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Relationship between stock prices and exchange rates in the Nairobi Securities Exchange.

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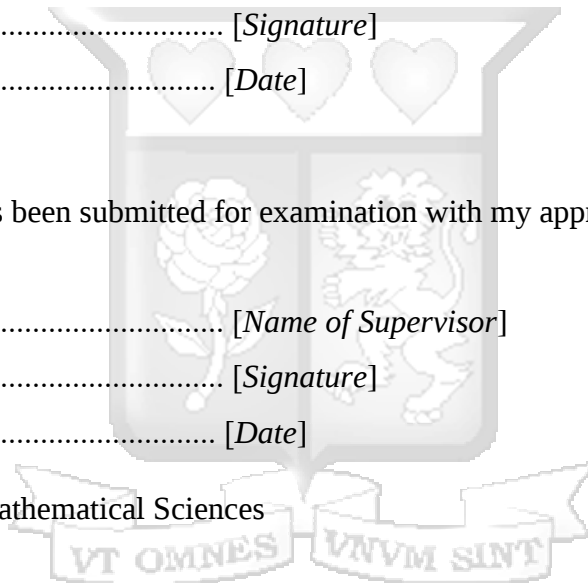
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Abstract

A country's Exchange rates implicate many factors in its economy, including the stock market. Research has been done to understand if there exists a relationship between exchange rates and stock prices. Previous researchers have arrived at contradictory findings. Researchers suggested doing more studies to see which findings are more consistent. This research has an objective of investigating the exchange rates and stock prices phenomenon to assess if stock prices in the Nairobi Securities All Share-Price Index (NASI) can be explained by the foreign exchange (FX) in the Nairobi Securities Exchange (NSE). The two variables of this research are Exchange Rates (FX) particularly the KSH against the USD (FX) and Nairobi Securities All Share - Price Index (NASI) Stock price indices which are seen to follow a times series pattern with volatility hence the employment of a suitable model. The research design is descriptive and a correlation and regression analysis was performed using Excel. The research study established that a negative and relatively significant relationship exists between exchange rates and stock market prices in the Nairobi Securities exchange.

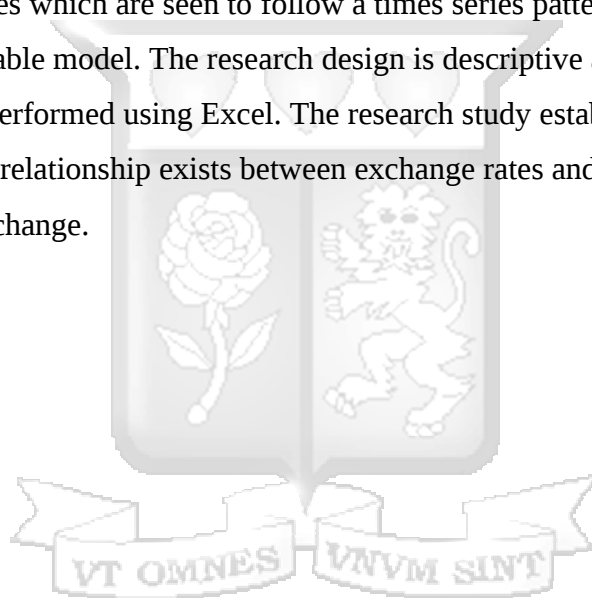
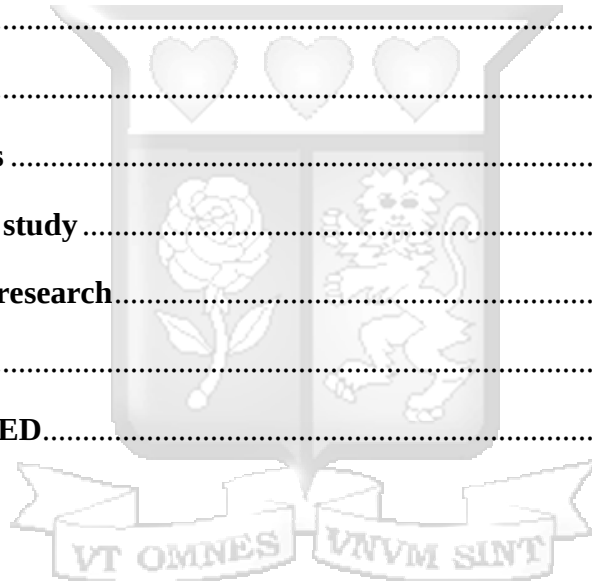


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LIST OF ABBREVIATIONS

Nairobi Securities Exchange (NSE)

Nairobi Securities All Share - Price Index (NASI)

Foreign Exchange (FX)

Central Bank of Kenya (CBK)

United States Dollar (USD)

Kenya Shilling (KSH)

Foreign direct investment (FDI)



CHAPTER ONE: INTRODUCTION

1. Background Information

The Financial sector is a very important part of the economy of a country. The impact of Exchange rates on stock prices has been analyzed by a good number of researchers as many stock investors want to understand how to gain capital growth from the stock markets. A profound dependency exists between the financial and economic sector, very unpredictable exchange rates could cause premeditated and administrative damages (Makori, Esther. N. (2017)).

Exchange rates now play a crucial role in determining equity prices and business profitability due to increased global trade and capital movements (Kim, K. (2003).). According to (Joseph, N. L. (2002).), output and input prices have a direct impact on firm value and international competitiveness. Understanding this association can help foreign and local investors diversify their portfolios and hedge against risks. (Mishra, A. K. (2004).) acknowledged the lack of theoretical agreement regarding the relationship between exchange rates and stock prices. For example, (Solnik, B. (1987).) believes that the local currency and stock market have a negative relationship but (Mumo, M. P. (2017).) established a positive relationship.

1.1.1 The Nairobi Securities Exchange (NSE)

The Nairobi Securities Exchange (NSE) is the primary securities exchange of Kenya, providing a platform where securities such as equities, derivatives, and bonds are traded. As one of the major stock exchanges in Africa, the NSE plays an important role in the economic development of the country and further aids its development. The exchange has experienced significant growth over the years, with its market capitalization reaching a record high of Ksh 3.91 trillion in 2020 (NSE, 2020).

The NSE has become increasingly open to foreign investment in recent years, with more than 30% of the listed companies having some form of foreign shareholding (NSE, 2020). This has

attracted a significant number of foreign investors seeking to diversify their portfolios and tap into the economic growth potential of Kenya. However, foreign investors are not only influenced by the performance of the local companies but also by the exchange rates between their home currency and the Kenyan shilling. This raises the question of what relationship is there between exchange rates and stock prices in the NSE.

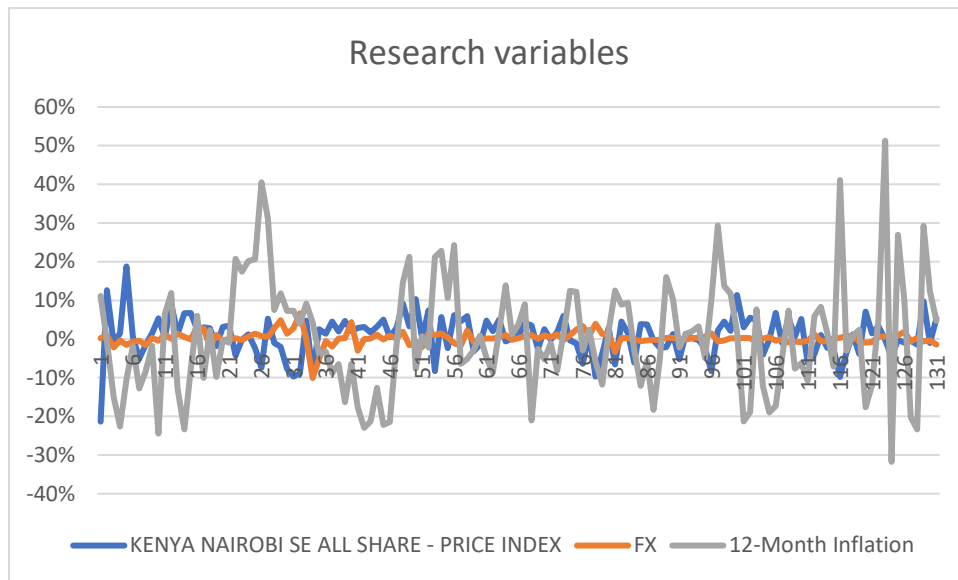
1.1.2. Exchange Rates and Stock Returns

Exchange rates refer to the value of a country's currency when valued against another. The FX is associated with the forces of demand and supply in the foreign exchange market, and their fluctuations can be influenced by various factors some might be inflation, interest rates, trade balances, and political stability. On the other hand, stock returns refer to the change in the value of a stock over a while and are often used as a measure of investment performance. Real rate of stock return takes into account the effects of inflation, providing a more accurate picture of the return on investment.

Foreign investment in the NSE has been on the rise, driven by the country's stable political climate and robust economic growth. In recent years, the Kenyan shilling has experienced significant fluctuations against major currencies, such as the USD and the British pound. If the Kenyan shilling depreciates against the US dollar, foreign investors will lose purchasing power when repatriating their investment, resulting in a lower real rate of stock returns.

While there have been various studies on the impact of exchange rates on stock returns in developed economies, there is limited research on this topic in the context of emerging markets, especially in the African region. This creates a gap in the understanding of how exchange rate movements can be used to explain stock prices in the NSE. As the NSE continues to attract foreign investment, it is crucial to understand the role of exchange rates in determining the stock return.

Figure 1.1: All variables of the study volatility



The figure above shows the volatility of all the variables used in this study. The objective focus of this study is to analyze if Stock prices in the NSE can be explained by FX hence test if these variables have a significant relationship. This will be achieved by analyzing the historical trends in FX rates and stock prices in the NSE. The findings of this study will contribute to the literature on international finance and provide insights for policymakers and investors on the significance of exchange rates on the stock markets in emerging markets.

1.2 Problem statement

The link between exchange rates and stock returns has been extensively studied in the context of developed economies, with most studies focusing on the impact of exchange rates on domestic investors and companies. However, there is a limitation of research on this topic in emerging markets, especially in the African region. This presents a gap in understanding the specific dynamics of how exchange rates affect stock returns in these markets. This study particularly focused in the case of the NSE. The NSE has given researchers quite a debate because of findings that differ. Most researchers focused on simple models such as regression and

correlation models. The relationship between exchange rate and stock prices has been contradictory as proven from the examples below.

(Omondi, J. O. (2016).) studied how exchange rates movement can affect the performance of the Nairobi Securities Exchange. He used a descriptive design as well as a longitudinal design and incorporated correlation and Multiple Regression analyses, Analysis of Variance (ANOVA). He established the relationship to be not statistically significant, Pearson's partial correlation and regression analyses revealed weak and negative associations between FX and NSE20, NASI.

In his study (Mumo, M. P. (2017).) used time series analysis exploiting stationarity concepts and employing the Johansen (1991) and/or Johansen and Juselius (1990) co-integration tests and VECM model he established a negative equilibrium relationship for money supply and a positive relation for exchange rates and interest rates with stock prices in the long-run. Inflation showed a negative but insignificant relation with stock prices in the long-run. This was contrary to previous research findings of that time.

(Makori, N. G. (2017).) In her study made use of a descriptive design and regression and descriptive analysis. Strong and positive relationship between Real exchange rates and NSE 20 was established and a negative correlation for Inflation. Real interest rate established an insignificant negative coefficient. She recommended further studies as important to bring the inconclusive debate on whether the relationship is negative or positive to an end.

A study on how share prices of listed firms in Kenya are affected by foreign exchange rates volatility used longitudinal research design and conducted a Descriptive Statistical Analysis, Regression Data Diagnostic Tests and Regression Analysis (Muigai, R. G., & Cherono, I. (2019).). The researcher concluded that an increase in exchange rate volatility will lead to a fall in market share prices with the attendant decline in market capitalization.

Previous studies in other emerging markets have found that there is a significant relationship between exchange rates and stock market returns (Ibrahim, M. H., & Aziz, H. (2003).; Jorion, P. (1990).). However, the nature of this relationship may vary depending on market conditions, currency regimes, and macroeconomic factors such as inflation and interest rates (Phylaktis, K., & Ravazzolo, F. (2005)). In the Kenyan context, the country's reliance on foreign direct investment (FDI) and international trade further underscores the need to explore how exchange rate volatility impacts the stock market.

The relationship between stock prices and foreign exchange rates is a key area of interest for investors, policymakers, and economists alike. Understanding this dynamic is crucial for both domestic and international investors, especially in emerging markets such as Kenya. This study aims to investigate the relationship between stock prices and foreign exchange rates on the (NSE) over the period from 2009 to 2019 because most of the cited studies didn't include the 2019 data. The findings of this research are crucial to support fundamental studies on this topic and hence come up with a conclusion that can further be used for generalization.

1.3 Objective of the study.

General objective.

The main aim of this study is to understand how best can stock prices be explained by the FX in NSE, Kenya.

Specific objectives.

The objectives of this study are as follows:

1. To assess if there is a statistically significant relationship between exchange rates and stock prices in the NSE.
2. To assess the strength of the relationship between exchange rates and stock prices in the NSE.

1.4 Research questions

Based on the objectives stated, this study will aim to achieve answering the following research questions:

1. What is the statistical significance of the relationship between exchange rates and stock prices in the NSE?
2. What is the strength of the relationship between exchange rates and stock prices in the NSE?

1.5 Significance of the research

The findings of this study will be beneficial to various stakeholders, including policymakers, investors, and researchers.

Policymakers

Policymakers in Kenya and other emerging markets will benefit from the insights provided by this study as they seek to attract foreign investment and promote economic growth.

Understanding if there is a relationship between stock prices and foreign exchange in the NSE policymakers can create more effective policies and measures to promote a stable and favorable investment climate. This could lead to increased foreign investment in the NSE, contributing to the country's economic development and growth.

Foreign investors in NSE and other emerging markets

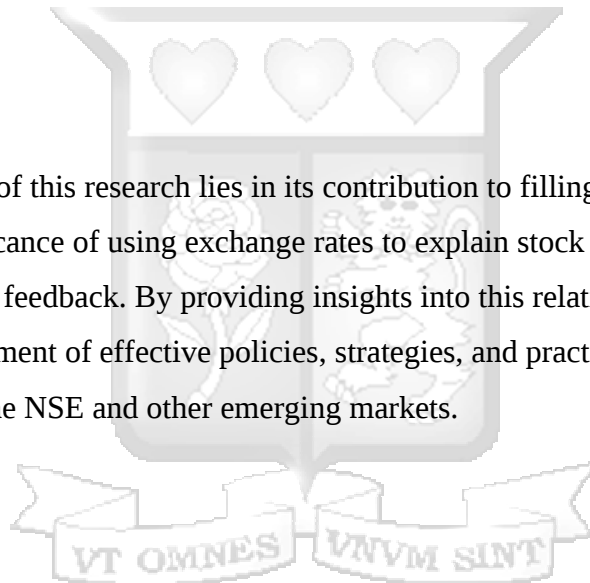
Foreign investors in the NSE will also benefit from this research as it will provide valuable insights into the relationship between exchange rates and stock returns. By understanding this relationship, foreign investors can make more informed decisions about their investment strategies and mitigate their exposure to foreign exchange risk. This could potentially lead to better returns for foreign investors in the NSE.

Moreover, this study will also have practical implications for investors in other emerging markets, as the findings can be applied to a broader context. By filling the gap in the existing literature on this topic in emerging markets, this study will contribute to the understanding of the dynamics of foreign investment in these markets.

Researchers

In addition, this study will also contribute to the existing body of literature on international finance and the relationship between exchange rates and stock returns. Researchers can use the findings of this study as a basis for further research in this area, particularly in the context of emerging markets.

Overall, the significance of this research lies in its contribution to filling the gap in the understanding the significance of using exchange rates to explain stock returns in the NSE hence providing consistent data feedback. By providing insights into this relationship, this study will contribute to the development of effective policies, strategies, and practices that can benefit various stakeholders in the NSE and other emerging markets.



CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The Literature review chapter will simply show past literature done by similar research on the impact of exchange rates on the stock return hence directing the study towards meeting its objectives and research questions.

2.2 Theoretical Review

The theoretical framework for this study is based on the theory of international finance and the relationship between exchange rates and stock returns. According to this theory, exchange rate movements can significantly affect foreign investors' returns in a stock market. This is because foreign investors' returns are affected not only by the performance of the local companies but also by the fluctuations in the exchange rates between their home currency and the local currency at the time of stock liquidations hence might get more stock returns or less.

Since its adoption in 1993, Kenya has maintained a floating exchange rate system. Market forces of supply and demand are noted to be great influencers of the shilling's value (Odongo Kodongo, 2024). Various models have been employed to analyze exchange rate fluctuations, including the flex-price model [Frenkel (1976) and Bilson (1978)], the sticky-price model [Dornbusch (1976)], the real interest rate-differential model or hybrid monetary model [Frankel (1979)], and the equilibrium real exchange-rate model [Hooper and Morton (1982)]. Research has utilized these models to study exchange rate volatility and its effects on different economic and financial sectors, with stock markets serving as a notable example.

Purchasing Power Parity (PPP) (Froot, K. A., & Thaler, R. H. (1990).) suggests exchange rates should adjust to equalize the price levels between two countries. According to PPP, any depreciation of the local currency would lower the real value of the stock returns for foreign investors. In this context, if the Kenyan shilling depreciates, foreign investors holding stocks in the Nairobi Securities Exchange (NSE) would see a reduction in the real rate of returns when converted to their home currency, assuming prices remain stable in their home markets (Froot,

K. A., & Thaler, R. H. (1990).). The International Fisher Effect (Madura. (2018).), posits that differences in nominal interest rates between two countries reflect expected changes in exchange rates. If exchange rates change in line with interest differentials, the real returns from NSE stocks might fluctuate (Madura. (2018).).

The literature review on this topic highlights a strong caution due to the mixed and inconclusive results across studies. Research by Smith (1992), Aggarwala (1981), Solnik (1987), Frank and Young (1972), Granger et al. (2000), Abdalla and Murinde (1997), and Apte (2001) has identified a significant positive correlation between stock returns and the FX. Conversely, studies like those by Soenen and Hennigar (1998), Ma and Kao (1990), and Ajayi and Mougoue (1996) have found a negative relationship between the two variables of this research. Additionally, research by Bartov and Bodnar (1994) and Frank and Young (1972) found either insignificant or no connection at all between stock returns and FX rates. Causation analyses have also shown mixed results, with notable examples including Morley and Pentecost (2000), Bahmani-Oskooee et al. (1992), Ibrahim (2000), and Kanas (2000).

One of the main theoretical perspectives that have been used in previous research on the topic is the asset pricing approach. According to this perspective, stock returns are determined by asset prices, risk, and other factors, including exchange rates. (Chauhan, Y., Mishra, A. K., & Spahr, R. W. (2020).) applied this approach in their study on the impact of exchange rates on the Indian stock market and found a negative relationship between exchange rates and stock returns.

The flow-oriented model is another model in past research that postulates that exchange rate fluctuations affect a country's trade balance, impacting corporate earnings and stock prices (Dornbusch, R., Branson, W. H., Whitman, M. V. N., Kenen, P., Houthakker, H., Hall, R. E., Lawrence, R., Perry, G., Fellner, W., Brainard, W., & Von Furstenburg, G. (1980)). If the Kenyan shilling appreciates, it could hurt export-oriented companies listed on the NSE, thereby lowering stock returns. Conversely, a depreciation of the Kenyan shilling could benefit these

companies, enhancing returns for foreign investors in local currency but potentially diminishing them when repatriated.

The portfolio diversification theory suggests that investors seek to diversify their portfolios to reduce risk. This is particularly relevant for foreign investors in emerging markets, where risks may be higher compared to developed markets and hence can affect the diversification potential of their portfolios. Dlugosz and Hall (2019) found that exchange rate fluctuations affected the returns of international stock portfolios, including those in emerging markets. The investment theory suggests that investors are motivated by returns and seek to maximize their profits having a significant impact on their profitability and, therefore, influencing their investment decisions. Das and Mukherjee (2020) found a notable negative relationship between the two variables.

2.3 Empirical Review

Numerous empirical studies have been conducted to examine the relationship between exchange rates and stock returns in different markets. However, there is limited research on this topic in the context of emerging markets, particularly in the African region. Nevertheless, these studies provide valuable insights into the dynamics of this relationship and offer a basis for understanding the impact of foreign exchange rates on stock returns in the NSE.

In (Mlambo, C., Maredza, A., & Sibanda, K. (2013).) examined the impact of currency volatility on the Johannesburg Stock Exchange using the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) method. The study utilized monthly data from South Africa covering the period between 2000 and 2010. The results indicated a very weak correlation between currency volatility and the stock market, aligning with the conclusions of earlier research.

Empirical studies in global markets have found mixed results regarding the effect of exchange rates on stock returns. For example, (Doukas, J., Hall, P. H., & Lang, L. H. (1999).) found that exchange rate fluctuations have a significant impact on stock prices in international markets,

particularly for industries with substantial foreign exposure. Conversely, (Jorion, P. (1990).) found little evidence of exchange rate changes affecting U.S. stock returns but highlighted that firms with a high percentage of international operations are more sensitive to exchange rate movements.

Empirical research into the link between stock and FX markets reveals a complex and uncertain effect of exchange rate fluctuations on stock values. In their study of the interaction between bilateral FX rates and stock market returns in Botswana, Lesotho et al. (2016) found a one-way causality flowing from the FX to stock market prices. Findings that were similar have been reported by Abdalla and Murinde (1997) for India, Korea, and Pakistan (Bagh, T., Azad, T., Razzaq, S., Liaqat, I., & Khan, M. A. (2017).), as well as by Kasman (2003) for Turkey. Conversely, Kutty (2010) identified a one-way causality running from stock prices to exchange rates, a result echoed by Agrawal, G., Srivastav, A. K., & Srivastava, A. (2010). Additionally, some research, such as that by Cakan and Ejara (2013), suggests a bidirectional relationship between stock prices and foreign exchange markets. Understanding these interactions is crucial for effectively managing exchange rate risk.

Olugbenga, A. A. (2012) conducted a study on exchange rate volatility and stock market behavior in Nigeria, utilizing Johansen's Cointegration Technique and an Error Correction Mechanism with quarterly data spanning from 1985 to 2009. The findings revealed that exchange rates significantly influence the Nigerian stock market both in the short and long term. In the short term, exchange rates had a positive and significant effect on stock market performance. However, in the long term, the relationship became significantly negative.

(Daggash, J., & Abraham, T. (2017).) analyzed the exchange rate returns of the Rand and the Naira to assess volatility and its impact on stock market performance in South Africa and Nigeria. Utilizing the Vector Autoregressive (VAR) model and conducting a Granger causality test, their findings revealed that the South African Rand exhibited volatility, while the Nigerian Naira did not. The relationship was seen to be significant in the short run.

When investigating the factors that affect stock market performance in South Asia, Aurangzeb (2012) came to a similar conclusion. The study used descriptive statistics to analyze monthly data for three countries (Pakistan, India, and Sri Lanka) from 1997 to 2010, and the results showed that exchange rates significantly improve stock market performance in all three South Asian markets.

Das and Mukherjee (2020) also conducted a study on the impact of exchange rates on stock returns in the Indian market, finding a negative relationship between the two variables. They suggested that this negative relationship could be attributed to the impact of exchange rates on the profitability of companies, affecting their stock prices. This finding is also relevant to this study as it provides insights into the potential impact of exchange rates on the performance of companies listed on the NSE, which can indirectly affect stock returns.

Makori, E. N. (2017) researched the effect of exchange rate on stock market performance in the Nairobi Securities Exchange. Granger causality test found that stock market returns were caused by the exchange rates Granger. A weak but negative and significant correlation between the exchange rates and stock returns was also noticed. Exchange rates and inflation were confirmed to have significant and substantial negative effect on stock returns. A rise in inflation was established to contribute to a decrease in stock returns. Other variables used in that research had insignificant impact on the stock returns using the regression analysis.

Omondi, J. O. (2016) used both NSE20 and NASI to determine the study's findings regarding the impact of exchange rate movement on the Nairobi Securities Exchange's performance. He used a descriptive design for the study as well as a longitudinal design and incorporated correlation and Multiple Regression analyses, Analysis of Variance (ANOVA) from Excel. He established the relationship to be not statistically significant, Pearson's partial correlation and regression analyses revealed weak and negative associations between FX and both NSE20 and NASI.

(Mumo, M. P. (2017).) Using time series analysis, stationarity concepts, the Johansen (1991) and/or Johansen and Juselius (1990) co-integration tests, and the VECM model, he found that the money supply had a negative equilibrium relationship with stock prices over the long term, while interest rates and exchange rates had a positive relationship. Inflation showed a negative but insignificant relation with stock prices in the long-run. This was contrary to previous research findings of that time.

A study that investigated the effect on stock market returns from exchange rate changes made use of a descriptive design and regression and descriptive analysis (Makori, N. G. (2017).). Strong and positive relationship between Real exchange rates and NSE 20 was established and a negative correlation for Inflation. Real interest rate established an insignificant negative coefficient. She recommended further studies as important to bring the inconclusive debate on whether the relationship is negative or positive to an end (Makori, N. G. (2017).).

2.4 Research Gap

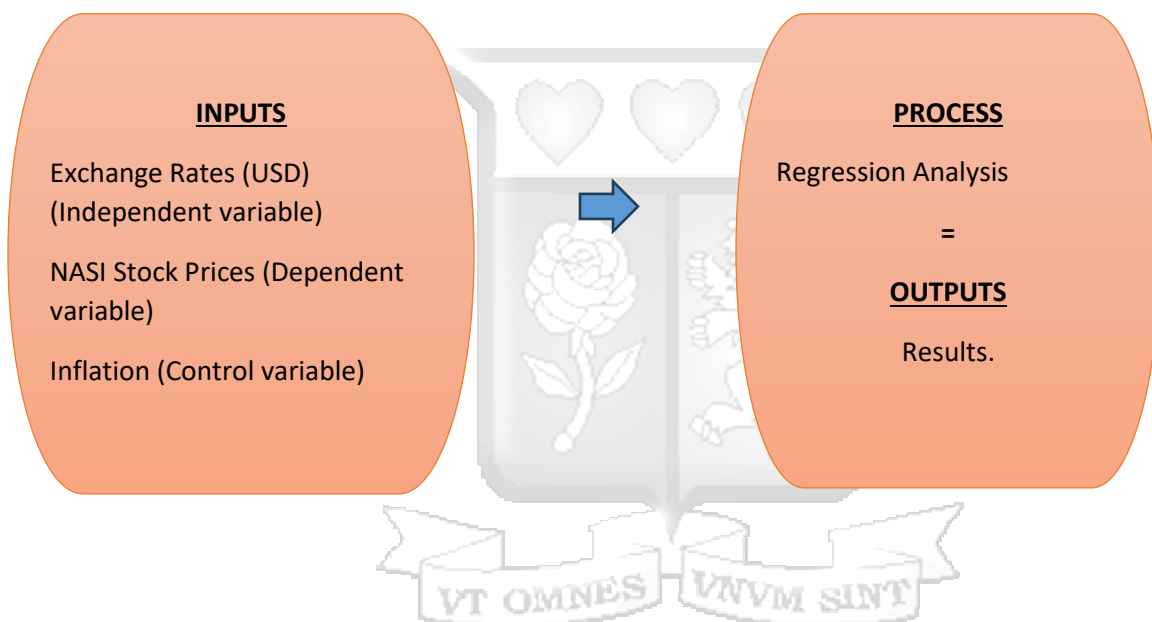
This study aims to fill this gap by focusing on the specific dynamics of this relationship in the context of the NSE. There is a need for a more comprehensive analysis that spans a decade, particularly from 2009 to 2019—a period that witnessed significant fluctuations in exchange rates, global economic crises, and major shifts in foreign investment flows. This is also the period before the COVID 19 pandemic which affected economic business to a big extent hence will be a data outlier.

The gap found is that lots of research has been done but due to reasons like short durations, period of the data and models used, researchers have found contradictory answers. This means there's still room for research on this sector so as to find which results are actually consistent and hence conclude this long thought debate. (Kithome, L. N. (2017).), (Makori, Esther. N. (2017).) and (Omondi, J. O. (2016).) found the same results of negative correlation while (Makori, N. G. (2017).) and (Mumo, M. P. (2017).) established a positive relationship between the variables.

2.5 Conceptual Framework

The connection between exchange rates and the stock return is expected to be negative, based on the theoretical perspectives discussed in the literature review. The inputs are the three variables: Exchange Rates (USD) (Independent variable), NASI Stock Prices (Dependent variable) and Inflation (Control variable). The variables will be analyzed and go through a regression modelling process to give us the finding/results of the study. This will help foreign investors understand if there is an impact of the FX on their stock returns and will also benefit domestic investors.

Figure 2.1: Conceptual Framework



CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The research methods chapter consists of systematic approaches used to collect, analyze, and interpret data in order to answer specific research questions and hence achieve the objectives of the study. They can be broadly categorized into three main types: qualitative, quantitative, and mixed methods.

3.2 Research Design

This study utilized quantitative research methods as it focuses on numerical data and statistical analysis. According to Williams (2007), descriptive research is a research design used to examine the situation involving the identification of attributes of a particular phenomenon based on an observational basis. A descriptive and cross-section research design can be employed as we have chosen data from a specified period (2009 to 2019) for the study.

The use of quantitative methods, such as data analysis of historical trends of exchange rates and stock returns, will provide a more objective and statistical perspective on the relationship between these variables. This approach will help to identify any patterns and trends in the data, allowing for a more systematic analysis of the connection between exchange rates and stock returns in the NSE.

3.3 Population and sampling

The population for this study will be the NASI share index from 2009 to 2019 and its corresponding Exchange rates data in that time horizon. The Share Index NASI includes all the listed companies on the NSE, this ensures a more comprehensive representation of the overall market compared to the NSE 20 Share Index which only tracks 20 blue-chip stocks. Using the NASI allows the research to capture a greater picture of the market (NSE,20).

NASI is a major stock market index that tracks the performance of large companies based in Kenya which currently.

3.3.1 Sampling

A purposive sampling method was employed meaning a non-probability sampling method where participants are intentionally chosen based on specific characteristics relevant to the study's objectives. The sample was all the stock share indices in the NSE's All-Share Index to ensure that the research focuses on companies with values close to the FX for easier modeling.

3.4 Data collection

There are two types of data, the type of data for this study will be secondary data. Primary data refers to data collected directly from participants in the study, while secondary data refers to data that already exists and has been collected by other sources (Creswell & Creswell, 2017). The secondary data for this study will be collected from the official websites of the NSE and the Central Bank of Kenya. This data will include historical trends and patterns of exchange rates and stock returns in the NSE. The data will then be combined in Excel and cleaned to fix double entries, and omissions and align the monthly data of NASI and its corresponding monthly data of exchange rates.

3.5 Data analysis

The research data was be cleaned and matched, i.e., the exchange rates of purchasing the USD and monthly NASI stock returns level was be matched correctly according to the dates of occurrence from the year 2009 to 2019. The data was then quantitatively analyzed starting with descriptive statistics on Excel. The descriptive statistics generally tells us fundamental information about the collected data hence useful for further analysis and interpretation.

Correlation Analysis is essential to understand if variables move together or inversely hence performing it will enable us to know more about the variable's relationship to each other. The researcher then used the collected data to perform a regression analysis which establishes the extent of relationship between exchange rate volatility and stock market movement.

The regression model used by the study was:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + E_t$$

Where:

Y = Stock market price movement

X₁ = the exchange rate volatility

X₂ = the inflation movement

β₀ and **β₁** are the co-efficient of the regression variables

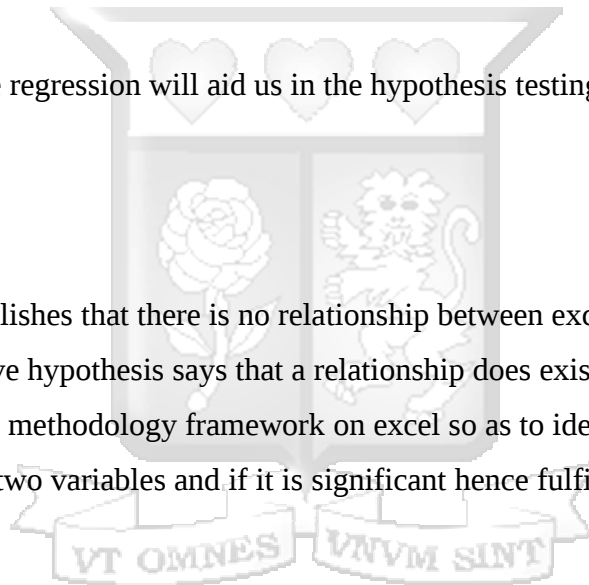
E_t = the error term

The P values found in the regression will aid us in the hypothesis testing:

$$H_0 = P > 0.05$$

$$H_a = P \leq 0.05$$

The null hypothesis establishes that there is no relationship between exchange rates and stock prices while the alternative hypothesis says that a relationship does exist. The research analysis chapter was applying this methodology framework on excel so as to identify if there is a relationship between the two variables and if it is significant hence fulfilling the research objectives.



CHAPTER FOUR: RESULTS AND ANALYSIS

4.1 Introduction

This chapter will make use of the steps articulated in chapter 3 using appropriate data analysis tools in Excel. Results of the descriptive statistics and regression analysis will be shown and interpreted in this chapter.

4.2 Descriptive Statistics

This part of the chapter will include: Mean, Standard Error, Median, Standard Deviation, Kurtosis, Skewness, Minimum and Maximum of the study.

Table No 4.1: Descriptive Statistics

	<i>KENYA NAIROBI SE ALL SHARE - PRICE INDEX</i>	<i>FX</i>	<i>12- Month Inflation</i>
Mean	0.008298443	0.001999111	0.004015
Standard Error	0.004525129	0.001504285	0.012754
Median	0.013179782	0.001801521	-0.00613
Standard Deviation	0.051792468	0.017217324	0.145976
Sample Variance	0.00268246	0.000296436	0.021309
Kurtosis	2.677388424	11.13527008	0.810666
Skewness	-0.438522566	-1.165305192	0.577025
Range	0.401252103	0.167125687	0.830273
Minimum	-0.21363704	-0.10079847	-0.31763
Maximum	0.187615063	0.066327217	0.512644
Sum	1.087096079	0.261883565	0.526001
Count	131	131	131

The study differenced the variables before analysis, it then has mean value units for the NASI stock prices, FX (USD), and 12-Month Inflation as 0.008298443, 0.001999111 and 0.004015 respectively. The corresponding Standard errors are 0.004525129, 0.001504285 and 0.012754 which are relatively low hence the sample mean is more accurate. The Kenya Nairobi Se All Share - Price Index has a median of 0.013179782, FX (USD) has a mean of 0.001801521 and 12-Month Inflation has a mean of -0.00613.

The Standard Deviation correspondingly established the following values respectively: 0.051792468, 0.017217324 and 0.145976. The values are relatively low hence values tend to be close to the mean. Kurtosis is a determiner of the distribution's flat or peak appearance. A critical value of 3 suggests a normal distribution, above 3 implies a peaked distribution but if lower than 3 then it has a flat distribution. The Kenya Nairobi Se All Share - Price Index has a flat distribution of 2.677388424, FX (USD) has a peaked distribution of 11.13527008 and 12-Month Inflation has a flat distribution of 0.810666.

Skewness has a critical value of 0 for there to exist a normal distribution. Positive skewness implies a long right tail and the opposite is true (negative skewness means long left tail). The results show that stock prices and exchange rates are negatively skewed while inflation is the only variable that is positively skewed. The Kenya Nairobi Se All Share - Price Index, FX (USD) and 12-Month Inflation have the following skew values of: -0.438522566, -1.165305192 and 0.577025 respectively. This concludes that none of the variables of this study follow a normal distribution because they don't meet the terms (Skewness=0 and Kurtosis=3).

4.2.1 Line charts.

Figure 4.1: KENYA NAIROBI SE ALL SHARE - PRICE INDEX

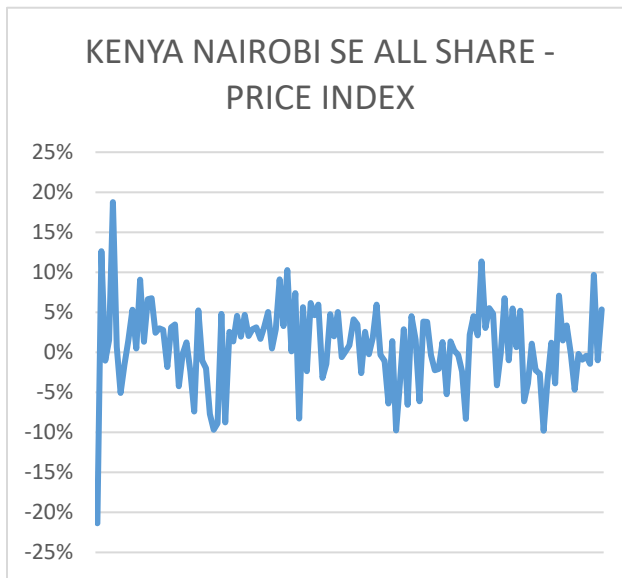


Figure 4.2: FX

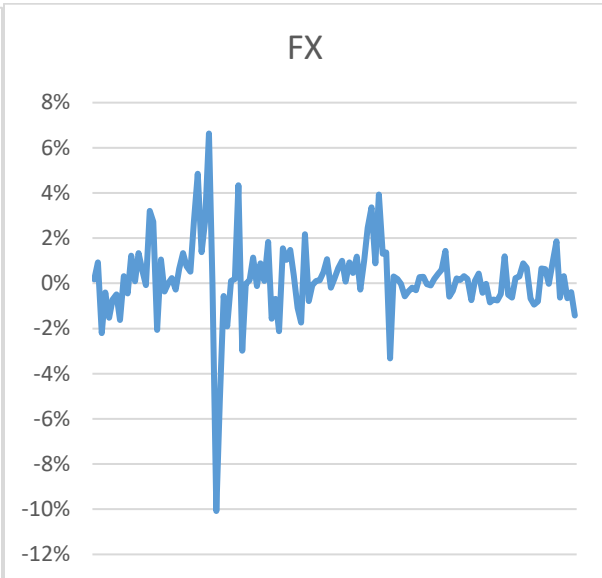
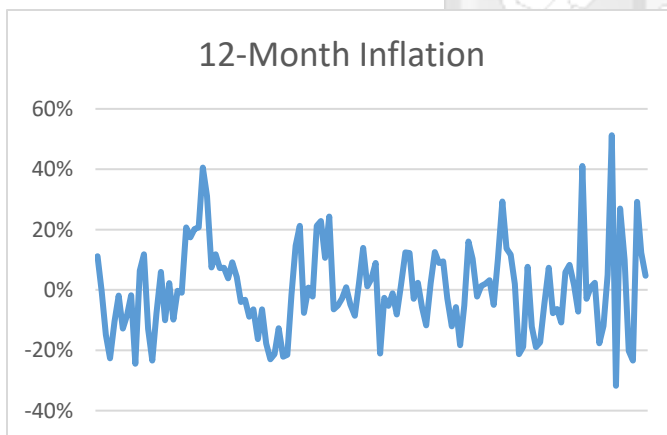


Figure 4.3: 12-Month Inflation



This line charts represent percentage differences of each variable hence showing the volatility of the variables. They also represent the trends over time of each variable that has been used in this study to achieve the objectives set.

4.2.2 Correlation Analysis.

Correlation is a statistical method of analyzing trends and patterns between variables which is important for making informed decisions. No correlation exists if the correlation coefficient is 0.

A perfectly negative correlation exists if the correlation coefficient is -1. A perfectly positive correlation exists if the correlation coefficient is +1. Correlation is stronger as the correlation coefficient tends to 1 but weaker when it tends towards 0.

Table 4.2: Correlation Analysis

	<i>KENYA NAIROBI SE ALL SHARE - PRICE INDEX</i>	<i>FX</i>	<i>12- Month Inflation</i>
KENYA NAIROBI SE ALL SHARE - PRICE INDEX	1		
FX	-0.1183631	1	
12-Month Inflation	-0.160838448	0.096005001	1

Exchange rates and inflation are negatively correlated to stock prices in the Nairobi Stock Exchange. FX has a correlation coefficient of -0.1183631 to Kenya Nairobi Se All Share - Price Index which means there exists a weak and negative correlation between the two variables. This means that the variables don't move together, an increase in exchange rates could imply a decrease in stock prices.

12-Month Inflation has a correlation coefficient of -0.160838448 to Kenya Nairobi Se All Share - Price Index this implies that there exists a weak and negative association between the two variables as well. This implies that an increase in inflation would result to an inverse reaction to stock markets hence a decrease in the stock prices in the Nairobi Securities Exchange.

Exchange rates and inflation are seen to have a positive correlation to each other. FX has a correlation coefficient of 0.096005001 to 12-Month Inflation this informs the existence of a weak but positive correlation between the variables. This means a proportional relationship between the two variables. An increase in exchange rates could mean a simultaneous increase in inflation.

4.3 Regression Analysis

This is a statistical process that provides a combined analysis of the independent variables (predictor variables) effect on the dependent variable (target variable) of a study. This research has an objective of establishing exchange rates effect on stock prices in NSE. The dependent variable of this study is Kenya Nairobi Se All Share - Price Index (stock prices). The independent variables used in this research are Exchange rates and inflation obtained from the Central Bank of Kenya (CBK).

Table 4.3: Model Summary

<i>Regression Statistics</i>	
Multiple R	0.191207863
R Square	0.036560447
Adjusted R Square	0.021506704
Standard Error	0.051232498
Observations	131

Adjusted R square is a coefficient of determination and it is the best to use when the model has multiple variables. This value will tell us how changes in the predictor variables explain the changes in the dependent variable. The regression statistics results establish that exchange rate volatility impacted stock price movement by 2.1506704% as seen by the Adjusted R Square. This implies a low impact on stock price movements from exchange rate volatility. Other factors not covered in this research would contribute to the unexplained 99.97849%.

Table 4.4: Analysis of Variance

ANOVA					<i>Significance</i>
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>F</i>
Regression	2	0.012749351	0.006374675	2.428661551	0.09220749
Residual	128	0.335970418	0.002624769		
Total	130	0.348719768			

Table 4.5 Regression Coefficients

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	0.009138063	0.004507112	2.027476358	0.044689935	0.000219972	0.018056	0.00022	0.018
FX	-0.312485441	0.262191692	-1.191820527	0.235536665	-0.831276499	0.206306	-0.83128	0.206
12-Month								
Inflation	-0.053527287	0.030924537	-1.730900185	0.085879317	-0.114716766	0.007662	-0.11472	0.007

The significance F and p values should not be >0.05 because using a p-value that is more than the significance level is not statistically significant and that indicates strong evidence for the null hypothesis. This implies that we fail to reject the null hypothesis and reject the alternative hypothesis.

Table 4.6: Model Summary

<i>Regression Statistics</i>	
Multiple R	0.844665709
R Square	0.71346016
Adjusted R Square	0.709017682
Standard Error	19.77403116
Observations	132

This summary is for the data that was not differenced yet. The tables 4.3-5 were for data that was differenced which has different results from the regression analysis. The coefficient of determination in this case is very high. The Adjusted R Square is 0.709017682 meaning 70.9017682% of the stock price movements can be explained by exchange rate volatility.

Table 4.7: Analysis of Variance

ANOVA

				<i>Significance</i>	
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>F</i>
Regression	2	125592.8	62796.42	160.60	0.00
Residual	129	50440.59	391.0123		
Total	131	176033.4			

Table 4.8 Regression Coefficients

		<i>Standard</i>				
	<i>Coefficients</i>	<i>Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	89.77839695	17.36645411	-5.16964	0.00	-124.14	-55.42
FX	2.641228938	0.180054716	14.66904	0.00	2.28	3.00
12-Month	-					
Inflation	3.963579509	0.464558251	-8.53193	0.00	-4.88	-3.04

The results show that significance F and p values are all 0 which is <0.05 hence this means that the results are statistically significant and we can reject the null hypothesis. The null hypothesis states that there exists no relationship between the variables of the study hence the results are insignificant and due to coincidence hence a link in the study's variables.

Using the model $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + E_t$ for the regression analysis, it shows:

$$Y = 89.77839695 + 2.641228938X_1 + 3.963579509X_2 + E_t$$

The study results mean that holding both independent variables constant, the stock market price would be KSH 89.77839695. Therefore, a unit increase in exchange rate volatility, 12-month Inflation movement would lead to an increase in stock market price movements by 2.641228938 and 3.963579509 respectively.

CHAPTER FIVE: CONCLUSION

5.1 Introduction

This is the final chapter of the research that concludes the study by connecting the theories and research previously done to further enhance the understanding of the analysis from chapter 4. Conclusions of this paper will then be outlined and relevant recommendations will be provided. The last parts of the chapter will identify the limitations of this study and hence suggest areas where further study will be essential.

5.2 Discussions

The research first started by getting the descriptive statistics of the involved variables. The mean of the volatility of the variables was positive as expected. Mean value units for the NASI stock prices, FX (USD), and 12-Month Inflation as 0.008298443, 0.001999111 and 0.004015 respectively were established. Standard errors were relatively low hence the sample mean is more accurate. The median values were positive for both NASI stock prices and FX (USD) (0.013179782 and 0.001801521 respectively) but negative for 12-Month Inflation (-0.00613).

Standard deviation values (0.051792468, 0.017217324 and 0.145976) are relatively low hence values tend to be close to the mean. The Skewness (-0.438522566, -1.165305192 and 0.577025 respectively) and Kurtosis (The Kenya Nairobi Se All Share - Price Index has a flat distribution of 2.677388424, FX (USD) has a peaked distribution of 11.13527008 and 12-Month Inflation has a flat distribution of 0.810666) values has shown us that none of the variable possess normal distribution characteristics perfectly.

Correlation analysis had the following results: exchange rates and inflation are negatively correlated to stock prices in the Nairobi Stock Exchange. FX has a correlation coefficient of -0.1183631 to Kenya Nairobi Se All Share - Price Index which means there exists a weak and negative correlation between the two variables. 12-Month Inflation has a correlation coefficient of -0.160838448 to Kenya Nairobi Se All Share - Price Index this implies that there exists a weak and negative association between the two variables as well.

Contrary to my results (Makori, N. G. (2017).) found strong and positive relationship between Real exchange rates and NSE 20. She also found Inflation to have a negative correlation which is similar to my finding and (Mumo, M. P. (2017).) has the similar results to her. (Kithome, L. N. (2017).) found the same results of negative correlation from both exchange rates and inflation against stock prices. (Makori, Esther. N. (2017).) established that exchange rates have a negative and significant correlation and the same applies to inflation, negative but weak correlation. (Omondi, J. O. (2016).) used Pearson's partial correlation and regression analyses and revealed weak and negative associations between FX and NSE20 and NASI.

The two adjusted R Squares from the two regression analysis models explain for 2.1506704% and 70.9017682% respectively. The first model is not statistically significant hence the use of the second model that was statistically significant with p-values of 0.00. The regression analysis model finally concludes that study results mean that holding both independent variables constant, the stock market price would be KSH 89.77839695. (Omondi, J. O. (2016).) also found a statistically insignificant regression analysis finding. (Ambunya, P. L. (2012).) found that a strong relationship existed between exchange rate movement and stock market returns volatility through a spiral effect. Exchange rate volatility and volatility of other macro-economic variables have insignificant relationship of 3.755% with stock (Mburu, D. M. (2015).).

5.3 Conclusions

The Nairobi Stock Exchange has attracted researchers because of contradicting results from previous findings, some say positive relationship and some say negative relationship. The debate is still there but the more researches are done the closer we are towards a solid conclusion. This will be beneficial to the country as investors will come to understand the aspect of exchange rate risk more clearly with enough research to back up the finding. Policies will be made from these findings because the government will get enough analytical research to guide them.

This research study concludes that a negative and relatively significant relationship exists between exchange rates and stock market prices in the Nairobi Securities exchange. This study

therefore found that an inverse relationship exists implying that the variables don't move together, an increase in exchange rates could imply a decrease in stock prices. The inflation control variable also established a negative relationship with stock prices.

5.4 Recommendations

The government needs to consider improving the monetary policy by stabilizing macroeconomic factors in general especially exchange rates because they do have an impact on stock markets within the country. The stock exchange market's performance will aid in the economy's development hence it's important for the government to aid in improving the performance. Central Banks and Capital Market Authority (CMA) are other key regulators of monetary policies hence they should stabilize the exchange rates regime among other macroeconomic factors that cause significant effect on the stock exchange markets.

5.5 Limitations of the study

The study used data from 2009 to 2019 and this is a short period hence results can't be used for generalization. The short 10 years period does not capture some economic booms and recessions that could have been captured by longer duration. The data is secondary hence the quality is limited as there might be data errors which could affect results. The Somali al-Shabab militants attacks around 2013 to 2015 could have affected stock prices because of investors fleeing from security disruptions. The use of regression models means there could be presence of limitations such as erroneous and misleading outputs due to change in variables.

5.6 Areas for further research

Longer durations of data such as 30 years to model the relationship between exchange rates and stock prices should be employed to aid in emitting bias and allow for generalization purposes. This will also capture more economic shocks and give more reliable findings. Primary data should be considered in future research such as administering precise and appropriate questionnaires and interviews to get better insights on the topic of study.

The study used the USD and for the exchange rates data hence future researchers should consider using other currencies that trade in the NSE. This will show investors from different countries and continents if there's any effect on the stock prices from their respective country's currency movements hence, they can seek hedging instruments. Economic growth, political stability, management efficiency, capital gains tax and other types of variables that can affect stock prices should be considered in future research.



REFERENCES

- Agrawal, G., Srivastav, A. K., & Srivastava, A. (2010). A study of exchange rates movement and stock market volatility. *International Journal of Business and Management*, 5(12).
<https://doi.org/10.5539/ijbm.v5n12p62>
- Ambunya, P. L. (2012). *The Relationship between Exchange rate movement and stock market returns volatility at the Nairobi Securities Exchange*.
<http://erepository.uonbi.ac.ke/handle/11295/14819>
- Ar, B. S., & A, H. (2018). Exchange Rate and Stock Market Interactions: Evidence from Nigeria. *Arabian Journal of Business and Management Review*, 8(1), 1–5.
<https://www.hilarispublisher.com/open-access/exchange-rate-and-stock-market-interactions-evidence-from-nigeria.pdf>
- Aurangzeb. (2012). *Factors affecting the trade balance in Pakistan*.
https://scholar.google.com/citations?view_op=view_citation&hl=en&user=joL71McAAAJ&citation_for_view=joL71McAAAJ:k_IJM867U9cC
- Bagh, T., Azad, T., Razzaq, S., Liaqat, I., & Khan, M. A. (2017). The Impact of Exchange Rate Volatility on Stock Index: Evidence from Pakistan Stock Exchange (PSX). *International Journal of Academic Research in Accounting Finance and Management Sciences*, 7(3).
<https://doi.org/10.6007/ijarafms/v7-i3/3150>
- Chauhan, Y., Mishra, A. K., & Spahr, R. W. (2020). Stock pledging and firm risk: Evidence from India. *Financial Management*, 50(1), 261–280. <https://doi.org/10.1111/fima.12326>
- Daggash, J., & Abraham, T. (2017). Effect of Exchange Rate Returns on Equity Prices: Evidence from South Africa and Nigeria. *International Journal of Economics and Finance*, 9(11), 35. <https://doi.org/10.5539/ijef.v9n11p35>
- Das And Mukherjee. (2020). *Econometric Models and Tests of Volatility, Cointegration and Randomness in Indian Equity Indices and other Vista Countries Post Global Financial Crisis*.<https://www.indianjournals.com/ijor.aspx?target=ijor:ajrbf&volume=10&issue=4&article=001>
- Dornbusch, R., Branson, W. H., Whitman, M. V. N., Kenen, P., Houthakker, H., Hall, R. E., Lawrence, R., Perry, G., Fellner, W., Brainard, W., & Von Furstenburg, G. (1980). Exchange Rate economics: Where do we stand? *Brookings Papers on Economic Activity*, 1980(1), 143. <https://doi.org/10.2307/2534287>

- Doukas, J., Hall, P. H., & Lang, L. H. (1999). The pricing of currency risk in Japan. *Journal of Banking & Finance*, 23(1), 1–20. [https://doi.org/10.1016/s0378-4266\(98\)00112-5](https://doi.org/10.1016/s0378-4266(98)00112-5)
- Engle, R. F., & Granger, C. W. J. (1987). Co-Integration and error correction: representation, estimation, and testing. *Econometrica*, 55(2), 251. <https://doi.org/10.2307/1913236>
- Froot, K. A., & Thaler, R. H. (1990). Anomalies: foreign exchange. *The Journal of Economic Perspectives*, 4(3), 179–192. <https://doi.org/10.1257/jep.4.3.179>
- Harvey, S. K., Adjasi, C., & Agyapong, D. (2008). Effect of exchange rate volatility on the Ghana Stock Exchange. *SSRN Electronic Journal*.
https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID1534178_code1409802.pdf?abstractid=1534178&mirid=1&type=2
- Ibrahim, M. H., & Aziz, H. (2003). Macroeconomic variables and the Malaysian equity market. *Journal of Economic Studies*, 30(1), 6–27. <https://doi.org/10.1108/01443580310455241>
- Johansen, S. (1995). Likelihood-Based inference in cointegrated vector autoregressive models. In *Oxford University Press eBooks*. <https://doi.org/10.1093/0198774508.001.0001>
- Jorion, P. (1990). The Exchange-Rate exposure of U.S. multinationals. *The Journal of Business*, 63(3), 331. <https://doi.org/10.1086/296510>
- Joseph, N. L. (2002). Modelling the impacts of interest rate and exchange rate changes on UK stock returns. *Derivatives Use, Trading & Regulation*, 7(4), 306–323.
<https://research.aston.ac.uk/en/publications/modelling-the-impacts-of-interest-rate-and-exchange-rate-changes->
- K, C., MA, & Kao, G. W. (1990). ON EXCHANGE RATE CHANGES AND STOCK PRICE REACTIONS. *Journal of Business Finance & Accounting*, 17(3), 441–449.
<https://doi.org/10.1111/j.1468-5957.1990.tb01196.x>
- Kim, K. (2003). Dollar exchange rate and stock price: evidence from multivariate cointegration and error correction model. *Review of Financial Economics*, 12(3), 301–313.
[https://doi.org/10.1016/s1058-3300\(03\)00026-0](https://doi.org/10.1016/s1058-3300(03)00026-0)
- Kisaka, S. E., & Mwasaru, A. (2012). The Causal Relationship between Exchange Rates and Stock Prices in Kenya. *Research Journal of Finance and Accounting*, 3(7), 121–130.
[http://pakacademicsearch.com/pdffiles/ech/519/121130%20Vol%203,%20No%207%20\(2012\).pdf](http://pakacademicsearch.com/pdffiles/ech/519/121130%20Vol%203,%20No%207%20(2012).pdf)

- Kithome, L. N. (2017). *The relationship between foreign exchange rates and stock market returns in Nairobi Securities Exchange*.
<http://erepository.uonbi.ac.ke/handle/11295/103174>
- Koskei, L. (2017). The effect of exchange rate risk on stock returns in Kenya's listed financial institutions. *Research Journal of Finance and Accounting*, 8(3), 1–5.
<https://iiste.org/Journals/index.php/RJFA/article/download/35684/36695>
- Kwofie, C., & Ansah, R. K. (2018). A study of the effect of inflation and exchange rate on stock market returns in Ghana. *International Journal of Mathematics and Mathematical Sciences*, 2018, 1–8. <https://doi.org/10.1155/2018/7016792>
- Madura. (2018). *International Financial Management*. Google Books.
[https://books.google.com/books?hl=en&lr=&id=vkNMDwAAQBAJ&oi=fnd&pg=PR1&dq=Madura,+Jeff+\(2008\),+International+Financial+Management,+USA:+Thompson+Higher+Education&ots=xfQKfUX-0L&sig=gEvlrBmweDtPtBtx-lsYfUZZurQ](https://books.google.com/books?hl=en&lr=&id=vkNMDwAAQBAJ&oi=fnd&pg=PR1&dq=Madura,+Jeff+(2008),+International+Financial+Management,+USA:+Thompson+Higher+Education&ots=xfQKfUX-0L&sig=gEvlrBmweDtPtBtx-lsYfUZZurQ)
- Makori, E. N. (2017). *The effect of exchange rate on stock market performance in the Nairobi Securities Exchange*. <http://erepository.uonbi.ac.ke/handle/11295/102177>
- Makori, N. G. (2017). *The effect of exchange rate changes on stock market returns at the Nairobi Securities Exchange*. <http://erepository.uonbi.ac.ke/handle/11295/102147>
- Malkiel, B. G. (2003). The efficient Market hypothesis and its critics. *The Journal of Economic Perspectives*, 17(1), 59–82. <https://doi.org/10.1257/089533003321164958>
- Mburu, D. M. (2015). *Relationship between exchange rate volatility and stock market performance*. <http://erepository.uonbi.ac.ke/handle/11295/93980>
- Mishra, A. K. (2004). Stock Market and Foreign Exchange Market in India: Are they Related? *South Asia Economic Journal*, 5(2), 209–232.
<https://doi.org/10.1177/139156140400500202>
- Mlambo, C., Maredza, A., & Sibanda, K. (2013). Effects of exchange rate volatility on the stock market: A case study of South Africa. *Mediterranean Journal of Social Sciences*.
<https://doi.org/10.5901/mjss.2013.v4n14p561>
- Muigai, R. G., & Cherono, I. (2019). EFFECT OF FOREIGN EXCHANGE RATES VOLATILITY ON SHARE PRICES OF LISTED FIRMS IN KENYA. *European Journal of Economic and Financial Research*. <https://doi.org/10.46827/ejefr.v0i0.674>

- Mumo, M. P. (2017). Effects of Macroeconomic Volatility on Stock Prices in Kenya: A Cointegration Evidence from the Nairobi Securities Exchange (NSE). *International Journal of Economics and Finance*, 9(2), 1. <https://doi.org/10.5539/ijef.v9n2p1>
- Olugbenga, A. A. (2012). Exchange rate volatility and stock market behaviour: The Nigerian Experience. *Research Journal of Finance and Accounting*, 3(3), 31–39. <https://www.iiste.org/Journals/index.php/EJBM/article/view/1504>
- Omondi, J. O. (2016). *The effect of exchange rate movement on the performance of the Nairobi Securities Exchange*. <http://erepository.uonbi.ac.ke/handle/11295/98593>
- Ouma, W. N., Kenya, N., & Muriu, P. (2014). THE IMPACT OF MACROECONOMIC VARIABLES ON STOCK MARKET RETURNS IN KENYA. *International Journal of Business and Commerce*, Vol. 3, No.11: July 2014[01-31]((ISSN: 2225-2436)). <https://www.ijbcnet.com/3-11/IJBC-14-31001.pdf>
- Phylaktis, K., & Ravazzolo, F. (2005). Stock prices and exchange rate dynamics. *Journal of International Money and Finance*, 24(7), 1031–1053. <https://doi.org/10.1016/j.jimonfin.2005.08.001>
- Sims, C. A. (1980). Macroeconomics and reality. *Econometrica*, 48(1), 1. <https://doi.org/10.2307/1912017>
- Solnik, B. (1983). International Arbitrage pricing theory. *The Journal of Finance*, 38(2), 449–457. <https://doi.org/10.1111/j.1540-6261.1983.tb02251.x>

APPENDIX: DATA USED

Year	Month	KENYA NAIROB I SE ALL SHARE - PRICE INDEX	FX	12-Month Inflation	Percent differences		
2009	January	67.17	79.5439	13.22	KENYA NAIROBI SE ALL SHARE - PRICE INDEX	FX	12- Month Inflatio n
2009	February	52.82	79.6872	14.69	-21%	0%	11%
2009	March	59.49	80.4306	14.6	13%	1%	-1%
2009	April	58.86	78.6617	12.42	-1%	-2%	-15%
2009	May	59.75	78.3483	9.61	2%	0%	-23%
2009	June	70.96	77.1578	8.6	19%	-2%	-11%
2009	July	71.43	76.6067	8.44	1%	-1%	-2%
2009	August	67.79	76.2333	7.36	-5%	0%	-13%
2009	September	66.73	74.9994	6.74	-2%	-2%	-8%
2009	October	67.68	75.2389	6.62	1%	0%	-2%
2009	November	71.29	74.9072	5	5%	0%	-24%
2009	December	71.64	75.82	5.32	0%	1%	6%
2010	January	78.15	75.8856	5.95	9%	0%	12%
2010	February	79.18	76.8972	5.18	1%	1%	-13%
2010	March	84.43	77.3314	3.97	7%	1%	-23%
2010	April	90.13	77.266	3.66	7%	0%	-8%
2010	May	92.33	79.7453	3.88	2%	3%	6%
2010	June	95.1	81.9167	3.49	3%	3%	-10%
2010	July	97.74	80.2297	3.57	3%	-2%	2%
2010	August	95.93	81.0711	3.22	-2%	1%	-10%

2010	September	98.92	80.7781	3.21		3%	0%	0%
2010	October	102.36	80.7869	3.18		3%	0%	-1%
2010	November	98.01	80.9742	3.84		-4%	0%	21%
2010	December	97.82	80.7519	4.51		0%	0%	17%
2011	January	99.02	81.2722	5.42		1%	1%	20%
2011	February	96.66	82.3639	6.54		-2%	1%	21%
2011	March	89.5	82.9889	9.19		-7%	1%	41%
2011	April	94.18	83.4194	12.05		5%	1%	31%
2011	May	93.21	85.7044	12.95		-1%	3%	7%
2011	June	91.36	89.8639	14.48		-2%	5%	12%
2011	July	84.32	91.1	15.53		-8%	1%	7%
2011	August	76.15	93.6222	16.67		-10%	3%	7%
2011	September	69.38	99.8319	17.32		-9%	7%	4%
2011	October	72.71	99.7783	18.91		5%	0%	9%
2011	November	66.33	89.7208	19.72		-9%	-10%	4%
2011	December	68.03	85.0681	18.93		3%	-5%	-4%
2012	January	68.94	84.5875	18.31		1%	-1%	-3%
2012	February	72.07	82.9708	16.69		5%	-2%	-9%
2012	March	73.47	83.0556	15.61		2%	0%	-6%
2012	April	76.91	83.2164	13.06		5%	0%	-16%
2012	May	78.48	86.825	12.22		2%	4%	-6%
2012	June	80.75	84.2333	10.05		3%	-3%	-18%
2012	July	83.26	84.2125	7.74		3%	0%	-23%
2012	August	84.66	84.3208	6.09		2%	0%	-21%
2012	September	87.38	85.2833	5.32		3%	1%	-13%
2012	October	91.78	85.1775	4.14		5%	0%	-22%
2012	November	92.2	85.9347	3.25		0%	1%	-21%
2012	December	94.86	86.0286	3.2		3%	0%	-2%

2013	January	103.5	87.6111	3.67		9%	2%	15%
2013	February	106.91	86.2361	4.45		3%	-2%	21%
2013	March	117.91	85.6386	4.11		10%	-1%	-8%
2013	April	118.07	83.8208	4.14		0%	-2%	1%
2013	May	126.8	85.1236	4.05		7%	2%	-2%
2013	June	116.31	86.0075	4.91		-8%	1%	21%
2013	July	122.86	87.2797	6.03		6%	1%	23%
2013	August	119.96	87.5967	6.67		-2%	0%	11%
2013	September	127.35	86.6458	8.29		6%	-1%	24%
2013	October	133.24	85.1469	7.76		5%	-2%	-6%
2013	November	141.17	86.9931	7.36		6%	2%	-5%
2013	December	136.65	86.3097	7.15		-3%	-1%	-3%
2014	January	134.66	86.2361	7.21		-1%	0%	1%
2014	February	141.05	86.3264	6.86		5%	0%	-5%
2014	March	143.89	86.4414	6.27		2%	0%	-9%
2014	April	151.13	86.8711	6.41		5%	0%	2%
2014	May	150.2	87.7972	7.3		-1%	1%	14%
2014	June	150.37	87.6269	7.39		0%	0%	1%
2014	July	151.69	87.8042	7.67		1%	0%	4%
2014	August	157.94	88.3944	8.36		4%	1%	9%
2014	September	163.45	89.2794	6.6		3%	1%	-21%
2014	October	159.23	89.3522	6.43		-3%	0%	-3%
2014	November	163.27	90.1792	6.09		3%	1%	-5%
2014	December	162.89	90.5978	6.02		0%	0%	-1%
2015	January	165.8	91.6736	5.53		2%	1%	-8%
2015	February	175.7	91.4231	5.61		6%	0%	1%
2015	March	175.11	92.335	6.31		0%	1%	12%
2015	April	173.2	94.6	7.08		-1%	2%	12%
2015	May	162.13	97.781	6.87		-6%	3%	-3%
2015	June	164.41	98.6394	7.03		1%	1%	2%

2015	July	148.39	102.521 2	6.62	-10%	4%	-6%
2015	August	142.8	103.869 9	5.84	-4%	1%	-12%
2015	September	146.92	105.292 8	5.97	3%	1%	2%
2015	October	137.28	101.8	6.72	-7%	-3%	13%
2015	November	143.47	102.114 3	7.32	5%	0%	9%
2015	December	145.7	102.311 4	8.01	2%	0%	9%
2016	January	136.81	102.283 4	7.78	-6%	0%	-3%
2016	February	142.03	101.697 1	6.84	4%	-1%	-12%
2016	March	147.44	101.333 9	6.45	4%	0%	-6%
2016	April	146.93	101.141 3	5.27	0%	0%	-18%
2016	May	143.61	100.830 6	5	-2%	0%	-5%
2016	June	140.6	101.102 2	5.8	-2%	0%	16%
2016	July	142.39	101.388 9	6.4	1%	0%	10%
2016	August	134.94	101.358 9	6.26	-5%	0%	-2%
2016	September	136.75	101.261 7	6.34	1%	0%	1%

2016	October	137.04	101.458 6	6.47		0%	0%	2%
2016	November	136.61	101.876 9	6.68		0%	0%	3%
2016	December	133.34	102.485 8	6.35		-2%	1%	-5%
2017	January	122.23	103.955 6	6.99		-8%	1%	10%
2017	February	124.89	103.341 7	9.04		2%	-1%	29%
2017	March	130.51	103	10.28		4%	0%	14%
2017	April	133.28	103.222 2	11.48		2%	0%	12%
2017	May	148.4	103.381 1	11.7		11%	0%	2%
2017	June	152.92	103.711 7	9.21		3%	0%	-21%
2017	July	161.35	103.911 1	7.47		6%	0%	-19%
2017	August	169.16	103.143 3	8.04		5%	-1%	8%
2017	September	162.21	103.247 2	7.06		-4%	0%	-12%
2017	October	161.99	103.694 4	5.72		0%	0%	-19%
2017	November	172.92	103.253 3	4.73		7%	0%	-17%
2017	December	171.2	103.231 7	4.5		-1%	0%	-5%

2018	January	180.6	102.357 2	4.83	5%	-1%	7%
2018	February	181.77	101.616 7	4.46	1%	-1%	-8%
2018	March	191.23	100.847 2	4.18	5%	-1%	-6%
2018	April	179.53	100.361 1	3.73	-6%	0%	-11%
2018	May	172.53	101.565 8	3.95	-4%	1%	6%
2018	June	174.36	101.05	4.28	1%	-1%	8%
2018	July	170.46	100.408 3	4.35	-2%	-1%	2%
2018	August	165.92	100.648 3	4.04	-3%	0%	-7%
2018	September	149.67	100.955 6	5.7	-10%	0%	41%
2018	October	144.35	101.847 2	5.53	-4%	1%	-3%
2018	November	146.08	102.544 4	5.58	1%	1%	1%
2018	December	140.43	101.846 1	5.71	-4%	-1%	2%
2019	January	150.34	100.89	4.7	7%	-1%	-18%
2019	February	152.56	100.086 1	4.14	1%	-1%	-12%
2019	March	157.66	100.75	4.35	3%	1%	5%
2019	April	157.31	101.380 3	6.58	0%	1%	51%

2019	May	149.92	101.355 6	4.49		-5%	0%	-32%
2019	June	149.61	102.298 3	5.7		0%	1%	27%
2019	July	148.25	104.209 8	6.27		-1%	2%	10%
2019	August	147.58	103.55	5		0%	-1%	-20%
2019	September	145.46	103.885 6	3.83		-1%	0%	-23%
2019	October	159.55	103.205 9	4.95		10%	-1%	29%
2019	November	157.93	102.806 5	5.56		-1%	0%	12%
2019	December	166.41	101.336 5	5.82		5%	-1%	5%

