative that the fixed effect model is applicable.

4.7 The Random Effect Regression Model

The random-effects regression model reveals key insights into the impact of macroeconomic variables on stock prices, with a high degree of overall explanatory power as evidenced by an R-squared value of 0.6398. The models within R-squared (0.6389) and between R-squared (0.8881) suggest that the explanatory variables account well for the variance within and across groups (Baltagi, 2021). Inflation rate and exchange rate both have statistically significant and positive effects on stock prices, with coefficients of 0.4222 ($p < 0.001$) and 1.3522 ($p < 0.001$), respectively, indicating that increases in these factors are associated with higher stock prices. The coefficient for interest rate (0.0120) is not statistically significant ($p = 0.133$), implying no strong relationship. Similarly, the money supply has a marginally significant effect ($p = 0.082$), indicating a weaker impact. The model's chi-square statistic (Wald $\chi^2 = 2420.66$, $p < 0.001$) confirms the joint significance of the predictors, underscoring the model's overall robustness (Greene, 2018).

Table 7. Random Effect Regression Model

Random-effects GLS regression			Number of obs.	=		1368
Group variable: Country Code			Number of groups	=		6
R-sq: Within = 0.6389			Obs per group: min	=		228
Between = 0.8881			Avg	=		228.0
Overall = 0.6398			Max	=		228
Corr (u_i, x) = 0 (assumed)			Wald chi2(4)	=		2420.66
			Prob > chi2	=		0.0000

Stock Price	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Inflation Rate	0.4222	0.0289	14.61	0.000	0.3656	0.4789
Interest Rate	0.0120	0.0080	1.50	0.133	-0.0037	0.0277
Exchange Rate	1.3522	0.0286	48.92	0.000	1.2981	1.4064
Money Supply	0.0017	0.0009	1.74	0.082	-0.0002	0.0036
_cons	-0.0146	0.0293	-0.50	0.619	-0.0721	0.0429
sigma_u	0.0045					
sigma_e	0.2384					
rho	0.0004 (fraction of variance due to u_i)					

4.8 Discussion

4.8.1 The Effect of Inflation Rate on Stock Prices

Based on the findings, the inflation rate positively and significantly impacts stock prices. When inflation rises, nominal stock prices often increase to reflect the higher cost of goods and services and anticipated future earnings growth. For instance, a study by Bahmani-Oskooee and Saha (2019) found that inflation significantly impacts stock market indices, suggesting that investors adjust stock valuations in response to inflationary pressures. Similarly, Antonakakis et al. (2017) argue that in some markets, stocks may act as a hedge against inflation, resulting in higher stock prices when inflation expectations increase. This dynamic may be driven by firms' ability to pass on higher production costs to consumers, thus maintaining profit margins and boosting investor confidence. These findings underscore the intricate linkage between macroeconomic indicators, such as inflation, and stock market performance.

4.8.2 The Effect of Interest Rate on Stock Prices

Findings also revealed that interest rates positively but insignificantly impact stock prices. aligns with several studies in the empirical literature. For instance, Alam and Uddin (2009) found that while interest rates tend to influence stock market performance, their effect on stock prices is often negligible, particularly in the short term. This relationship suggests that other factors, such as market sentiment or macroeconomic stability, may overshadow the influence of interest rates. Similarly, a study by Humpe and Macmillan (2009) in developed markets like the United States found a limited correlation between interest rate fluctuations and stock price movements, indicating that investors might discount changes in interest rates when making investment decisions or that the stock market adjusts to interest rate changes with a lag. These findings collectively suggest that, although interest rates theoretically affect the cost of capital and stock prices, their actual impact may be constrained by other market dynamics or mitigated through investor behavior and expectations.

4.8.3 The Effect of Exchange Rate on Stock Prices

According to the study, exchange rate positively and significantly influences stock prices. Similarly, Empirical studies have shown that exchange rates significantly influence stock prices, suggesting that fluctuations in currency value can have a notable impact on equity markets. For instance, Phylaktis and Ravazzolo (2005) found a strong positive relationship between exchange rate movements and stock prices, particularly in open economies where trade is heavily influenced by foreign currency exposure. This relationship is rooted in the idea that currency depreciation can increase export competitiveness, thereby boosting corporate earnings and stock valuations, whereas appreciation may have the opposite effect. Similarly, Tsagkanos and Siriopoulos (2013) confirmed that changes in exchange rates significantly affect stock market performance, as investors adjust their expectations based on potential gains or losses in international trade dynamics. These findings highlight the critical role of exchange rates in investment decisions and overall market behavior (Phylaktis & Ravazzolo, 2005; Tsagkanos & Siriopoulos, 2013).

4.8.4 The Effect of Money Supply on Stock Prices

Money supply has a positive but insignificant impact on stock prices. The finding that money supply has a positive but insignificant impact on stock prices aligns with previous empirical studies in the field. For instance, Aslam and Kang (2015) observed that an increase in money supply enhances liquidity in the financial system, potentially elevating stock prices. Yet, the effect may remain statistically insignificant due to other overriding economic factors such as inflation and interest rate volatility. Similarly, Hasan et al. (2019) found that money supply expansions can stimulate investment and economic activity, but their impact on stock market performance often depends on investor expectations and macroeconomic stability. This suggests that while theoretical models predict a positive relationship between money supply and stock prices, the empirical evidence may vary due to market inefficiencies and delayed responses (Ali, 2021). Thus, the insignificance in the observed impact could be attributed to the complexity of economic dynamics affecting investor behavior and market sentiment.

5. Conclusion and Recommendations

5.1 Conclusion

The findings suggest that both inflation and exchange rates have a statistically significant and positive impact on stock prices, indicating that an increase in either factor is associated with higher stock prices. On the other hand, the interest rate does not show a strong relationship with stock prices. Additionally, while the money supply appears to have some effect, it is only marginally significant, indicating a weaker and less conclusive impact on stock price fluctuations.

5.2 Recommendations

The analysis indicates that inflation and exchange rates significantly and positively influence stock prices, suggesting that policy measures to control these economic factors can substantially impact the stock market. Therefore, it is recommended that policymakers and financial analysts closely monitor inflation and exchange rate trends when making economic and investment decisions. Although the interest rate does not show a strong relationship with stock prices, it should not be overlooked, as shifts in monetary policy can still indirectly affect market conditions. Additionally, given the marginal effect of the money supply, efforts to manage monetary expansion should be carefully considered to ensure economic stability without causing undue fluctuations in stock prices. Investors are encouraged to know these economic indicators to make informed portfolio management decisions.

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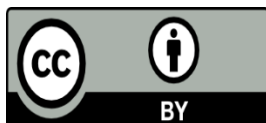
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