EFFECT OF CHANGES IN INTEREST RATES ON STOCK RETURNS AT THE NAIROBI SECURITIES EXCHANGE

BY

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE IN MASTER OF SCIENCE IN FINANCE, UNIVERSITY OF NAIROBI

NOVEMBER, 2018

DECLARATION

I confirm that this is my original work and has not been submitted for presentation at the University of Nairobi or any other institution of higher learning.

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This research project has been submitted for examination with my approval as the University supervisor.

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ACKNOWLEDGEMENT

I am highly indebted to my supervisor, Dr. Lisiolo Lishenga, moderator, Dr. K. Okiro, chairman, Dr. Mirie Mwangi and the entire faculty at the department of Finance and Accounting whose support, input, commitment and availability enabled successful completion of this project. To all the staff at the department of Finance and Accounting both at the Ambank and Lower Kabete offices as well as the Mwai Kibaki Library, I say a big THANK YOU to all of you. I also wish to record and express my sincere gratitude to my family, friends, and all researchers whose work this projected depended upon. Thanks also to the Almighty God for the good health and guidance which made this project a success.

DEDICATION

This work is dedicated to my entire family, all my lecturers and classmates for their support, encouragement, and understanding during the entire period of my study. This work is also dedicated with humility and love to Eunice. Thank you dear for encouraging me every step of the way.

To Brendon and Jayden, all I can say to you at this time is this: Any coward can tell a lie boys. Telling the truth takes courage. As you grow up, grow up to become people who have more and more courage to tell the truth quicker – even if the truth hurts, even if being honest makes you look bad. It is better to look bad telling the truth than to be a good-looking lying coward. The world is filled with good-looking cowards. But this world needs more than anything else COURAGEOUS people.

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ABSTRACT

The objective of the study was to determine how and the extent to which stock returns at the Nairobi Stock Exchange (NSE) are impacted by changes in interest rate. It also aimed at reviewing the increasing body of theoretical and empirical studies that have endeavored to examine the range of magnitude and effects of interest rates on the stock market returns at the NSE. The study employed a hybrid of descriptive and causal research design. The target population was all the listed sixty seven firms at the NSE, the sample was represented by the NSE 20 Share Index. Secondary sources of data were employed, and data was collected on; the average weighted lending rate, the inflation rates, the GDP, the exchange rates, and the NSE 20 Share Index. The unit period of analysis was quarterly, and data was collected for the period from January 2008 to December 2017. The period which comprised of 40 quarters. The study applied correlation analysis and multiple linear regression equation with the technique of estimation being Ordinary Least Squares (OLS) so as to establish the relationship of interest rates and stock market returns. The interest rates were adjusted off the effect of inflation to get real interest rates. The study found that a significant positive association exists between real interest rates and the stock market returns. A unit increase in the real interest lending rate would lead to a 0.646 increase in the stock market returns. However, when lagged effect of period t-1 of the predictor variable was introduced into the model, it did not exhibit any significant effect on the stock market returns. Thus, time lags do not significantly affect the response variable. When the control variables, GDP growth and change in the exchange rate, were introduced into the model, they also did not exhibit a significant effect on the stock market returns. Thus, the GDP growth and changes in the exchange rate do not significantly influence stock market returns. The study concluded that that real interest rates and stock market returns have a positive significant relationship. Thus, higher real interest rates lead to higher returns in the stock market. The study recommended that; the governments through its various arms can device methods of influencing and stimulating the stock market. Investment banks, stock brokerage firms, institutional investors, and individual investors, can try the strategy of investing in the stock market when they anticipate a rise in real interest rates because the returns are likely to increase during the period.

ABBREVIATIONS

CAL	- Capital Allocation Line
CAPM	- Capital Assets Pricing Model
CBK	- Central Bank of Kenya
CBR	- Central Bank Rate
CDSC	- Central depository and Settlement Corporation
CMA	- Capital Markets Authority
CML	- Capital Market Line
DDM	- Dividend Discount Model
EMH	- Efficient Markets Hypothesis
FCFE	- Free Cash Flow to Equity
FCFF	- Free Cash Flow to the Firm
IRR	- Internal Rate of Return
MPC	- Monetary Policy Committee
RIR	- Real Interest Rates
WACC	-Weighted Average Cost of Capital

CHAPTER ONE: INTRODUCTION

1.1 Study Background

Over the past years, there has been a growing activity at the Nairobi Securities Exchange (NSE). Some of the reasons fuelling this interest at the bourse are the economic growth witnessed in the country which makes the population accumulate more disposable income, increased awareness about the market because of increased education level among the population, and the reforms and modernization both administrative and legal carried out at both the exchange and the market regulator, Capital Markets Authority (CMA) which has helped boost investors' confidence on the market.

The main stakeholders at the Exchange are the borrowers (corporations and the government) and the lenders (investors), both individual and institutional. The CMA then comes in as the regulator, on behalf of the government to bring order and sanity in the market while the NSE itself provides the administration of the law. Other players in the market include the stockbrokers and the analysts.

The aggregate value of the quoted companies on the exchange fluctuate from time to time due to varying prices of the companies' shares. This value represents the wealth of the investors in the stock market and it is normally measured using an index. The market is bullish when the index is increasing and it is bearish when the index is decreasing. During a bull market the wealth of the investors increase while in a bear market the wealth decreases.

The importance of a securities market in any country cannot be gainsaid. For on the one hand a securities market offers an opportunity for the country's residents to increase their wealth and therefore improve their living standards. On the other hand it offers investors and entrepreneurs a source of capital for expanding their enterprises and pursuing their ideas. It therefore makes it easier for production to expand and therefore grow the economy. It is in the interest of any government to have a well-functioning capital market that the players will have confidence in. In Kenya the regulation of the capital market is done by the government through the Capital Markets Authority (CMA).

The activity of the securities exchange is a very important indicator of the status of the economy of any country. It is for this reason that the monetary policy makers will make their decisions with reference to the securities market and also bearing in mind the impact of those decisions on the market. Markets in the first world and middle income countries are more robust and developed in terms of both the depth and breadth compared to less developed countries.

1.1.1Interest Rates

Interest refers to the reward for advancing a loan to another party and it is usually specified in terms of a percentage of the total amount advanced. Like any commodity, rate varies and it generally follows the laws of demand and supply holding all the other factors constant. The rate of a security that would prevail if no inflation was expected over the investment period is referred to as the real interest rate while the rates actually registered in the financial market are called nominal interest rates. The market price of

most securities that are traded in the capital as well as money markets is directly influenced by the prevailing nominal interest rates.

Fisher effect refers to the link among real interest rates, inflation rate, and the nominal interest rates. The Fisher effect postulates that the nominal interest rates prevailing in the financial markets should recompense investors for the decreased purchasing power of funds invested because of inflation. Therefore, an extra premium on top of the compensation for forgoing present consumption is placed to cater for the expected rate of inflation. When an investor purchases a fixed income security, the differential between nominal interest rate and the real interest rate is caused by inflation rate. Therefore, the nominal interest rate is ideally same as the real interest rate when investors anticipate zero inflation rates. Conversely, the nominal interest rates are equal to the expected inflation rate when real interest rates are zero.

Interest rates are also affected by the term structure of a fixed income security. Term structure of interest rates assumes that all other factors affecting interest rates such as default risk and liquidity risk are disregarded except the maturity period of the security. The variations in the required interest rates by investors as the security's maturity period changes are referred to as the maturity premium. Term structure of interest rates curves can assume a variety of shapes although descriptions for the shape of the yield curve are predominantly contained in the liquidity premium, unbiased expectations, and market segmentation theorems.

1.1.2 Stock Returns

A share represents part ownership of a company that is the company is divided into small parts so that many people are able to own the same company. Publicly traded companies have the price of their share quoted on the stock market at any one time and their market capitalization, which is the product of the total number of shares and the price per share. Generally speaking the price of a share at the securities market is subject to demand and supply forces although the actions or otherwise of a company's management can influence that price. The aim of the company is to create value for shareholders (Ward, 2009). Shareholder value is represented by both capital appreciation and dividends received which in total is the shareholders' return. Since at any one point before it is declared the dividend is an expectation, it is normally reflected in the price of the share.

According to (Modigliani, 2009), the variation of the value of the portfolio as well as any income obtained from the portfolio, which is divided by the initial portfolio value is called the portfolio return during that time interval. In other words, portfolio return is as the amount that can be pulled out at the end of the period while maintaining the initial portfolio value intact.

It is assumed in this calculation that any dividend proceeds obtained from the portfolio of securities but is not distributed to the investor is reinvested in the portfolio and it is consequently reflected in the portfolio's value at the period end. The holding period in this study will be one quarter and it will be assumed that dividend income is reinvested and therefore will be reflected in the value of the portfolio at the end of the quarter.

1.1.3 Determinants of Stock Returns

Modigliani (2009) defines the return on an investor's portfolio during a particular time period as the variation of the value of the portfolio as well as any proceeds obtained from the portfolio divided by the initial portfolio value. Further, Cornnett (2009) explains that equity securities offer investors two revenue streams; capital gains if the stock price increases over time, and dividends payment to the stockholder over the holding period. In our study we are going to consider only the capital gains part of the stock return since we are assuming that the dividend income is reinvested and therefore reflected in the price of a stock in the market. The stock returns will therefore be determined by the same aspects that influence the value of a stock in the market which are both the micro and macro-economic factors.

The interest rates' term structure explains the association that exists between the yields to maturity of bonds and their maturity periods. This offers that foundation of the prevailing interest rate which is a key macroeconomic factor afecting stock returns. Efficient Market Hypothesis helps to explain how the stock market and by extension stock prices behave while Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Model (APT) explain how the return and risk of a stock are related.

1.1.4 Interest Rates and Stock Returns

Interest refers to the reward for advancing a loan to another party and it is usually specified in terms of a percentage of the total amount advanced. (Brown, 2011) defines pure interest rate as the exchange rate between future and current consumption. Like any

commodity, rate varies and it generally follow the laws of demand and supply holding all the other factors constant. The prevailing interest rate of a fixed income security with no expectation of inflation over the holding period is referred to as the real interest rate while the rates essentially observed in the financial market are called nominal interest rates. The market price of the majority of securities traded in the money and capital markets is directly impacted by the nominal rates.

Fisher effect refers to the link among real interest rates, inflation rate, and the nominal interest rates. The Fisher effect postulates that the nominal interest rates prevailing in the financial markets should recompense investors for the decreased purchasing power of funds invested because of inflation. Therefore, an extra premium on top of the compensation for forgoing present consumption is placed to cater for the expected rate of inflation. When an investor purchases a fixed income security, the differential between nominal interest rate and the real interest rate is caused by the rate of inflation. Therefore, the nominal interest rate is ideally equal to the real interest rate when investors anticipate zero inflation rate. Conversely, the nominal interest rates are equal to the expected rate of inflation when real interest rates are equal to zero.

Interest rates are also affected by the term structure of a fixed income security. Term structure of interest rates assumes that all other factors affecting interest rates such as default risk and liquidity risk are disregarded except the maturity period of the security. The variations in the required interest rates by investors as the security's maturity period changes is defined as the maturity premium. Term structure of interest rates curves can

assume a variety of shapes although descriptions for the shape of the yield curve are predominantly contained in the liquidity premium, unbiased expectations, and market segmentation theorems.

With 67 listed securities and market capitalization of more than Ksh. 2.5 trillion, the NSE provides a very important platform where investors especially local can improve their economic wellbeing if they obtain good returns from their investment. It is therefore the aim of this research to explain the factors that affect stock returns at the NSE in general and specifically to establish how changes in interest rates affect the stock returns.

1.1.5 Nairobi Securities Exchange

The Nairobi Securities Exchange (NSE) is a leading African Exchange situated in Kenya. It was founded in 1954 and it offers exposure to local as well as international investors seeking to profit from Kenya's and the African economic growth (www.nse.co.ke, n.d.). NSE received approval from the Capital Markets Authority (CMA) to operate as a demutualize entity and offer its shares to the public in 2014, becoming the first exchange in East and Central Africa to be publicly listed.

NSE provides an avenue for savings as well as investments among Kenyans. It aids local and international companies' to obtain capital that is both easily accessible and cost effective. This way the exchange plays a crucial role in the growth of the country's economy. It is the solitary exchange licensed by the CMA to promote, develop, support,

and carry on the business of a securities exchange and to discharge all the functions of a securities exchange.

NSE operates within an ecosystem consisting of other players within and outside it including the listed companies, trading participants, the Central Depository and Settlement Corporation (CDSC) as well as the regulator. CMA is an independent public agency under The National Treasury tasked with the main task of licensing, overseeing and scrutinizing the activities of the NSE, the CDSC and all other institutions licensed under the relevant legislation. It facilitates the mobilization and distribution of capital resources that help to fund long-term profitable investments, a critical role in Kenya's economy. CDSC operates a central depository system that provides central clearing, settlement, and depository services for listed securities and oversees the conduct of Central Depository Agents comprising of stockbrokers and investment banks, who in turn are affiliated to the NSE primarily as the custodians. The NSE has a 22.5% stake in the CDSC. Currently there are 23 market participants and 67 listed equity securities at the NSE.

The CMA grants approval for all public offers and listing of securities on the NSE (Reg 3 (2)). Further, under Reg 3 (2A), NSE may by way of introduction, grant the listing of a security on the Growth Enterprise Market Segment (GEMS) if that security is not on offer to the public. Listing of securities on the Exchange can be done in two methods: initial public offering (IPO) or additional listing. IPO also can include introduction or offer for sale of issued securities while additional listing include rights issue,

capitalization (bonus) issue in lieu of dividend or otherwise and scrip dividend. At the NSE, equities are listed on four segments.

1.2 Statement of the Problem

There is a growing interest among Kenyans in investing at the Nairobi Securities Exchange (NSE) as evidenced by the growth observed at the bourse since its inception in 1954. The CMA Annual report of 2016 shows that the Nairobi Securities Exchange (NSE) Initial Public Offering (IPO) of June 2014 had a subscription level of 764%. As at the end of 2017/2018 financial year, total market capitalization was 2,576.23 Billion with a total of 17,930,300 shares traded (www.nse.co.ke, n.d.). The 2018 Economic Survey Report released in April 2018 indicate that the GDP of the country in 2017 was 8,823.00 Billion (www.knbs.go.ke, n.d.). This means that that almost thirty percent of the GDP is held at the NSE underlying the importance of the NSE in the Kenyan economy. The Vision 2030 policy document has an objective of deepening financial markets by raising institutional capital through pension fund reforms and expansion of bond and equity markets.

It is therefore important that the investors at the bourse both institutional and individuals understand the dynamics of the market. This study aims to establish how the stock returns at the NSE are impacted by variations in interest rates, one of the key macroeconomic factors.

Nyamute (1998) found that the three month Treasury bill rate indeed has an impact on the performance of stock prices while Chirchir (2014) found that there existed no significant causal association between the variables. Adhiambo (2012), found that the association between interest rate and the stock returns was negative, Rotich (2016) found that the association between interest rate and the performance of firms quoted at the NSE was weak and insignificant while Simba (2016) had mixed results when NASI and NSE 20-Share index were considered.

On the international front, James (2014) found out that bank returns on stock are highly correlated with interest rate changes and Jahur (2014) found that all macroeconomic variables including interest rates posses a significant effect on the stock market performance in Bangladesh.

The local studies reviewed concerned aimed to ascertain the association between interest rate and either stock returns or share prices and the results show that so far there is no consensus on how or whether interest rate changes affect security returns at the NSE. Of the international studied reviewed, it is James (1984) who focused on the effect of changes in interest rate on stock returns concluding that bank stock returns are highly correlated with interest rate changes. It is the aim of the current research to ascertain how changes in interest rate affect stock returns at the NSE, a research that has not been covered by any of the reviewed local studies.

1.3 Objective of the Study

To establish how and the extent to which stock returns at the NSE are impacted by changes in interest rate.

1.4 Value of the Study

This study's findings will be useful to policy makers within the government and regulatory bodies especially the Central Bank of Kenya in that it will help improve the quality of financial as well as monetary decisions and therefore, economic policies in Kenya.

To the investors and citizens, this study provides an insight into the concept of interest rates and how it impacts on the share prices at the securities market. Investors need to make informed decisions putting into consideration the long term effects (and consequences) of their actions on the performance of their portfolios. It is necessary to educate potential investors and citizens so as to encourage them make efficient allocation of their resources and increase their wealth and therefore improve their standards of living.

The academicians and researchers will find that this study adds to the existing literature in this field which will be a good platform of literature review for future researchers in this field.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This section will present a review of the existing literature on the subject. Existing literature represents what is already known in the body of knowledge and a methodical review of past literature helps to makes clear the knowledge gap that will be addressed by the research prior to initiating any research study. This chapter reviews literature on how stock returns at the NSE are affected by the different economic factors.

2.1 Theoretical Framework

The adopted theoretical approach herein describes and expounds the different models and economic theorems which have been utilized by economists to describe the aspects that affect the share prices and stock returns in a market. The various economic factors are studied for their macroeconomic effects on the economy and these theorems attempt to explain what is important or necessary to improve the economy in general and the wealth of investors in particular. Exogenous theorems are founded on steady returns to accumulation, that is, preference on investments and savings impact the long-run growth rates. Neoclassical theorems on the other hand assume that the actual output is equal to the prospective output hence, it is only technology that can elucidate the variations in the economies of varied countries.

2.1.1 Term Structure of Interest Rates

The association between the yields to maturity of fixed income securities and their maturities is defined as term structure of interest rates. The term structure of interest rates

contrasts the interest rates on bonds, on the assumption that all factors influencing yield apart from maturity, are held constant (Cornnett, 2009). The general expectation is that it will be upward sloping since in general the yield to maturity of bonds increase as their time to maturity increases. Three theorems have been advanced to explain this yield curve's upward sloping shape.

Expectations theorem assumes efficient capital markets, complete absence of transaction costs and maximization of returns as the investors' sole purpose. This theorem purports that long-term rates will be higher than the short-term, hence supporting the upward sloping yield curve. The significant implication of this theorem is that investors will receive similar average expected returns on all maturity combinations given their investment horizons (Sharpe, 1981).

According to the liquidity premium theorem, investors are given higher long-term rates than the short-term rate through risk premiums, which is positively associated with maturity. The yield curve will have an upward bias owing to the extra return referred to as liquidity premium. This theorem also implies that the implicit forward rates won't' be unbiased estimates of the Market's expectations of future interest rates because they embody a liquidity premium. The liquidity premium theorem suggests from the firm's perspective that as the cost of short-term debt decreases, the business enterprise could minimize its borrowing cost by continuously refinancing its short-term obligations rather than taking on long-term debt (Sharpe, 1981).

Market segmentation theorem operates on the assumption that the fixed income securities market is separated into some segments based on their maturity and that in every segment, the yield of the securities is dependent on its maturity. The preference to each segment by the investors arises due to the need to match the maturities of assets and liabilities in order to minimize the exposure to interest rate fluctuations. This theorem assumes that the investors do not shift from segment to another and therefore only changes in the supply and demand for securities of various maturities cause the shift in yields.

Since the yield curve is upward sloping it means that borrowers interested in acquiring long term funds would borrow now because they expect that borrowing at a later date d be expensive. Alternatively, investors interested long term investors would shy away from buying long term bonds since they would expect a rise sooner or later in the yield structure.

Although the yield assumes that the market consists of just the long term and short term bonds, its implications on the interest rates will also impact the stock market as an alternative investment segment. Any investor pushed out of the debt market by unattractive interest rates will in all likelihood be attracted to the stock market which will result in bidding the prices in this market higher because of increased demand.

2.1.2 The Efficient Market Hypothesis (EMH) and Random Walk Theorem

First examined by Maurice Kendall in 1953, the efficient markets hypothesis (EMH) states that markets are efficient in that past prices cannot predict movement of stock prices and therefore technical analysis is futile. Maurice Kendall found that it was impossible to identify any patterns in stock prices movement, i.e., prices rather randomly evolved. In general, markets are described as efficient when prices swiftly respond to new information, when every successive business is transacted a price closer to the previous price, and when huge amounts of assets and securities can be brought into the market without significantly affecting the price (Block, 1990).

The efficient market hypothesis refers to the belief that all the available information is reflected in the price of shares at any given point in time. Three versions of EMH exist differing by their understanding on the implication of terminology the 'all available information".

According to the weak form hypothesis, at any one point in time, all information which could be obtained by looking at the market trading data for instance trading volume, short interest or the history of past prices is reflected in the stock prices and that trend analysis is futile. The weak form hypothesis further implies that if such data ever show reliable signals about future performance, all the existing investors would learn how to exploit the signals.

The semi-strong form hypothesis argues that all publicly available information regarding the firm's prospects. All information including critical data on the firms' product lines, in addition to past prices, quality of management, balance sheet composition, earnings forecasts, accounting practices and patents held is already reflected in the share price, according to the semi-strong form hypothesis. In other words semi-strong form hypothesis states that share prices will reflect all publicly available information.

The strong-form version of the efficient market hypothesis argues that all the information valuable to the firm, even information only dispensable to company's insiders will be reflected in stock prices. Since even company insiders are not allowed to use any information not yet made public for trading in the stock market this version of the hypothesis might be extreme.

The theorem of random walk says that the path of a series of future price changes is as unpredictable as the path of series of cumulative random numbers (Fama, 1965). It is a limiting version of weak form efficient market hypothesis.

Market efficiency is defined by the random walk model with respect to lack of dependence between subsequent price movements, the efficiency of the market with respect to information set contained in the past share price movements are independent of past movements (Keane, 1983).

EMH proponents advocate for passive investment strategy that put no effort to shine in the market because they believe that active management is unable to justify for the

incurred expenses. If the investment community agrees with this hypothesis then the number of market participants will be reduced and the market will tend towards inefficiency. The fact that there are investors who believe that the market is inefficient helps to make the market efficient because these people will always be looking for profit opportunities by researching on the companies and unearthing new information.

The concept of efficient markets is very important to investors because it boosts their confidence and attracts more funds into the market. This upsurge of investors will have the effect of bidding the price of securities high and therefore increase the returns. Therefore, in an efficient market, the stock returns will be high due to increased demand.

2.1.3 Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theorem (APT)

These describe in simple terms the association between risk and return of a security or portfolio of securities in an efficient market. Risk is measured by the variation of returns from the mean while an efficient market whereby all the available information regarding a particular stock is fully reflected in the stock prices. The Capital Asset Pricing Model (CAPM) is based on quite simplistic assumptions but the model yields a precise prediction of the association that should be observed between the risk and expected return of an asset or portfolio of assets. The model depicts the required or expected rates of return.

It is implied by CAPM that as individuals seek to capitalize on their personal portfolios in order to arrive at a standard portfolio with weights the assets being same as those of the traded securities' portfolios which is also called the market portfolio. Market portfolio has all the risk unique to individual assets diversified away meaning that it is completely diversified. The market portfolio is the tangency portfolio is the optimal capital allocation line derived by every investor as well as being on the efficient frontier. As a result the line from the risk-free rate through the market portfolio, the capital market line is also the best attainable line of capital allocation. The market portfolio will be held by all investors as their optimal risky portfolio, with the only difference being the invested amount versus the risk-free asset.

CAPM is built on the insight that an asset's contribution to the investors' overall portfolio risks determines the appropriate risk premium on that asset. Generally, CAPM shows both the required and expected rates of return on more volatile assets. This rate provides an ideal discount rate to be used in any valuation model and therefore helps an investor to value an asset. Alternatively if one has already estimated the rate of return that they think will earn on an investment, they can ascertain whether the asset is overvalued, undervalued or accurately valued by comparing this estimated rate of return implied by CAPM. This model is also useful in capital budgeting decisions in that it can be used by managers to obtain a project's cut off internal rate of return (IRR).

A risky company in systematic risk terms because of the extent to which its revenues are determined by the macroeconomic indicators outbound the management's control. The

factors that are considered in this research are all outside management's control and therefore in essence this is a research of the systematic risks on the stock returns at the NSE.

CAPM is useful to the extent that it provides several significant insights into the major factors determining share price which makes it of direct interest to decision makers within companies as well as investors. The association between systematic risks and its expected return is also explained to an extent by CAPM. The level of responsiveness of the expected return on the shares relative to the movement in market expected returns is indicated by the company's beta value. It should not be surprising, therefore that this association can be directly observed from the stock market, by examining how share returns vary as the returns in the stock market since the portfolio surrogate varies (Lumby, 1995).

The APT model goes further and postulates that a variety of factors influence the expected return of a security as opposed to single market index of the CAPM. The theorem assumes that the association between the returns on security and the factors is linear although it does not specify what these factors are.

Developed purely from arbitrage arguments arbitrage pricing theorem, proponents of this model cite as a feature that makes it more appealing the fact that it has less restrictive assumptions. However, APT model tests do not entail the "true" market portfolio though it requires empirical determination of these factors since they aren't specified by the

theorem (Modigliani, 2009). Apparently, in the APT model the market portfolio identification problems in the CAPM is replaced with the problem of selection and measurement of the underlying aspects.

2.2 Empirical Studies

This section introduces the empirical review based on both international and local studies. Various studies have been concluded by many researchers on the behavior of stock market prices.

A study by James (1984) explored the influence of changes in interest rate on the returns of common stocks of financial institutions. They examined in this paper whether the sensitivity of interest rate of common stock returns was had any relationship to the maturity composition of the company's nominal contracts holdings. The study used a sample of 67 banks from the Data Resource Incorporated (DRI) Security Price File covering the period from January 1, 1976 to November 1, 1981. The Third Order autoregressive model (AR(3)) was used to analyze the data and it was established that returns on bank stocks have a high correlation with changes in interest rates. Further, the study found that the effect of nominal interest rate on common stock prices changes was further found to be related with the maturity structure of a company's net nominal asset holding.

Jahur (2014) used secondary data sources to study the determination of stock market performance in Bangladesh. Applied descriptive statistics and linear regression were used

for data analysis and the results established that all the macro-economic variables including interest rate, exchange rate and consumer index in addition to remittances have significant impact on stock market performance. Pragmatic policy measures including sound macroeconomic policy are vital for monitoring interest rate and exchange rate movement, they concluded further.

Nyamute (1998) analyzed the association between the Nairobi Securities Exchange Index and selected major economic variables including exchange rate, inflation rate, treasury bills rate, and money supply. The objective of this was to establish whether or not the performance of the Nairobi Stock Exchange is affected by macroeconomic factors affect. This study considered as macroeconomic factors the month-on-month inflation, money supply, three month Treasury bill rate and the shilling exchange rate against the dollar. The study covered the period from January 1992 to December 1997 and used monthly data coming up with seventy two (72) data points. Using the multiple regression model he found that the macroeconomic variables considered did indeed impact on the stock prices' performance but concluded that these four variables used in the study might not be the only ones that affect the stock prices.

Adhiambo (2012) conducted a study on how selected macroeconomic variables are related to the stock market performance in Kenya. In her study the stock market performance was proxied by the NSE All Share Index (NASI) while the 91 day T-bill rate, inflation rate and the lending rate were used as the macroeconomic variables. Using monthly data spanning from March 2008 to March 2018, the study objective was to

investigate whether any relationship existed between the selected macroeconomic factors and stock market performance in Kenya. Regression model was employed to analyze the data and the findings indicated that the 91 day T-bill rate have a negative association with the NASI while between inflation rate and NASI there existed a weak positive relationship.

Chirchir (2014) conducted a research titled association between share prices and interest rates: A case study of Kenya whose objective was to explore the association between interest rate changes and stock prices. The study was conducted in Kenya using monthly data covering the period from October 2002 to September 2012. In this research the commercial banks' monthly weighted average lending rates was used as a proxy for interest rate and the NSE 20 Share index for stock prices. Data was analyzed using the Toda Yamamoto method where the results indicated that between interest rate and share price there existed no significant causal relationship. It was also established that negative causality existed in both directions.

Rotich (2016) explored the impact of selected macroeconomic variables on the financial performance of listed firms at the NSE. The study's objective was to establish the impact of selected macroeconomic variables on financial performance of firms quoted at the NSE. The variables used in this study were Consumer Price Index (CPI), GDP growth, lending interest rate, exchange rate of the Kenya shilling against the dollar and money supply while return on assets (ROA) was used as the dependent variable. This study used average yearly data covering the ten years period from 2006 to 2015. VAR Regression

model was used FOR data analysis and the study indicated the existence of a strong positive relationship between the variables together and performance of listed companies at the NSE. In addition the study affirmed that money supply, GDP and interest rate had a weak and negligible relationship with the performance of firms listed at the NSE. This indicates that interest rates taken on its own have no effect on the performance of firms and therefore share prices at the NSE.

Simba (2016) studied the effect of interest rates on security market prices in the NSE. The study objective was to investigate how interest rates affect stock market prices at the NSE. The population of this study was the monthly data for the period from June 2009 to June 2015 and all elements in this population were included in the study. The data collected in the study was regressed using monthly security prices, one year T-bills rates, monthly average lending rates, spread and monthly term deposit rates. The security market prices was proxied by both the NSE 20-Share Index as well as the NSE All Share Index (NASI). The study established that there existed a positive relationship between NASI and lending rate, Treasury bill rate and term deposit rate while there between NASI and interest rate there existed a negative relationship. Further, it was established from the study that the NSE 20-Share index had a positive relationship with term deposit rate and negative relationship with lending rate, interest rate spread and Treasury bill rate.

2.3 Conclusions from literature review

Many previous studies conducted on the impact of interest rate on share prices at the Nairobi Securities Exchange show that indeed interest rate affect the movement of prices

of shares and therefore this concept of interest rate is worth studying. The conclusions from previous studies on the subject matter are varied. Some studies have found that there is no relationship between the two variables, others have found there exists a negative relationship while yet others established a positive association. It is worth noting that these studies covered different time periods and also different data analysis methods were applied on the data collected.

Nyamute (1998) found that the three month Treasury bill rate indeed has an impact on the performance of stock prices while Chirch (2014) found that the causal relationship between the variables is not significant. Adhiambo (2012) established that the association between interest rate and the stock returns is negative, Rotich (2016) found that the relationship between interest rate and the performance of firms listed at the NSE was weak and insignificant while Simba (2016) had mixed results when NASI and NSE 20-Share index were considered.

Most investors are not conversant with the whole concept of interest rate as an economic factor that indeed affects their investments. While many people understand and appreciate interest rate as a macro- and micro-economic factor, many investors are not in apposition to exactly link the effect of this factor to their wealth accumulation process. All stakeholders including academicians, regulators and industry players agree on the importance of interest rate control in any economy and as such investors across the globe must work hard towards understanding how interest rate impact returns at the stock market.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

The research methodology that the study will adopt is discussed in this chapter. It explains the methodology that will be employed in population selection, data sampling, collection and gathering. Coding, classifying as well as analysis and reporting of the study results will also be explained under this chapter. The researcher will aim at applying techniques, tools and methods that are relevant and reliable to ensure relevance and accuracy of the data for the study.

3.1 Research design

This research will adopt explanatory as well as diagnostic approaches. The diagnostic approach depicts the link between the variables while the causal relationship between the variables will be studied using the explanatory approach (Kothari, 2004). The descriptive approach will provide the foundation to the study by clearly giving an in-depth profile and understanding on the two issues of changes in interest rate and stock returns while the explanatory approach will be adopted to estimate how and to what extent interest rates in Kenya affect stock returns at the Nairobi Securities Exchange. Since government documents and records will be used as the main sources of data, the study will adopt the archival research strategy (Saunders *et al.*, 2009).

3.2 The Sample and Population

This study's population will comprise quarterly data for the period of ten years from January 2008 to December 2017. Since historical quarterly data will be used in this study,

the entire population will be used thus implying that the size of the sample is equal to the population size. This will give forty (40) data points for each of the four variables in the study, i.e. the quarterly average return on the NSE 20-Share Index (S), the average quarterly interbank lending rate (I), the average quarterly GDP growth (P), and the average quarterly exchange rate of the Kenya shilling against the dollar (R). Ten years' figures consisting of forty (40) data points are considered to be sufficiently representative and the period from the year 2008 to 2017 is chosen because it will give the most current behavior of the market.

3.3 Data collection

Secondary data collected from Kenya National Bureau of Statistics (KNBS), the CBK, and the Nairobi Securities Exchange (NSE) will be used for the study. Secondary data is best used in such a study because we are attempting to establish an association between stock returns and interest rate change for a period of ten years based on historical data. Data will be obtained mainly from published statistics, budget, economic and financial reports. The source of the data is institutions with unquestionable reputation and integrity hence it gives us confidence on the reliability of the data.

3.4 Data analysis

The collected data will be organized, tabulated and simplified so as to make it easier to analyze, interpret and understand. The analysis of the data will then be carried out using the SPSS Version 21.0. The analysis of the data will apply percentages, measures of central tendencies and standard deviations. Further, analysis of correlation will be used to

show whether and how strongly changes in interest rate is related to stock returns while regression analysis will applied to establish the association between stock returns and interest rate changes. The quantitative reports obtained from the analysis will be presented using charts, graphs and tabulations. The model to be applied in data analysis is given below. S is the dependent variable, I, P, and R will be the independent variables where P and R will be control variables.

The model will be of the following form:

$$\mathbf{S(t) = \beta_0 + \beta_1 I(t) + \beta_2 P(t) + \beta_3 R(t) + \varepsilon} \qquad \textbf{for n=0 ……(i)}$$

$$\mathbf{S(t) = \beta_0 + \beta_1 I(t-1) + \beta_2 P(t-1) + \beta_3 R(t-1) + \varepsilon} \qquad \textbf{for n=1……(ii)}$$

Where **S(t)** = the stock return at period t as measured by the quarterly return from the NSE 20 Share index

I(t-n)= change in the average quarterly interest rate measured by the interbank lending rate at period t-n;

P(t-n) = change in the average quarterly GDP at period t-n;

R(t-n) = change in the average quarterly exchange rate of Kenya shilling to the dollar at period t-n;

$\mathbf{B_0}$, $\boldsymbol{\beta_1}$, $\boldsymbol{\beta_2}$, and $\boldsymbol{\beta_3}$ are the parameters to be estimated for each lag period

t = 0,1,2,…,39 for the 40 quarterly data covering 10 years;

n = 0 and 1 represents lag periods for the effects of the independent variables on the dependent variable where; and

ε_i the random error term representing the failure to include all possible factors in the model

The time lags (t-n) will be taken into account for the reason that from economic theorem the impact of the variables change may be felt on the stock market returns in the subsequent periods after they have occurred (i.e., they lead the stock market returns). This means that when n=0 the changes in the independent variables will impact the stock returns concurrently and when n=1 the variables will have a one quarter lead over the stock market returns. The data collected will be analyzed separately for n=0, n=1, and n=2 so then we will have separately $\boldsymbol{\beta_0}$, $\boldsymbol{\beta_1}$, $\boldsymbol{\beta_2}$, and $\boldsymbol{\beta_3}$ for each lag period.

The change in the independent variables will be measured by the quarterly increase or decrease of the particular variable, i.e. I_t, P_t and R_t for interest rate, GDP, and exchange rate respectively.

The F-Statistic for the multiple linear regression model will be computed to determine the significance of the model that is, to what extent the variation in the independent variable explains the changes in the dependent variable. The significance of individual variables on the other hand will be tested using the t-statistic. The explanatory power of the model will be tested using the R-squared statistic.

$$\mathbf{F = [SSR/ (k)] / [RSS / (n-k-1)]}$$

Where SSR = the regression sum of squares (SSR)

RSS = residual sum of squares (RSS) or the sum of squares error

Then study will assume that the general assumptions of regression analysis hold for the regression used in this study.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.0 Introduction

In this section, a presentation, interpretation and discussion of the findings are done. The chapter will be divided into four sections. It will include; descriptive statics, correlation analysis statistics, regression analysis, and the interpratation and discussion of findings. In summary, the chapter showcases data analysis, presentation, and interpretations of the study.

The study will analyze the impact of interest rates on the stock returns in isolation, and then introduce the control variables, GDP growth and change in exchange rates of the Kenya shilling to the US dollar. The study will then do the same analysis on one period lag of the independent variables. The study will be conducted for a period of forty quarters, from January 2008 to December 2017. Data will be obtained from NSE, CBK and KNBS. The variable interest rates will see the adjustment of nominal interest rates to real interest rates in the study to cater for the effect of inflation. The formula for obtaining real interest rates is illustrated below.

$$\mathbf{(1 + R) = \frac{(1 + N)}{(1 + I)}}$$

Where;

R is the real interest rate

N is the nominal interest rates

I is the rate of inflation which is mainly represented by the Consumer Price Index (CPI)

4.1 Descriptive Statistics

A descriptive study tries to explain or describe a subject frequently by establishing an outline of a collection of problems, individuals, or events, by collecting data and the tabulation of the frequencies of research variables or their relationship. It provides a range of research objectives such as; explanation of an event or characteristics linked with a subject population, approximation of extent of the population that possesses these features, and unearthing of linkages among varying variables (Ngechu, 2004). In this study, descriptive research design was selected since it will enable the generalization of the findings of the population; it will allow analysis and relation of variables.

Table 4.1: Null Lag Descriptive Statistics

	Stock Returns	**Real Interest Rates**	**GDP Growth**	**Change in Exchange Rates**
N STATISTIC	40	40	40	40
MINIMUM STATISTIC	-0.21847	-0.04727	-0.03421	-0.06964
MAXIMUM STATISTIC	0.248917	0.150333	0.276882	0.051829
MEDIAN STATISTIC	-0.00583	0.08725	-0.00205	0.003936
MEAN STATISTIC	-0.00612	0.069389	0.011355	0.005907
STANDARD DEVIATION	0.104447	0.052624	0.047859	0.019502

SKEWNESS	0.112251	-0.87173	4.588693	-0.80383
KURTOSIS	-0.01881	-0.08134	25.18021	5.671777

From the findings in Table 4.1 above, the highest value for the stock returns is 24.89% while the lowest value is -21.85%. The following measures of central tendency were exhibited; a mean of -0.61%, and a median of -0.583%. Also, the value of the standard deviation depicts variability in the stock returns of ±10.45%. The data in the series has a normal distribution because it has skewness ranging from -0.8 to +0.8, and a kurtosis within the range -3 to +3.

From the findings, the highest value for the real interest rate variable is 15.03% while the lowest value is -4.03%. The following measures of central tendency were exhibited; a mean of 6.93% and a median of 8.73%. The data in the series does not exhibit normal distribution because its skewness lies slightly out of the rage of -0.8 to +0.8, but the kurtosis lies within the range -3 to +3. In addition, the value of the standard deviation depicts variability in the variable of ±5.26.

Further results from the findings indicate that the highest value of the GDP growth variable is 27.69% while the lowest value is -3.42%. The following measures of central tendency were exhibited; a mean of 1.14%, and a median of -0.20%. In addition, the value of the standard deviation depicts variability in the GDP growth of ±4.79%. The data in the series does not exhibit a normal distribution because it has skewness that is out of the range of -0.8 to +0.8, and a kurtosis out of the range of -3 to +3.

The final results from the findings point out that the highest value of the change in exchange rate variable is 5.18%, while the lowest value is -6.96%. The following measures of central tendency were exhibited; a mean of 0.59%, and a median of 0.39%. Also, the value of the standard deviation depicts variability in the variable of ±1.95%. The data in the series does not have a normal distribution because it has skewness that lies out of the range of -0.8 to +0.8, and a kurtosis out of the range of -3 to +3.

Table 4.2: One Period Lag Descriptive Statistics

	Stock Returns	Real Interest Rates	GDP Growth	Change in Exchange Rates
N STATISTIC	40	40	40	40
MINIMUM STATISTIC	-0.21847	-0.04727	-0.03421	-0.06964
MAXIMUM STATISTIC	0.248917	0.150333	0.276882	0.051829
MIDIAN STATISTIC	-0.00583	0.086983	-0.00205	0.003936
MEAN STATISTIC	-0.00612	0.06911	0.011363	0.005349
STANDARD DEVIATION	0.104447	0.052562	0.047858	0.019958
SKEWNESS	0.112251	-0.85891	4.588675	-0.72936
KURTOSIS	-0.01881	-0.0871	25.18081	4.891045

The findings in Table 4.2, obtained from the one period lag does not vary substantially from the null lag. The results are equivalently similar.

4.2 Correlation Analysis

Correlation analysis establishes whether there exists an association between two variables lying between (-) strong negative correlation and (+) perfect positive correlation. Pearson correlation was employed to analyze the level of association between stock returns and real interest rates. The analysis was done both for the null lag and one period lag data. The study employed a Confidence Interval of 95%, as it is the most utilized in social sciences. A two tailed test was utilized.

Table 4.3: Null Lag Correlation Analysis

		StockReturns	QuartRealIntRates
StockReturns	Pearson Correlation	1	.326*
	Sig. (2-tailed)		.040
	N	40	40
QuartRealIntRates	Pearson Correlation	.326*	1
	Sig. (2-tailed)	.040	
	N	40	40

*. Correlation is significant at the 0.05 level (2-tailed).

The study findings in Table 4.3 above indicate that quarterly stock returns are significantly correlated at the 5% significance level to the quarterly real interest rates. Thus, the findings imply that there is a positive relationship between the two variables.

Table 4.4: One Period Lag Correlation Analysis

		StockReturns	QuartRealIntRates
StockReturns	Pearson Correlation	1	.252
	Sig. (2-tailed)		.116
	N	40	40

	Pearson Correlation	.252	1
QuartRealIntRates	Sig. (2-tailed)	.116	
	N	40	40

The study findings in Table 4.4 above indicate that quarterly stock returns are not significantly correlated at the 5% significance level to the quarterly real interest rates. Thus, the findings imply that there is no relationship between the two variables.

4.3 Regression Analysis

The null lag data were initially analyzed using regression model. The Stock returns variable was first regressed against real interest rate using simple linear regression since this predictor variable is the main variable of interest in the study. Then the control variables were introduced and the stock returns variable was regressed against three predictor variables; real interest rates, GDP growth, and exchange rate changes, using multiple linear regression. The logarithm function was introduced on the GDP growth and exchange rate variable change in order to linearize them because they don't have a normal distribution. The regression analysis was undertaken at 5% significance level. The critical value obtained from the F test and T test were compared with the values obtained in the analysis.

4.3.1 Null Lag Data Analysis

Regression analysis was first done for the response variable stock returns being regressed against real interest rate. The findings are indicated below.

Table 4.5: Main Predictor Variable Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.326[a]	.106	.083	.10004	2.008

a. Predictors: (Constant), Quarterly_RealInt

b. Dependent Variable: Stock_Returns

R squared, being the coefficient of determination indicates the deviations in the response variable that is as a result of changes in the predictor variables. From the outcome in Table 4.5 above, the value of R square was 0.106, a discovery that 10.6% of the deviations in stock returns caused by changes in real interest rates. Other variables not included in the model justify for 89.4% of the variations in stock returns in the NSE.

Table 4.6: Main Predictor Variable Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.045	1	.045	4.508	.040[b]
	Residual	.380	38	.010		
	Total	.425	39			

a. Dependent Variable: Stock_Returns

b. Predictors: (Constant), Quarterly_RealInt

Rule of thumb indicates that a model is significant if the p value obtained from the study findings is less than the critical value of 0.05 or the F value obtained is greater than the critical value of 2.76. The study indicates a p value of 0.04, which is below the critical value. The study also gives an F value of 4.508, which is greater than the critical value. This implies that the model is statistically significant in predicting how real interest rates affect stock returns in the NSE.

Table 4.7: Main Predictor Variable Model Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-.051	.026		-1.932	.061	-.104	.002
Quarterly_RealInt	.646	.304	.326	2.123	.040	.030	1.263

The Coefficient of the main independent variable were used as an indicator of the magnitude and direction of the relationship between the independent variable and stock returns. The p-value was used to establish the significance of the association of the independent variable to the dependent variable. A confidence interval of 95% was utilised and hence, a p-value of less than 0.05 was interpreted as a measure of statistical significance. As such, a p-value above 0.05 indicates a statistically insignificant link between the dependent and independent variables. The findings are as shown in Table 4.7 above.

From the above results, it is evident that real interest rates variable has a statistically significant positive relationship with stock returns. It has a p-value of 0.04 which is less than the critical value of 0.05. The regression equation below was thus estimated:

$$\mathbf{Y = -0.051 + 0.646X_1}$$

Where;

Y = Stock Returns

X_1 = Real Interest Rates

Regression analysis was then done for the response variable stock returns being regressed against real interest rate, GDP growth rate, and change in exchange rate.. The findings are indicated below.

Table 4.8: Inclusion of Control Variables Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.445[a]	.198	.131	.09736	1.907

a. Predictors: (Constant), LExchRate_Change, LGDP_Growth, Quarterly_RealInt

b. Dependent Variable: Stock_Returns

From the outcome in Table 4.8 above, the value of R square was 0.198, a discovery that 19.8% of the deviations in stock returns caused by changes in real interest rates, GDP growth, and changes in the exchange rate. Other variables not included in the model justify for 80.2% of the variations in stock returns in the NSE.

Table 4.9: Inclusion of Control Variables Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.084	3	.028	2.963	.045[b]
	Residual	.341	36	.009		
	Total	.425	39			

a. Dependent Variable: Stock_Returns

b. Predictors: (Constant), LExchRate_Change, LGDP_Growth, Quarterly_RealInt

The study indicates a p value of 0.045, which is less than the critical value. The study also gives an F value of 2.963, which is bigger than the critical value. This implies that the model is statistically significant in predicting how real interest rates, GDP growth, and changes in the exchange rate affect stock returns in the NSE.

Table 4.10: Inclusion of Control Variables Model Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-.027	.028		-.950	.348	-.084	.030
Quarterly_RealInt	.478	.308	.241	1.553	.129	-.146	1.102
LGDP_Growth	-.400	.331	-.183	-1.208	.235	-1.072	.272
LExchRate_Change	-1.330	.817	-.248	-1.628	.112	-2.987	.327

a. Dependent Variable: Stock_Returns

From the above results, it is evident that the predictor variables; real interest rates, GDP growth, and changes in the exchange rates do not have has a statistically significant relationship with stock returns. They have a p-value which exceeds the critical value of 0.05.

4.3.2 One Period Lag Data Analysis

Regression analysis was first done for the response variable stock returns being regressed against real interest rate. The findings are indicated below.

Table 4.11: Main Predictor Variable Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.252[a]	.064	.039	.10238	1.794

a. Predictors: (Constant), Lagged_RealIntr

b. Dependent Variable: Stock_Returns

From the findings in Table 4.11 in the previous page, the value of R square was 0.064, a discovery that 6.4% of the deviations in stock returns caused by changes in real interest

rates. Other variables not included in the model justify for 93.6% of the variations in stock returns in the NSE.

Table 4.12: Main Predictor Variable Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.027	1	.027	2.587	.116[b]
	Residual	.398	38	.010		
	Total	.425	39			

a. Dependent Variable: Stock_Returns

b. Predictors: (Constant), Lagged_RealIntr

The study indicates a p value of 0.116, which lies below the critical value. The study also gives an F value of 2.587, which exceeds the critical value. This implies that the model is not statistically significant in predicting how real interest rates affect stock returns in the NSE.

Table 4.13: Main Predictor Variable Model Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-.041	.027		-1.513	.138	-.095	.014
Lagged_RealIntr	.502	.312	.252	1.608	.116	-.130	1.133

a. Dependent Variable: Stock_Returns

From the above results, it is evident that predictor variable real interest rates does not have a statistically significant relationship with stock returns. It has a p-value of 0.116, which lies below the critical value of 0.05.

Regression analysis was then done for the response variable stock returns being regressed against real interest rate, GDP growth rate, and change in exchange rate. The findings are indicated below.

Table 4.14: Inclusion of Control Variables Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.442[a]	.195	.128	.09753	1.774

a. Predictors: (Constant), LLagged_ExchRat, LLagged_GDP, Lagged_RealIntr

b. Dependent Variable: Stock_Returns

From the outcome in Table 4.14 above, the value of R square was 0.195, a discovery that 19.5% of the deviations in stock returns caused by changes in real interest rates, GDP growth, and changes in the exchange rate. Other variables not included in the model justify for 80.5% of the variations in stock returns in the NSE.

Table 4.15: Inclusion of Control Variables Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.083	3	.028	2.910	.048[b]
	Residual	.342	36	.010		
	Total	.425	39			

a. Dependent Variable: Stock_Returns

b. Predictors: (Constant), LLagged_ExchRat, LLagged_GDP, Lagged_RealIntr

The study indicates a p value of 0.048, which is lesser than the critical value. The study also gives an F value of 2.910, which is greater than the critical value. This implies that the model is statistically significant in predicting how real interest rates, GDP growth, and changes in the exchange rate affect stock returns in the NSE.

Table 4.16: Inclusion of Control Variables Model Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-.044	.028		-1.565	.126	-.101	.013
Lagged_RealIntr	.525	.308	.264	1.703	.097	-.100	1.150
LLagged_GDP	.662	.332	.303	1.995	.054	-.011	1.335
LLagged_ExchRat	-1.118	.799	-.214	-1.399	.171	-2.739	.503

a. Dependent Variable: Stock_Returns

From the above results, it is evident that the predictor variables; real interest rates, GDP growth, and changes in the exchange rates do not have has a statistically significant relationship with stock returns. They have a p-value which exceeds the critical value of 0.05.

4.3 Interpretation and Discussion of Findings

The study sought to determine how real interest rates affect stock returns in isolation, and then how real interest rates and the introduced control variables, GDP growth and changes in exchange rate, affect the response variable in unison. This was done for data obtained for the null lag, and then consecutively, for the one period lags. The effect of each of the independent variable on the dependent variable was analyzed in terms of strength and direction.

The descriptive statistics in Tables 4.1 and 4.2 reveal that the variables; GDP growth rate, and changes in exchange rate do not have a normal distribution for both the null lag and the one period lag. Thus, a logarithmic function had to be introduced to linearize them.

The test for correlation in Table 4.3 shows that indicate that the variable stock returns is significantly correlated to the real interest rates in the null lag analysis. The findings imply that there exists a positive link between the two variables. However, the correlation of the two variables in the one period lag analysis is not significant, as exhibited in Table 4.4. This shows that the impact of the real interest rates variable is not felt on the stock market returns in the subsequent periods after they have occurred, as opined by economic theorem.

In the regression analysis, the analysis of variance in the null lag analysis where only the main variable was included, as exhibited Table 4.6, shows that the model developed is significant as evidenced by the F and P values obtained when compared to the critical values. On the other hand, the analysis of variance in the one period lag analysis where only the main variable was included, as exhibited Table 4.12, shows that the model developed is not significant. This implies that the impact of the real interest rates variable is not felt on the stock market returns in the subsequent periods after they have occurred, as opined by economic theorem.

The model coefficients in Table 4.7 developed in the null lag analysis and when only the main predictor variable is introduced, exhibits that real interest rates have a positive significant relationship to the stock returns. The model developed implies that; the constant -0.051 shows that if the predictor variable had a zero value, the dependent variable would equal to that value. The predictor variable coefficient of 0.646 shows that a unit increase in the predictor variable would lead to an increase in the response variable

by 0.646. When the control variables are introduced into the model, the model is significant as exhibited in Table 4.9, and so it can predict changes in stock returns. However, the model coefficients are not significant as showcased in Table 4.10. This implies that the control variables do not influence the response variable, stock returns. Only real interest rates can influence stock returns.

The study findings also resonates with those of the study conducted by Jahur (2014) which was to establish the determinants of stock market performance in Bangladesh. The results found that all the macro-economic variables such as consumer index, interest rate and exchange rate in addition to remittances have significant impact on the stock market performance. Thus interest rates have generally being found to affect stock market returns. The current study also aligns itself with a study conducted by Nyamute (1998) which analyzed the relationship between the Nairobi Securities Exchange Index and selected major economic variables including exchange rate, inflation rate, treasury bills rate, and money supply. His study findings were that the macroeconomic variables considered did indeed impact on the stock prices' performance. This confirms that interest rates generally have a relationship with stock market returns.

CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.0 Introduction

This section discusses the summary of the study's findings and offers conclusions and recommendations of the study on the effect of interest rates on the stock market returns. It further goes on to state the limitations of the study and provide suggestions for further research.

5.1 Summary

This study aimed at determining the effect of interest rates on the the stock market returns. The unit period of analysis was quarterly, and data was collected for the period from January 2008 to December 2017, and the period comprised of forty quarters. Secondary data was collected on; the average weighted lending rate, the inflation rates, the GDP, the exchange rates, and the NSE 20 Share Index. The study employed the use of descriptive statistics, correlation analysis, and regression analysis to establish the effect of interest rates on stock market returns.

The study established that the effect of real interest rates on stock market returns exhibits a positive significant relationship between the two variables. This was revealed in the correlation and regression analysis. The study also found out that the control variables, GDP growth and changes in the exchange rate do not have a significant effect on stock market returns. The study also established that when a time lag of t-1 is introduced, the real interest rate variable does not have a significant influence on stock market returns.

The model applied in the study showed that a unit increase in real interest rates would result in an increase in the stock returns in the NSE by a factor of 0.646.

5.2 Conclusion

From the above findings, it can be concluded that certainly, real interest rates and stock market returns have a significant relationship. Real interest rates have a significant positive relationship with stock market returns, higher real interest rates lead to higher returns in the stock market.

This study concludes that main independent variable selected for this study, interest rates, to a large extent influence stock market returns in the NSE. This is as evidenced by p value and F value in the analysis of variance table. This is without the introduction of time lags and the control variables. However, the fact that the real interest rates variable explains 10.6% of changes in stock market returns implies that the variables not included in the model explain 89.4% of changes in stock market returns. Thus, interest rates influence stock market returns at the NSE, but not to a large extent.

5.3 Recommendations

Policy recommendations are that since interest rates have been established to exhibit significant positive effect on stock market returns, the governments through its various arms can device methods of influencing the stock market. The central bank can regulate the prevailing real interest rates by setting the appropriate interest rates through the

Monetary Policy Committee (MPC) and controlling the country's inflation levels through Open Market Operations (OMO) to stimulate the stock market.

Recommendations can also be made to investment banks, stock brokerage firms, institutional investors, and individual investors, to enable them 'beat the market' and make above average market returns. They can achieve this by investing in the stock market when they anticipate a rise in real interest rates because the returns are likely to increase during the period.

5.4 Limitations of the Study

Due to time and cost limitations, the scope of the study has been limited to ten years, between 2008 and 2017. Thus, it has not been determined if the result findings would hold for a longer time period. Furthermore, it is uncertain whether similar findings would result beyond 2017. Since the study employed secondary sources of data, some of this data was not readily available, especially the stock market returns, and it took great lengths to obtain it. Some data could also not be used in its raw form, for instance real interest rates. Thus, delays were imminent as data was to be edited and processed further before the researcher could be able to compile it.

5.5 Recommendations for Further Study

On the basis of information gathered and the knowledge gained in this study, the researcher has suggested some areas for further research. First, there are many variables impacting stock market returns, apart from interest rates. Further research can be done to

identify these factors. The current study's scope was limited to ten years, further research can be done beyond ten years to ascertain if the findings would hold. Thus, future studies may use a range of many years, for instance, from 1970 to date and this can be helpful to confirm or disapprove the findings of this study. The scope of the study was also limited to the Kenyan context where the country's exchange, the NSE, was examined. Researchers in other East African, African, and other global countries can conduct the study in these jurisdictions to ascertain whether the current study findings would hold.

Secondary data was solely utilized in the study, alternative research can be employed using primary sources of data like in-depth questionnaires and structured interviews to be administered to all the stock market participants. These can then approve or disapprove the current study findings. Linear regression and correlation analysis were used in this research, further research can incorporate other analysis methods like factor analysis, cluster analysis, and discriminant analysis.

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APPENDICES

Appendix 1: Research Data

Year	Quarter	Stock Return	Quarterly Real Interest Rates	Quarterly GDP Growth	Quarterly Change in Exchange Rates
2007	Q4		0.075067	0.001644	-0.02125
2008	Q1	-0.09223	0.027567	-0.03421	-0.00757
	Q2	0.071587	-0.04103	0.004982	0.017313
	Q3	-0.19457	-0.04727	0.03892	0.050248
	Q4	-0.15768	-0.04653	-0.0103	0.029884
2009	Q1	-0.21847	-0.00477	0.276882	0.012605
	Q2	0.170779	0.038567	-0.01469	-0.02053
	Q3	-0.08918	0.063533	-0.00496	-0.01094
	Q4	0.074482	0.084867	0.001163	0.009259
2010	Q1	0.248917	0.089967	0.046208	0.010206
	Q2	0.06878	0.106933	-0.01066	0.024589
	Q3	0.07345	0.106033	-0.00367	-0.00481
	Q4	-0.04391	0.098567	0.01587	-0.00027
2011	Q1	-0.13532	0.066767	0.031201	0.011957
	Q2	0.011102	0.005033	-0.0156	0.031895
	Q3	-0.1671	-0.02237	-0.00696	0.051829
	Q4	-0.02315	-0.01273	0.009436	-0.06964
2012	Q1	0.047942	0.0361	0.032089	-0.00957
	Q2	0.101144	0.0857	-0.01641	0.006749
	Q3	0.055294	0.1364	-0.00619	0.006153

	Q4	0.042179	0.150333	0.010121	0.004314
2013	Q1	0.173992	0.136533	0.039122	-0.00127
	Q2	-0.08602	0.130433	-0.01232	0.003558
	Q3	0.046731	0.097733	-0.01095	0.003026
	Q4	0.019996	0.092333	-0.00238	0.002267
2014	Q1	0.007135	0.099333	0.044948	0.001006
	Q2	-0.0151	0.0969	-0.00753	0.006993
	Q3	0.066945	0.088267	-0.01164	0.008352
	Q4	-0.0294	0.095833	3.13E-05	0.00628
2015	Q1	0.025546	0.0995	0.042721	0.009744
	Q2	-0.06382	0.084367	-0.00554	0.031763
	Q3	-0.14097	0.1007	-0.01079	0.024311
	Q4	-0.02703	0.102267	-0.00303	-0.01007
2016	Q1	-0.00622	0.111733	0.041854	-0.0032
	Q2	-0.08902	0.127667	-0.00143	-0.00107
	Q3	-0.11213	0.1018	-0.01335	0.001288
	Q4	-0.03305	0.069867	-0.00138	0.006017
2017	Q1	-0.02923	0.045333	0.036532	0.001496
	Q2	0.16128	0.025767	-0.00173	0.002731
	Q3	0.046897	0.0613	-0.01352	-0.00168
	Q4	-0.00545	0.086233	0.00133	0.001053