THE EFFECT OF INTEREST RATES, INFLATION AND MONEY SUPPLY ON THE MARKET INDEX: A CASE OF THE NAIROBI SECURITIES EXCHANGE

BY

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DECLARATION

I declare that this project is my original work and to the best of my knowledge, has not been

published and/or presented to any University for an award of any degree.

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Miyogo Angela Moraa **Date**

Reg No. D61/67962/2011

DECLARATION BY THE SUPERVISOR

This project has been submitted for examination with my approval as University advisor

.... ……………………………

Prof. Josiah Aduda **Date**

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Despite the many support received from different quarters, I remain solely responsible for any errors and omissions in this project.

DEDICATION

I dedicate my project to my parents who had to sacrifice their meager financial resources to see

me through my basic education.

TABLE OF CONTENT

List of Tables

LIST OF FIGURES

LIST OF ABBREVIATIONS

CMA	**Capital Markets Authority**
CPI	**Consumer Price Index**
EMH	**Efficient Market Hypothesis**
GDP	**Gross Domestic Product**
MS	**Money Supply**
MS	**Money Supply**
NASI	**NSE All Share Index**
NSE	**Nairobi Securities Exchange**

ABSTRACT

The performance of a stock market of an economy is of interest to various parties including investors, capital markets, the stock exchange and government among others as it provides an avenue for raising funds, for trading in securities including futures, options and other derivatives which provide opportunities for investors to generate returns (Peansupap &Walker,2005). The relationship between the macroeconomic variables and the performance of the stock exchange has been studied by most researchers both in the developed and developing countries and most of the results have been contradicting.

The purpose of this study is to establish the effect of interest rates, inflation and money supply on the market index represented by the NSE All Share Index, using a case study of the Nairobi Securities Exchange. The objective of the research was to find out how changes in interest rates (represented by 182 Day Treasury Bill in Kenya), Inflation (represented by the CPI), Money Supply affect the Market Index (proxied by NSE All Share Index) over the period July 2010 – June 2015. The secondary data was obtained from Central Bank of Kenya and the Nairobi Secuties Exchange for the period July 2010 to June 2015. The quantitative data was analyzed using quantitative approaches; correlation analysis and Ordinary Least Squares (OLS) method. Pearson correlation analysis was used to determine the direction, strength, and significance of the relationships between interest rates, money supply and inflation on the NSE All Share Index. Ordinary Least Squares (OLS) method was aided by STATA software.

The findings confirmed that inflation, 182 day Treasury Bill, and money supply are significant determinants of NSE All Share Index in Kenya. Specifically the results showed that increased inflation and money supply increases the NSE All Share Index. The greatest effect is realized from the money supply at 169 percent followed by inflation rate at 8.42 percent while the182 Day Treasury Bill was found to reduce NSE All Share Index by 11%.

In the light of the recent significant changes in the macroeconomic landscape such as increasing inflation, interest rate and money supply that may cause shifts on the NSE All Share index over time, making the function unstable it is necessary to investigate the NSE All Share Index in the country using available annual data with some of these variables in consideration. As a result, it is necessary to investigate the NSE All Share Index in the country using available daily, weekly and annual data with some of these variables in consideration.

With reference to the above findings the research recommends that the macroeconomic variables especially inflation and money supply need to be keenly monitored and appropriate measures taken as they eventually have an impact on the stock market performance and the economy as a whole. Further, the role of microeconomic variables factors on NSE All share index and other macroeconomic variables such as GDP should be researched further.

CHAPTER ONE: INTRODUCTION

1.1 Background information

Stock markets in the world individually and collectively play a critical role in their economies. They provide an avenue for raising funds, for trading in securities including futures, options and other derivatives which provide opportunities for investors to generate returns (Peansupap &Walker,2005).The performance of a stock market of an economy is of interest to various parties including investors, capital markets, the stock exchange and government among others. Stock market performance is influenced by a number of factors key among them the activities of governments and the general performance of the economy. Economic activities do affect the performance of stock markets. Other factors that affect the stock market's performance include, availability of other investments assets, change in composition of investors, and markets sentiments among other factors (Mendelson & Robbins, 2003).

In Kenya, securities are traded at the Nairobi Securities Exchange (NSE), formerly the Nairobi Stock Exchange. Trading at the Nairobi Securities Exchange is regulated by the Capital Markets Authority (CMA). Dealing in stocks and shares started in the 1920s when the country was still under British colony. There was however no formal market, no rules and no regulations to govern stock brokerage activities. Trading took place on gentlemen's agreement in which standard commissions were charged with clients being obligated to honor their contractual agreements of making good delivery and settling relevant costs (Kithinji and Ngugi 2008). In 1951 an Estate Agent by the name of Francis Drummond established the first professional stock broker firm and other stock brokerage firms were later established. The NSE came into being in 1954 when trading used to take place over a cup of tea at the New Stanley Hotel (Muga, 1974)

1.1.1 Interest Rates

Stock exchange and interest rate are two crucial factors of economic growth of a country. The impacts of interest rate on stock exchange provide important implications for monetary policy, risk management practices, financial securities valuation and government policy towards financial markets. Interest rates act as the cost of the capital to companies. It is the price paid for the use of money for a period of time. From the point of view of a borrower, interest rate is the cost of borrowing money that is borrowing rate. From a lender's point of view, interest rate is the fee charged for lending money that is the lending rate. They are also returns on the alternative assets, such as savings accounts and treasury bills. As the cost of capital, interest rates influence the profitability and the value of the quoted companies. If a company pays a very high interest rate on its debt capital, its earnings potential will be eroded, hence investors will mark down its value (Uddin and Alam 2007).

Changes in the Central Bank Rate affect the behavior of consumers and businesses. The stock market is also affected. The value of the firm fluctuates as a result of the different expectations that people have about the company at different times. Because of those differences, they are willing to buy or sell shares at different prices. If a company is seen as cutting back on its growth spending or is making less profit either through higher debt expenses or less revenue from consumers, the estimated amount of future cash flows will drop. All else being equal, this will lower the price of the company's stock. If enough companies experience declines in their stock prices, the whole market, or the indexes that is equated with the market, will go down. If the rate of interest paid by banks to depositors increases, people switch their capital from share market to bank. This will lead to decrease in the demand for share and hence decrease in the price of share and vice versa. On the other hand, when rate of interest paid by banks to depositors increases, the

lending interest rate also increases leading to decrease in investments in the economy. Theoretically there is inverse relationship between share price and interest rate (Alam 2009).

The interest rate has a wide and varied impact upon the economy. When it is raised, the general effect is a lessening of the amount of money in circulation, which works to keep inflation low. It also makes borrowing money more expensive. This increases expenses for companies, lowering earnings somewhat for those with debt to pay. Finally, it tends to make the stock market a slightly less attractive place to investment. The swings in the stock market results in higher interest rates which make a company's potential future earnings to look less attractive, therefore, the value of the company and the stock price should be adjusted downwards. Interest rates are among the most important factors affecting the fluctuations in stock trends. The other factors are corporate earnings, business cycle trends and government policies among others. Muthike and Sakwa 2012).

1.1.2 Inflation

This is the rate at which the general level of prices for goods and services increase with the purchasing power of currency decreasing. Simply put it is a situation where too much money chases too few goods with a devaluation in currency. The inflation rate for the purpose of this study will focus on the Consumer Price Index (CPI) which is a determinant of the inflation rate. The CPI is a measure of the aggregate price level relative to a selected base year. CPI is a principle measure of price fluctuations at retail level and it shows the cost of purchasing a goods and service consumed by private household (Subhani, Osman & Gul, 2010). High levels of inflation normally depicts a bad eceonomic condition to a country. Investros will ecpect tight monetary policy by the government inorder to control inflation and firms will suffer due to high

er cost of borrowing. Incase of decreasing inflation , it depicts good economic conditions and attracts investors to invest in the stock market.

1.1.3 Money Supply (MS)

Money supply is one of the components of monetary policy for the Central Bank of Kenya. There will be either anticipated or unanticipated of money supply by the people. money supply can be divided into multiple categories such as M1, M2 and M3. This is according to the type and the size of account in which the instrument is kept. M1 is currency held by public plus demand deposit. M2 is equal to M1 plus savings and time deposits with licensed banks and held by the public. While for the M3 is equal to M2 plus deposits with restricted licensed banks and deposit taking companies and held by the public (Jess & Alfred, 2009).

The changes in the money supply will tend to affect the stock prices. Sellin (2001) argues that the money supply will affect stock prices only if the change in money supply alters expectations about future monetary policy. He argues that a positive money supply shock will lead people to anticipate tightening monetary policy in the future. If the money supply increases, it means that money demand is increasing, which, in effect, signals an increase in economic activity. Higher economic activity implies higher cash flows, which causes stock prices to rise.

1.1.4 Market Index

A stock market index is a measure of the value of a group of stocks in numerical terms. The market index gives an overall indicator of the market performance. For the purpose of this study, NSE ALL Share Index (NASI) with its base year being 1st January 2008 and a base value of 100 will be used. NSE introduced the NASI in February 2008 as a complimentary index.

NASI incorporates all listed companies irrespective of their performance and their time of listing. NASI is calculated based on market capitalization, meaning that it reflects the total value of all listed companies at the NSE. (www.nse.co.ke).

1.1.5 Relationship between Interest Rates, Inflation, Money Supply and the Market Index

Various studies have been done to establish the relationship between interest rates, money supply and inflation on the performance of stock exchange index. These studies are crucial in attracting more investors to participate in the stock markets. The relationship between interest rates, Inflation, money supply and stock exchange index has been studied and documented both in the developed and developing world. It has been found in most of the studies that there is indeed an inverse relationship between interest rates, inflation, money supply and the stock market index (Alam 2009).

Other schools of thought have contradicted the perceived notion that there exist a relationship between interest rate, money supply, inflation and stock exchange index. The studies try to demonstrate that there are other fundamental factors affecting the stock market index most importantly the efficiency of the market that result in the market self-regulating due to availability of all fundamental market information and hence no one has the upper hand nor the ability to beat the market. The hypothesis that expected stock returns move one-for-one with ex

5

ante interest rates is rejected (Zhou 1996). Spyrou (2001) also studied the relationship between inflation, interest rate and stock returns for the emerging economy of Greece and found that inflation, interest rates and stock returns are negatively related, but only up to 1995 after which the relationship became insignificant.

Gikungu (2012) studied the impact of macroeconomic variables on the performance of the NSE. He postulated that a number of macroeconomic variables such as changes in interest rate, inflation rates, and economic growth are believed to affect how stocks perform. Wambui (2009) in studying the impact of money supply and selected macro-economic variables on stock market returns at the NSE, focused on capturing both the direct impact, if any, of money supply on stock returns and the indirect impact of interest rates and GDP growth trends on stock returns at the Nairobi Securities Exchange. (Kimani and Mutuku 2013) studied inflation dynamics on the overall stock market performance at the NSE. This study relates to the above studies earlier undertaken in that it focuses particularly on the control variables: the interest rate, money supply and inflation which forms a subject of the other studies but the difference from the other studies is that the earlier studies focus on a particular variable.

1.1.4 The Nairobi Securities Exchange

The performance of the NSE is largely dependent on the institutional framework and the political environment. In Kenya the NSE is largely dependent on the general economic performance and nature of the country's economy. The economic situation is reflected by the changes in macroeconomic variables such as levels of interest rates, money supply, exchange rates, Gross Domestic Product (GDP) and inflation. There are other factors such as unemployment and general elections but this study will not focus on these two.

This paper will try and examine how the changes in interest rates, inflation, money supply and stock prices (proxied by the NASI) are related to each other in Kenya over the period January 2003 to December 2014.

1.2 Research Problem

In this new global economy, stock market has become essential by playing important role in Kenya in fostering the needed capital formation and sustaining economic growth. It acts as a facilitator between savers and users. It not only consists of transferring and gathering of funds growth because it ensures the flow of resources to the most productive investment opportunities. It is therefore becoming difficult to ignore the importance of the stock market which represents the country's economic activity.

The significant relationship between stock market index and macroeconomic variables, are highly important and has attracted concern of economists, policy makers and the investment community for a long time.

An analysis carried out by Lee (1998) found the relationship between macroeconomic variables changing gradually from a significantly negative to no relationship, or even a positive although insignificant relationship. However, Mehwish (2013) established that there is a negative relationship between real interest rate and stock market performance in Pakistan. An analysis carriedout by Aduda, Masila, and Onsongo (2012) found that there is no relationship between stock market development and Macro-economic stability.

As such only a few studies have been conducted for developing countries such as Kenya and remain largely unexplored. Further, most studies are based on stock prices of some specific counters and the NSE 20 share index which focuses on 20 blue chip companies which in most cases do not represent accurately the underlying market position.

It is on this basis that this paper contributes to this literature gap by proposing that interest rate and other macroeconomic variables such as money supply, inflation and interest rates have a significant relationship with NSE All Share Index in Kenya.

The research question is: Is there a relationship between stock prices and interest rates, money supply and inflation?

Null hypothesis

There is no significant relationship between NASI and interest rates, inflation and money supply.

Alternative hypothesis

There is a significant relationship between NASI and interest rates, inflation and money supply.

1.3 Research Objective

The objective of this research was to examine how changes in interest rates (represented by 182 Day Treasury Bill in Kenya), Inflation (represented by the CPI), Money Supply affect the Market Index (proxied by NASI) over the period July 2010 – June 2015.

The study was guided by the following specific objectives:

    i.   To examine the determinants of NASI at the NSE in Kenya

    ii. To examine the overall relationship between NSE index and the determinants of NSE index with key focus on interest rates, money supply and inflation

    iii. To give policy recommendations based on the findings of (i) and (ii) above.

1.4 Value of the Study

This study will be useful to a cross section of the population in a myriad of ways depending on the use to which they intend to put it. The information contained in this study will be an

important barometer and an indicator on the expectation of the market. Various entities will find information contained in this study to be relevant to their various needs.

This study will help investors in the stock market time their investments in line with the movement of the interest rates from time to time. Investors will be able to know the best times to channel their funds into the stock exchange in order to reap maximum benefits and the times to get out of the stock market and direct their investments into more lucrative investment avenues to avoid losses at the stock market. This is because the study will be able to demonstrate the relationship between the interest rates and the NSE index and provide empirical evidence on this relationship. This will support decision making among investors.

The study will be important to managers and directors of listed companies who will be able to make decisions which will help retain the value of their companies by helping control the amount of debt financing to increase profitability and maintain interest in the shares of the company by new and existing investors thus making the shares of the company attractive to investors. The study will also enable them make informed decisions on the timings of new listing and right issue.

The study will be significant to the government in policy making. This study will provide the government and policy makers with important information on the impact that changes in interest rates are bound to create. The interest rate regime will therefore be tailored towards making it favorable to the stock market and the economy in general hence improving the efforts to grow the economy and even encourage more companies to offer their shareholding to the public.

Scholars studying the NSE will find readily available information and data on interest rates and NSE share index alongside other useful information on the relationship between the stock market index and interest rates. This will aid in opening new frontiers in research or enhancing what has

been done in this field to provide more useful insight into the subject of the stock market. This study will therefore aid in offering original and comparative literature.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents literature review on the impact of interest rates on the NSE Index. The chapter reviews theories guiding the study of interest rates and the stock market, the chapter also reviews empirical studies relevant to the topic, general literature review and gives highlight of the chapter in summary. Books, journals and other articles that carry research work on the topic under study are reviewed.

2.2 Review of Theories

2.2.1 The Efficient Market Hypothesis (EMH)

Fama (1970) proposed three types of efficiency, strong-form, semi-strong form and weak efficiency. He asserts that the markets are informational efficient. In consequence of this, one cannot consistently achieve returns in excess of average market returns on a risk-adjusted basis, given the information available at the time the investment is made. In weak form efficiency the information set is just historical prices, which can be predicted from historical price trend thus, it is impossible to profit from it. Semi-strong form requires that all public information is reflected in prices already, such as companies' announcements or annual earnings figures. Finally, the strong-form concerns all information, including private information are incorporated in price; it states no monopolistic information can entail profits, in other words, insider trading cannot make a profit in the strong-form market efficiency world. Proponents of the hypothesis have stated that market efficiency does not mean having no uncertainty about the future, that market efficiency is a simplification which may not always hold true and that the market is practically efficient for investment purposes for most individuals.

2.2.2 Expectation Theory

The key assumptions behind this theory are that buyers of bonds do not prefer bonds of one maturity over another, so they will not hold any quantity of a bond if its expected return is less than that of another bond with a different maturity period. Bonds that have these characteristics are said to be perfect substitutes. What makes long term bonds different from short term bonds are the inflation and interest rate risks.

2.2.3 Liquidity Premium Theory

The Liquidity Premium Theory asserts that long-term interest rates not only reflect investors' assumptions about future interest rates but also include a premium for holding long-term bonds (investors prefer short term bonds to long term bonds), called the term premium or the liquidity premium. This premium compensates investors for the added risk of having their money tied up for a longer period, including the greater price uncertainty. Because of the term premium, long-term bond yields tend to be higher than short-term yields, and the yield curve slopes upward. Long term yields are also higher not just because of the liquidity premium, but also because of the risk premium added by the risk of default from holding a security over the long term. The market expectations hypothesis is combined with the liquidity premium theory.

2.3 Determinants of Stock Market Indices

Many financial theories suggest that there is a close relationship between interest rates and the share prices (NASI) and macroeconomic variable which include interest rates, money supply, forex rates and GDP. These variables have been viewed as the most important determinants of stock market behavior as they are used to describe the state of macro economy that an investor

must monitor and forecast in order to make choices regarding their investment decisions (Junkin, 2012).

2.4 Review of empirical studies

Stock market is considered as one of the most important economic indicators of a country. From the overall economic perspective, a stock market is an institution that deals in exchange of securities issued by publicly quoted companies and the government. The stock market is part of the broader market referred to as financial market (Reilly, 1997; Fabbozi 1995). Stock markets in the world individually and collectively play a critical role in the most national economies. The performance of a stock market of an economy is of interest to various parties including investors, capital markets, the stock exchange and government among others. Stock market performance is influenced by a number of factors key among them the activities of governments and the general performance of the economy (Kithinji and Ngugi 2009). Economic activities do affect the performance of stock markets. Other factors that affect the stock market performance include, availability of other investments assets, change in composition of investors, and markets sentiments among other factors (Mendelson, 1976),

The markets perform a wide range of economic and political functions while offering trading, investment, speculation, hedging, and arbitrage opportunities. In addition they serve as a mechanism for price discovery and information dissemination while providing vehicles for raising finances for companies. Stock markets are used to implement privatization programs and often play an important role in the development of emerging economies (Lee, 1998). The major role that the stock markets have played and continues to play in many economies is that they promote a culture of thrift, or saving. The very fact that institutions exist where savers can safely invest their money and in addition earn a return is an incentive to investors to consume less and

save more. The growth of related financial services sector such as unit trusts investments clubs, pension and provident fund schemes have extensively contributed towards the deepening of the stock market. It should be appreciated that in as much as an economy can have savings, there is usually lack of established mechanisms for channeling those savings into activities that create wealth. Therefore encouraging a culture of saving in less developed financial markets may first track economic growth (www.nse.co.ke).

Reduction of the search and information costs of transaction at the stock market is key to facilitating growth of the market. Search costs presents explicit costs such as money spent to advertise, the desire to sell or purchase a financial asset and implicit costs such as the value of the time spent in locating counter party. The presence of an organized stock market reduces search and information costs (Fabbozi 1995).The prices of stocks around the world do not move together in an exact manner. This is because the economic systems in which stock markets are located have dissimilar environments in terms of taxation, industrial growth, political stability and monetary policies among other factors. Stock markets may experience a general increase in price level referred to as a bull market or general decrease in price level referred to as bear market. Stagnant prices or sudden big price movements downward is referred to as stock market crash (Kithinji and Ngugi, 2009).

Among the main measures of stock market performance include; stock market indexing, market capitalization and stock turnover. Stock market indexing is one of the most widely used measures of stock performance. Investors hold portfolios of many assets but it is cumbersome to follow progress on each security in the portfolio. Thus it is prudent to observe the entire market under the notion that their portfolio moved in the same direction as the aggregate market. The market index such as the NSE index is used to observe total returns for an aggregate market and

these computed returns are to judge performance of individual portfolios. The assumption is that randomly selecting a large number of stocks from the total market should enable the investor to generate a rate of return comparable to the market (Simiyu, 1992).

Monetary policy has implications to the economy. A restrictive monetary policy reduces the supply of funds for working capital and expansion of business. Alternatively a restrictive monetary policy may lead to increased interests rates thus increasing the cost of capital which makes it more expensive for individuals to finance home mortgage and purchase of durable goods (Mendelson 1976). Inflation affects the performance of stock markets as it causes differences between real and nominal interest rates thus changing the spending and saving behavior of consumers and corporations. Unexpected changes in the rate of inflation make it difficult for firms to plan, which inhibits growth and innovations. Beyond the impact of the domestic economic, differential inflation and interest rate influence the trade balance between countries and exchange rate of currencies (Reilly, 1997).

Market capitalization is another measure of stock market performance .This measure issued to measure market movements by measuring the total value of stock in a particular stock market by aggregating the market value of the quoted stocks. Changes in market capitalization occur due to fluctuations in share prices or issuance of new share prices or issuance of new shares and bonus issues. This implies that high activity at the stock market may signal more investments in the stock markets. Market turnover indicates inflows and outflows in the stock market and is based on the actively traded shares. A change occurs due to the actively traded shares and to fluctuations in share prices or number of shares traded in a given day (Otuke 2006).

Ologunde (2006) examined the relationships between stock market capitalization rate and interest rate. Time series data obtained from Central Bank of Nigeria (CBN) and Nigeria Stock

Exchange (NSE) were analyzed using regression. Empirical results showed that the prevailing interest rate exerts positive influence on stock market capitalization rate while, Government development stock rate exerts negative influence on stock market capitalization rate and prevailing interest rate exerts negative influence on government stock rate. Arango *et al* (2002) empirically explored the relationship of the share prices on the Bogota stock market and the interest rate measured as the interbank loan interest rate in Colombia. They found some evidence of the nonlinear and inverse relationship between the share prices on the Bogotá stock market and the interest rate as measured by the inter bank loan interest rate

Hsing (2004) adopted a structural VAR model that allows the simultaneous determination of several endogenous variables such as, output, real interest rate, exchange rate, the stock market index and found that there is an inverse relationship between stock prices and interest rate. Zordan (2005) said that historical evidence illustrates that stock prices and interest rates are inversely correlated, with cycles observable well back into the 1880's. Chen *et al*, (1986) argued that stock trends should be affected by any factor that influences future cash flows or the discount rate of those cash flows of which macroeconomic factors are part. Fama (1970) and McDonald (1986) generally in their empirical studies, found a significant relationship between changes in macroeconomic variables such as gross domestic product, inflation, money supply, interest rates yield, foreign exchange rates and the stock trends.

In a past survey, Cohn and Lessard (1980) established stock prices in many industrialized countries to be negatively related to nominal interest rates and inflation. Pearce and Roley (1985) used money supply, inflation, real economic activity, and the discount rate as explanatory variables in a study that sought to examine the response of stock prices to announcements in the aforementioned time series in the USA. The empirical results from the study indicated that

surprises related to monetary policy significantly affect stock prices. The researchers also found that only limited evidence of an impact from inflation surprises, and no evidence of an impact from real activity surprises on the announcement days. Contrary to previous studies, Poitra (2004) argued that he found no significant evidence on the impact of announcements in macroeconomic fundamentals on the stock prices. This author however, further acknowledged that other academic studies (Schwert, 1981; Urich and Wachtel, 1984) had more formally analyzed the effects of announcements by employing econometric methods and typically found statistical evidence that financial markets do respond systematically to macroeconomic announcements.

Mayasami and Koh (2000) examined the long term relationships between the Singapore stock index and selected macroeconomic variables by estimating VECM. Their results reveal that Singapore stock market is significantly sensitive to the long and short term interest rates and exchange rates. Mukherjee and Naka (1995) also employed the cointegration test and VECM analysis order to figure out the relationships between the Japanese stock market and selected macroeconomic variables. According to their results, Japanese stock market is cointegrated with exchange rate, money supply, inflation rate, industrial production, long term government bond rate and the short term call money rate.Wickramasinghe (2011) extended the work of Gunasekarage *et al.* (2004) by adapting a sophisticated unit root test, including more economic variables and exploring both short term and long term causal relationship among the stock market performance and the macroeconomic variables. His results suggest that there are both short run and long causal relationship among stock prices and macroeconomic variables.

Wing et al. (2005) found out through a cointegration test that Singapore's stock prices generally display a long-run equilibrium relationship with interest rate and money supply but similar

relationship does not exist in the US market. In the examination of the impact of macroeconomic variables on the Straits Times Industrial Index (STII), Ying Wu (2001) categorized the macroeconomic indicators into money supply and interest rates. He found that money supply did not register any pattern of influences on the STII but interest rate plays a significant role in determining the STII on the monthly investment perspective.

In his work on macro-economic theory and policy, Fisher (1930) asserted that inflation leads to high nominal interest rates since investors demand compensation for a loss in the future value of money. Since stock prices are based primarily on the present value of future streams of cash flow, inflation will reduce the future value of cash flows which means that the future cash flows are worth less today. The subsequent high interest rates lead to high costs of borrowing, and thus a rise in inflation induces a decline in the stock index reflecting a decline in the stock market performance. This is explained by the fact that borrowers tend to shy from the stock market to avoid getting into a debt whose cost is very high due to high rate of interest. Although most empirical studies have found evidence in support of a negative relationship between stock prices and both expected and realized inflation, there is little consensus as to what drives it.

Various analysts (Modigliani and Cohn, 1979; Sharpe, 2002; Campbell and Vuolteenaho, 2004) however concur that the negative relationship could reflect a correlation between inflation and expected real economic growth, the use of nominal interest rates to discount real cash flows by irrational investors or a subjective inflation risk premium.

Al-Qenae *et al* (2002) in their study on the effects of stock returns, inflation and interest rate on the stock market index found out that the macro-economic factors have a negative and significant impact on stock prices. Kaul (1990) studied the relationship between expected inflation and the stock market, which, according to the proxy hypothesis of Fama (1981) should be negatively

related since expected inflation is negatively correlated with anticipated real activity, which in turn is positively related to returns on the stock market.

Instead of using the short-term interest rate as a proxy for expected inflation, Kaul (1990) explicitly models the relationship between expected inflation and stock market returns. Zhou (1996) also studied the relationship between interest rates and stock prices using regression analysis. He found that interest rates have an important impact on stock returns, especially on long horizons, but the hypothesis that expected stock returns move one-for-one with ex ante interest rates is rejected. In addition, his results show that long-term interest rate explain a major part of the variation in price-dividend ratios and suggests that the high volatility of the stock market is related tothe high volatility of long-term bond yields and may be accounted for by changing forecasts of discount rates.

Lee (1997) used three-year rolling regressions to analyze the relationship between the stock market and the short-term interest rate. He tried to forecast excess returns on the Standard and Poor 500index with the short-term interest rate, but found that the relationship is not stable over time. It gradually changes from a significantly negative to no relationship, or even a positive although insignificant relationship. Jefferis and Okeahalam (2000) worked on South Africa, Botswana and Zimbabwe stock markets, where higher interest rates are hypothesized to depress stock prices through the substitution effect (interest-bearing assets become more attractive relative to shares), an increase in the discount rate, or a depressing effect on investment and hence on expected future profits.

Harasty and Roulet (2000) worked on 17 developed countries and showed that stock prices are cointegrated with earnings and the long-term interest rate in each country (except the Italian market for which the short-term interest rate was used). Uddin and Alam (2007) examines the

linear relationship between share price and interest rate, share price and changes of interest rate, changes of share price and interest rate, and changes of share price and changes ofinterest rate on Dhaka Stock Exchange (DSE). For all of the cases, included and excluded outlier, it was found that interest rate has significant negative relationship with share price and changes of interest rate has significant negative relationship with changes of share price.Mahmudul and Gazi,(2009) found that interest rate exerts significant negative relationship with share price for markets of countries such as Australia, Bangladesh, Canada, chile, Columbia, Germany, Italy, Jamaica, Japan, Malaysia, Mexico, Philippines, South Africa, Spain and Venezuela. Humpe and Macmillan (2007) find that in both USA and Japan, stock prices are negatively correlated to long term interest rate.

Uddim & Alam, (2007) examined the efficiency of Dhaka Stock Exchange and also investigated the effect of share price and growth of share prices on interest rate and growth of interest rate. The randomness of stock return is the basic assumption of Efficient Market Hypothesis that is violated for Dhaka Stock Exchange means the market is not efficient in weak form. The theoretical argument of negative relationship between stock price and prevailing interest rate is not rejected. (Wongbangpo and Sharma 2002) examined the effects of long term interest rates on stock prices in five Asian countries. A negative long-term linkage between stock price and interest rate was observed in the Philippines, Singapore and Thailand. However, a positive relation was detected in Indonesia and Malaysia (Maysami *et al*2004). Akpan (2012) determined significant macroeconomic variables that affect industrial/equities stock, government stocks and the total stock transaction in the Nigerian stock exchange market. Time series data were used in the study that covered the period 1970 to 2010. Unit root test (Augmented Dicker Fuller test) was conducted on the data to ascertain their stationarity. The result reveals that some variables

were stationary at level and some were not. This invalidates the use of co-integration and error correction models and implies that only static relationship could be established among the specified variables.

(Pallegadara, 2012) explored the dynamic relationship between the all share price index (ASPI) as a measure of performance of the Colombo Stock Exchange (CSE) in Sri Lanka and Sri Lanka interbank offer rate (SLIBOR) as a measureof prevailing interest rate decided by central bank of Sri Lanka using daily time series data. The results of the Johansen cointegration test indicated that there is a long run cointegration movement between stock market performance and short term interest rate and that there is negative long run relationship between stock market returns and short term interest rate which is consistent with theoretical prediction. However, results of the Granger causality test indicate there are no short run causal relationship between stock market returns and interest rate. In addition, IRF analysis reveals that permanent negative impact on stock market performance is as a result of a shock to the short term interest rate.

Tweneboah (2008) find the relationship between stock prices and interest rates to be negative and statistically significant on Ghana stock market. Coleman and Tettey, (2008) examines how macroeconomic indicators affect the performance of the stock market by using the Ghana Stock Exchange as a case study. Cointegration and the error correction model technique were employed to ascertain both short and long run relationship. Finding of the study reveals that lending rates from deposit money banks have an adverse effect on stock market performance and particularly serve as major hindrance to business growth in Ghana.

Anokye and Tweneboah (2008) examined the role of macroeconomic variables on stock returns movement in Ghana. They analyze both long run and short run relationships between the stock

market index and some macroeconomic variables using Johansen's multivariate cointegration test and innovation accounting technique.

They established that there is cointegration between macroeconomic variables identified and stock prices in Ghana indicating long-term relationship. Result of Impulse Response Function (IRF) AND Forecast Error Variance Decomposition (FEVD) indicate that interest rate and Foreign Direct Investment (FDI) are the key determinants of share price movement in Ghana. Kuwornu and OwusuNantwi, (2011) arrive at different conclusions by examining the relationship between macroeconomic variables and stock market returns. The Ordinary Least Square Estimation (OLS) model in the context of Box Jenkins time series methodology was used in establishing the relationship between macroeconomic variables and stock market returns. Empirical findings reveal that there is significant relationship between stock market returns and the consumer price index. On the other hand, crude oil prices, exchange rate and treasury bills rate do not appear to have any significant effect on the stock return.

Both Coleman and Tettey (2008) and Anokye and Tweneboah (2008) conclude that interest rates used as proxy of treasury bills have significant effect and cointegrated with stock market return but Kuwornu and OwusuNantwi (2011) findings reveals that treasury bills rate have no significant effect on the stock returns. The conflicting results may be due to analytical tools used or the methodology design.Both Coleman and Tettey, (2008)and Anokye and Tweneboah (2008) used cointegration test and vector error model (VECM) analytical tool in arriving at their conclusion whileKuwornu and OwusuNantwi,(2011) used the Ordinary Least Square Estimation (OLS) model The Ordinary Least Square Estimation (OLS) model in the context of Box Jenkins time series methodology was used in establishing the relationship between macroeconomic variables and stock market returns.

Amadi, Oneyema and Odubo (2000) employed multiple regression to estimate the functional relationship between money supply, inflation, interest rate, exchange rate and stock prices. Their study revealed that the relationship between stock prices and the macroeconomic variables are consistent with theoretical postulation and empirical findings in some countries. Though, they found that the relationship between stock prices and inflation does not agree with some other works done outside Nigeria.Ologunde, Elumilade and Asaolu (2006), examined the relationships between stock market capitalization rate and interest rate. They found that prevailing interest rate exerts positive influence on stock market capitalization. They also found that government development stock rate exerts negative influence on stock market capitalization rate and prevailing interest rate exerts negative influence on government development stock rate.

Their findings seem to take interest rate as the lending rate. If deposit rate increases, theoretically, investors will switch their capital from share market to banks.

Using the arbitrage pricing theory (APT) on Japanese Stock returns and several macroeconomic variables like industrial production, money supply crude oil price, short term interest rates, Elton and Gruber (1988) discovered that there existed a positive relationship between stock prices and short-term interest rates. Chen et al (1989) examined the effect of discount rate changes on the volatility of stock prices and on trading volume. They found out that at unexpected discount rate changes contributed to higher, though short-lived, volatility and trading volume.Pearce and Roley (1985) used money supply, inflation, real economic activity, and the discount rate asexplanatory variables in a study that sought to examine the response of stock prices to announcements in the aforementioned time series in the USA. The empirical results from the study indicated that surprises related to monetary policy significantly affect stock prices. The researchers also found that only limited evidence of an impact from inflation surprises, and no

evidence of an impact from real activity surprises on the announcement days. However, there seemed to be only weak evidence of stock price responses to surprises beyond the announcement day. In a separate study, Wahid et al (2011) attempted to formulate the relationship between stock prices versus inflation levels. The outcome from their empirical work revealed that the level of inflation affects share price index both in the short run and long run.

In conclusion the interest rates are determined by monetary policy of a country according to its economic situation. Changes in interest rates influence a company's stock and shares and thus the stock returns. High interest rates will prevent capital outflow, hinder economic growth and consequently hurt the economy as interest rates is one of the most important factors directly affecting growth of the economy. Lower interest rates increase stock prices which intern reduce the probability of financial distress. The rational for the relationship between interest rates and stock return is that stock prices and interest rates are said to be negatively correlated French *et al* (1987).

Higher interest rates resulting from contractionary monetary policy usually negatively affect stock market returns because higher interest rates reduce the value of equity and makes fixed income securities more attractive as an alternative to holding stock. This reduces the tendency of investors to borrow and invest in stock and raise the cost of doing business and hence affect profit margins. On the contrary lower interest rates resulting from expansionary monetary policy boosts stock market (Fama, 1981; Roll, 1983). The stock market constitutes the most important financial institution for massive capital formation geared towards economic development. Factors such as market capitalization rate, government stock rate, exchange rate, money supply, rate of interest charges on financial instruments among others exerts some impact on the development and growth of the economy.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology of the study and it comprises of Research Design, Population, data collection and data analysis. This chapter addresses the actual methodologies that were used in the research process from its time of inception to the end. The role of secondary data in the process of addressing the various research questions will be addressed and the manner in which data will be collected and later analyzed to reach a reliable conclusion will be discussed. The chapter also illustrates how this data will be analyzed giving details of any models or programmes that will be used and why they will be applied.

3.2 Research Design

Robson (1993) posits that research design begins with selection of the topic and a paradigm. The topic of the study is to investigate the effect of interest rates, money supply and inflation on the NASI.

According to Philips (1987) and Creswell (1994) a study can follow a qualitative and/or a quantitative paradigm. The quantitative paradigm is termed as the traditional, positivist, experimental, or empiricist paradigm. It is based on the empiricist tradition (Schiffman and Kanuk, 2009; Smith, 1983). In contrast, the qualitative paradigm is termed as the constructivist, naturalistic, interpretative, post- positivist, experiential or post-modern perspective (Schiffman and Kanuk, 2009; Smith, 1983).

The present study will follow the quantitative paradigm. This study will utilize a quantitative paradigm to investigate the effect of interest rates on the NASI at the NSE, Kenya. A correlational research design is proposed for this study to establish effect of various factors

including interest rates, money supply and inflation on the NASI at the NSE, Kenya. This is because it allows for analysis of covariant data to determine a pre-existing relationship and researcher makes no attempt to manipulate an independent variable. This research technique is used to relate two or more variables and allow predictions of outcomes based on causative relationships between the variables (Zeitun and Tian, 2007; Ebaid, 2009).variables.

3.6 Data Collection

3.6.1 Sources of Data

The study employed secondary data on the selected major firms listed on the NSE over a period of twelve years (July 2010 to June 2015). Other sources of data included audited published financial statements of the selected firms listed on the NSE as well as from the NSE Hand Books) which are readily available at the NSE and the Capital Markets Authority (CMA) libraries.

Table 1: Variable Explanation

Variables	Symbol	Explanation	Units
NSE All Share Index	NASI	Composite NSE All Share Index in Kenya Index	
Interest Rate	IR	Fixed annual deposit rate in Kenya	Percent (%)
Money Supply	MS	Money circulation in Kenya's market in (Kshs) million	
Inflation	I	Inflation in Kenya (CPI)	Index number

3.6.2 Data Collection Procedure

Data was collected from secondary sources mainly, which included but not limited to published financial statements of the selected firms over the period of analysis, Government published figures from the Central bank of Kenya, Kenya National Bureau of Statistics, Other Government Publications on the subject and other international bodies published documents such as IMF, World Bank databases among others.

3.6.3 Reliability Test for Data Collection instrument

Reliability refers to the extent to which an experiment, test, or any measuring procedure yields the same results on repeated trials. Secondary data reliability was done by examining the internal consistency and using three steps in evaluating secondary data proposed by Saunders et al., 2007. First, by assessing the overall suitability of the data in meeting research objectives, secondly, by checking whether the data generates the measures required in this study, and finally the credibility of the source in terms of how the data was collected, by whom, and what checks are there for validity and reliability.

3.7 Data Analysis

Quantitative data was analyzed using quantitative approaches notably descriptive statistics and correlation analysis. Pearson correlation analysis was used to determine the direction, strength, and significance of the bi-variate relationships between interest, money supply and inflation rates/determinants and NASI.

Panel methodology was used aided by STATA software. Panel data will be developed and used for the study as it increases efficiency by combining time series and cross-section data. Panel data involves the pooling observations on a cross section of units over several time periods. Furthermore, panel data facilitates identification effects that cannot be detected using purely cross-section or time series data. The analyzed data will be presented using figures, tables and graphs.

3.8 Model Specification

To reveal the effect of interest rates, money supply and interest rates on the NASI, the estimation procedure used by Jess & Alfred, (2009) is adopted and modified as:

$$Y_{it} = \alpha_i + \beta_i X_{it} + \varepsilon_{it} \qquad \textbf{(i)}$$

Where,

Y_{it} is NASI (Dependent Variable)

α_i = refers to time-invariant firm-specific effects.

β_i = Coefficients

X_{it} = are independent variables

ε_{it} = is a random disturbance

Based on the above general model the effect of interest rates, money supply and inflation on the NASI will be evaluated using the multiple linear regression model outlined below:

$$LogNSEIi_t = \beta_0 + \beta_1 LogIR\ i_t + \beta_2 LogMSi_t + \beta_3 LogINFi_t + \varepsilon_{it}$$

That is, NASI= f (Interest Rate, Money Supply, Inflation)

Where,

Log NASI = Natural logarithm of NASI at t year

LogIR = Natural logarithm of annual Interest Rates (182 Day Treasury Bill)

LogMS = Natural logarithm of money supply measured as average yearly monetary base (M3) the sum of currency in circulation,and reserve balances (deposits held by banks and other depository institutions in their accounts at the Central Bank)

LogINF = Natural logarithm of Inflation of Kenya at t year measured as average annual consumer price Index

ε_{it} –-Normally distributed error term

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

In this chapter, the results of the empirical analysis based on the econometric framework in Chapter Three are reported. This is done using STATA Econometric software. All the relevant variables were used in building the regression equation for determining the effect of Interest Rates (182 Day Treasury bill), Inflation and Money Supply on the Market Index (NASI) in Kenya. Before we look at the time series issues, we start with the descriptive statistics and also look at the various relationships between the variables (correlation matrix)

4.2 Descriptive Statistics

The table below displays the summary statistics of the variables of interest over the period of analysis (July 2010-June 2015) in Kenya. This totals to 60 time periods/observations.

Table 2: Summary Statistics

Variable	NASI	INF	M3	IR	M3GROWTH
Mean	114.89	8.24	1775000	9.54	1.27
Std. Dev.	33.67	4.68	392568.7	4.30	0.98
Minimum	66.34	3.18	1200000	1.72	-1.58
Maximum	175.7	19.72	2600000	20.69	3.29
No. of Observations	60	60	60	60	60

NASI- Composite NSE All Share Index in Kenya; **INF**-Monthly average inflation rate, **M3**-Money supply measured as average monthly monetary base (M3); **IR**- Monthly Interest Rates (182 Day Treasury Bill); **M3 GROWTH**-Growth of money supply measured as average monthly monetary base.

4.2: Monthly NSE All Share Index, Inflation, Money Supply, 182 Day Treasury bill Interest Rates and Money in Kenya from July 2010 to June 2015

Figure 0-1 Inflation, 182 Day treasury Bill Rates and Growth of Money Supply in Kenya
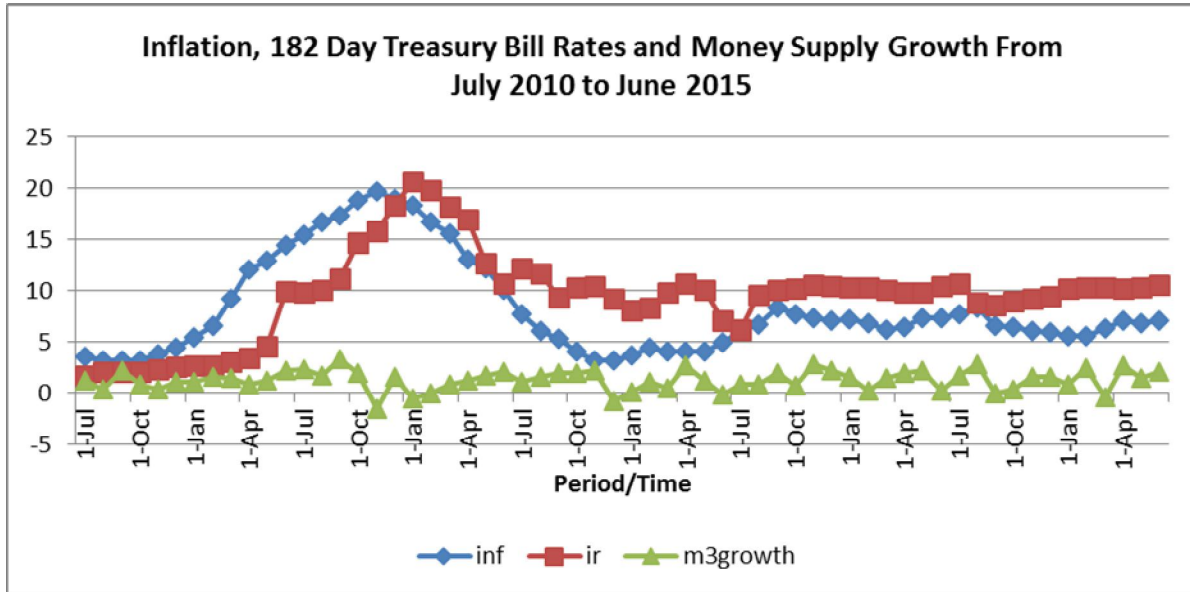
Figure 0-2: NSE All Share Index (NASI) in Kenya from July 2010 to June 2015
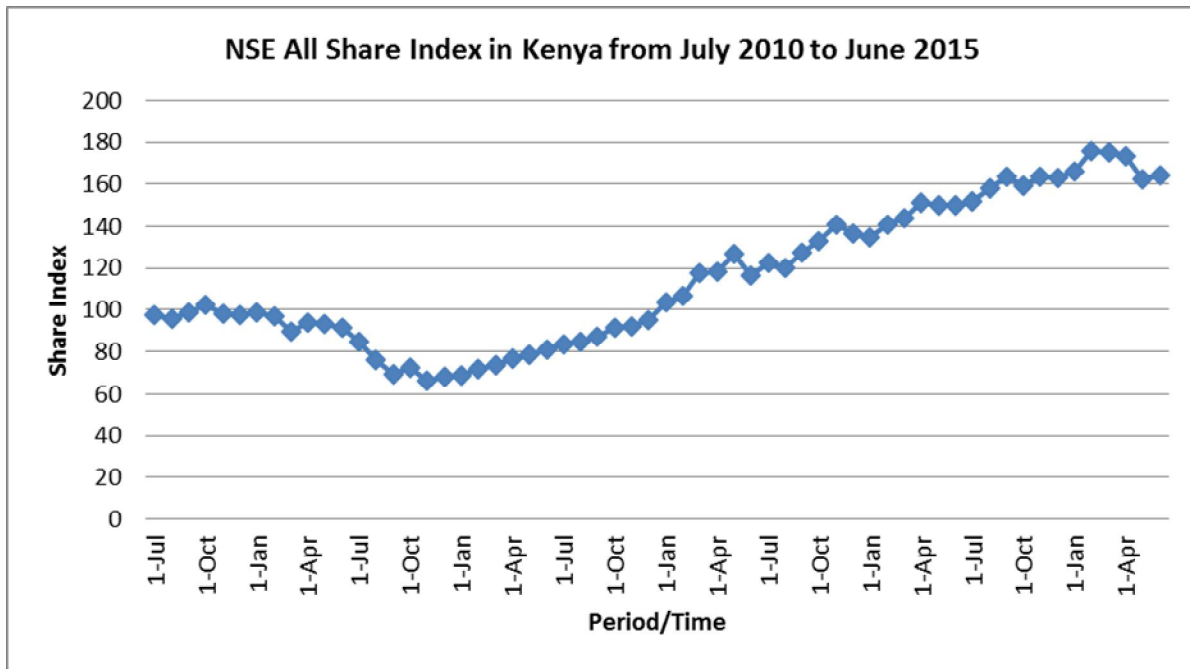
Figure 0-3: Money Supply in Kenya from July 2010 to June 2015
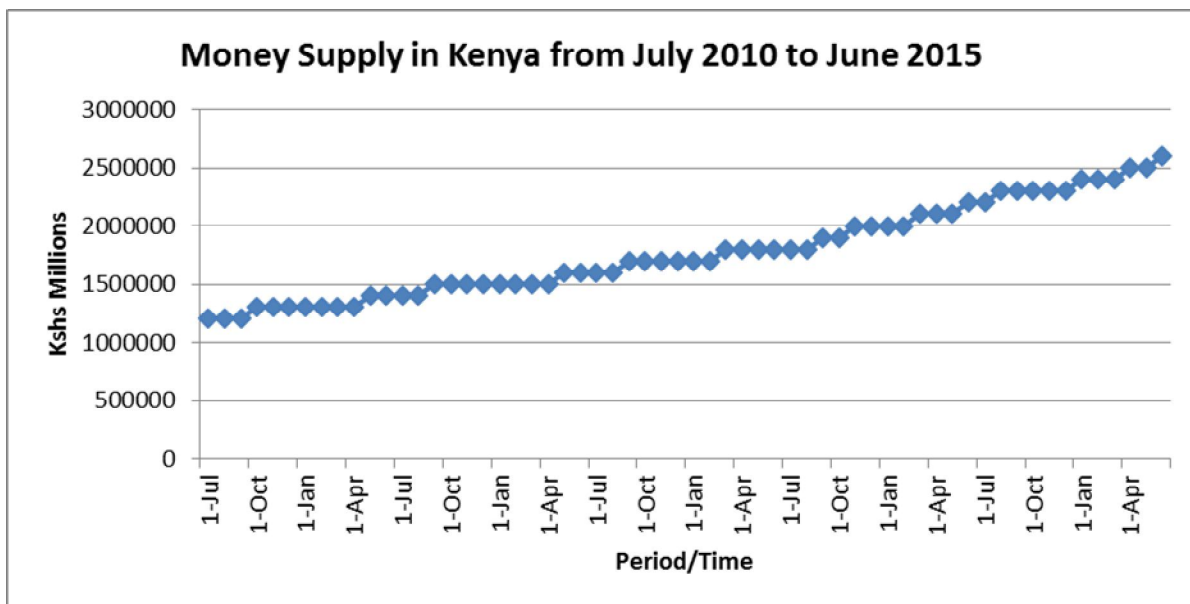
From the Summary Statistics table (Table 1) and graphs in this section, figures 0-1, 0-2, and 0-3, we find that most of the variables of interest have not been stable over the period but rather fluctuating. This is true for Inflation, 182 Day Treasury bill Rates and Growth of Money Supply

in Kenya save for NSE All Share Index (NASI) which increased steadily from November 2011 to February 2015 and Money Supply in Kenya with a mean of 1,775,000. Specifically, the highest inflation rate experienced in the country over the period is 19.72% (November 2011) with the least being 3.18% in December 2012. From the average inflation value during the period (8.24%), the target of 5% has not been realized. On the 182 Day treasury Bill, the mean over the period is 9.54 with the highest value being 20.69 and the lowest 1.72. Additionally, the mean value of money supply over the period was 1,775,000 implying a mean growth in Money supply over the period of 1.27%.

4.3 Correlation Matrix

To establish the level and direction of correlation among the variables of interest, below is the Correlations Matrix. This matrix attempts to provide insights on the hypothesis tests that the study intended to test.

Table 3: Correlation Matrix

Variable	NASI	INF	M3	IR	M3GROWTH
NASI	1.000				
INF	-0.500 ***	1.000			
M3	0.894 ***	-0.268 **	1.000		
IR	-0.148	0.622***	0.235*	1.000	
M3GROWTH	0.115	-0.004	0.122	-0.649	1.000

N.B: ***, **, * Indicate significance at the 1, 5 and 10 per cent levels, respectively. **NASI**- Composite NSE All Share Index in Kenya; **INF**-Monthly average inflation rate, **M3**- Money supply measured as average monthly monetary base (M3); **IR**- Monthly Interest Rates (182 Day

Treasury Bill); **M3 GROWTH**-Growth of money supply measured as average monthly monetary base.

From the above table of matrix, it can be observed that there is positive and significant relationship between NSE All Share Index (NASI) and Money supply measured as average monthly monetary base (M3). This is also true for the relationship between Inflation (INF) and 182 Day Treasury bill Interest Rates (IR). Similarly, there exists a positive and a significant relationship between 182 Day Treasury bill Interest Rates (IR) and Money Supply (M3). On the other hand, NSE All Share Index (NASI) has a significant negative relationship with Inflation (INF). This is also true for the relationship between Money Supply (M3) and Inflation. The negative relationship between NSE All Share Index and 182 Day Treasury bill Interest Rates is not significant. Similarly, growth of money supply and NSE All Share Index (NASI) has insignificant positive relationship.

4.4 Estimation

The study employs a time-series data analysis approach in order to find out the effect of inflation, money supply, growth of money supply and the monthly Interest Rates (182 Day Treasury Bill) on NSE All Share Index in Kenya using the equation specified in chapter three for the period between July 2010 and June 2015 (monthly data, totaling to 60 periods). The choice of this period is motivated by availability of reliable and comprehensive data and to meet the minimum sample requirement for a time series data n=30.

4.4.1 Unit Root Test and Order of integration Results

Before empirical estimations were conducted, the data series were subjected to unit root tests to establish their stationarity conditions i.e. their orders of integration. This was done for the logs of **NASI**- Composite NSE All Share Index in Kenya; **INF**-Monthly average inflation rate, **M3**-

34

Money supply measured as average monthly monetary base (M3); **IR**- Monthly Interest Rates (182 Day Treasury Bill); **M3 GROWTH**-Growth of money supply measured as average monthly monetary base. Where a series is found to be non-stationary at levels, it is differenced until it is stationary to avoid using non-stationary data in estimations which yields to non-sensible or spurious regression results. In time series data, there are two common methodologies for testing for unit roots; Augmented Dickey-Fuller (ADF) test and Phillips-Perron test. In this study, we use both Augmented Dickey-Fuller (ADF) test and Phillips-Perron test methodologies.

These tests form the preamble to the econometric analysis of long-run equilibrium proposed by economic theory. A stochastic process is said to be stationary if its mean and variance are constant over time and the value of the covariance between the two time periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed (Gujarati, 2007).

We also determine the order of integration of different variables by first differencing the change in various variables on a one month lag of the variable and the error term. This is done based on three main regressions: Augmented Dickey Fuller and Phillips-Perron tests and finally first difference when the variable turns out to be non-stationary. This outcome is presented in table 3 below.

Table 4: Unit Root Test Results

Variable Name	Augmented Dickey-Fuller Unit root test	Phillips Perron Unit root	Conclusion
Log of NASI	-1.184 (0.680)	0.491 (0.985)	I(0)
Log of INF	-11.951 *** (0.000)	-16.914 ***(0.000)	I(1)
Log of M3	1.833 (0.998)	2.984 (1.000)	I(0)
Log of IR	-31.844*** (0.000)	-31.468*** (0.000)	I(1)
Log of M3Growth	-7.201 *** (0.000)	-7.224 *** (0.000)	I(1)

*N.B: Statistics shown on the first row of each respective variable are the estimated t-statistics while those in parentheses are their respective p-values. *, **, *** represent significance at 10%, 5% and 1% respectively*

The results indicate that log of NSE All Share Index (NASI) and log of money supply (**M3)** are integrated of order zero i.e. are stationary at levels while log of inflation **(INF),** log of 182 Day Treasury Bill **(IR)** and log of growth of money supply **(M3)** are integrated of order one i.e. are stationary after first difference. As the results show, our dependent variable (NSE All Share Index, log NASI) has a no unit root, hence no need to test for cointegration.

4.5 Regression Results

We present our regression results in OLS long-run results. The results are as below:

Table 5: OLS Long-run Results Discussion

Variable	Robust Coefficient	t-statistic	Probability
Constant	2329.77	-15.18	0.000
Log of D_INF	8.42	3.61	0.001
Log of M3	169.87	16.06	0.000
Log of D_IR	-11.23	-4.57	0.000
Log of D_M3Growth	-0.33	-0.22	0.830

Adjusted R-Squared	0.956
F-statistic and Probability	156.65 (0.000)
Durbin-Watson static	0.963

The long-run estimation indicates that the model fits the data well as evidenced by high values of both R-Squared (Adjusted R-squared) which is 96 percent, and significant F-statistic tests with a P-value of 0.00, indicating that the independent variables jointly determine All Share index (NASI) in the long-run. The adjusted R-squared which measures the "goodness of fit" of the equation (after taking account of degrees of freedom), show that in the long-run, 96 percent of the variations in NSE All Share index is explained by variations in the changes in inflation, money supply, 182 day treasury bill and money supply growth. Similarly, the F-test statistic of 156.7 with a P-value of 0.000 indicates that the two variables jointly determine NSE All Share Index in Kenya.

From the estimated results in Table 4, it is evident that, in the long-run, inflation, money supply and 182 day Treasury bill are significant determinants of NSE All Share index in Kenya. The sign of the inflation coefficient is significantly positive (8.42). Similarly, money supply has high positive and significant coefficient. On the other side, 182 day Treasury bill, and growth of money supply has negative coefficients with that of 182 day Treasury bill being positive while the latter is insignificant. Since, the coefficients are elasticities; they are explained in terms of the effect of a percentage change of an independent variable on the dependent variable (NSE All Share Index).

It's apparent from the results that a percent increase in inflation is associated with 8.42% increase in the NSE All Share Index. This provides support for the hypothesis that increased inflation can directly cause increased NSE All Share index. Same elasticity calculation for money supply indicates that a percent increase in money supply is significantly associated with a 169% increase in NSE All Share Index. Still on the significant variables, the results also show that a percentage increase in the 182 Day Treasury bill (interest rates) decreases NSE All Share Index by 11%.

4.6 Summary and Interpretation of Findings

The estimation results show that 182 day Treasury bill in Kenya significantly affects NSE share index negatively. This result is in line with previous studies by Al-Qenae et al. 2002; Olugunde 2006; Uddin et al., 2007; and Arango et al. 2002 in developed countries; Wongbangpo et al., 2002 in Asia; Jefferis et al., 2000 in South Africa; Tweneboah 2008 and Coleman et al., 2008 in Ghana. Nonetheless, studies in Japan (Elton et al., 1988); Indonesia and Malaysia (Maysami et al., 2004) and in Nigeria (Olugunde et al., 2006) disagree with these findings but argue that there exists a positive relationship between stock prices and interest rates. Finally, there is a strand of studies such as Kuwornu et al., 2011 in Ghana; Lee 1997; and Pallegadara 2012 in Sri Lanka whose findings revealed that treasury bills have no significant effect on the stock prices.

In terms of meaning, the findings demonstrate that high 182 day Treasury bill interest rates prevent capital outflow, hinder economic growth and consequently hurt the economy as interest rates directly affects growth of the economy. On the other side, lower interest rates increase stock prices which intern reduce the probability of financial distress. The rational for the relationship between interest rates and stock return is that stock prices and 182 day Treasury bill interest rates are said to be negatively correlated (French *et al* (1987).

Fama, 1981 and Roll, 1983 explains that higher 182 day Treasury bill interest rates resulting from contractionary monetary policy usually negatively affect stock market returns because higher interest rates reduce the value of equity and makes fixed income securities more attractive as an alternative to holding stock. This reduces the tendency of investors to borrow and invest in stock and raise the cost of doing business and hence affect profit margins. On the contrary, lower 182 day Treasury bill interest rates resulting from expansionary monetary policy boosts stock market (The stock market constitutes the most important financial institution for massive capital formation geared towards economic development.

Inflation generally measured by the consumer price index and reflects the annual percentage change in the cost to the average consumer who acquires a basket of selected goods and services, is found to have a significant positive relationship with NSE share index. This is not in tandem with what we had expected after reviewing previous research which shows that inflation negatively affects NSE share index (Wahid (2011), Kowornu et al., (2011), Geetha, Mohidin, Chandran and Chong (2011), earlier studies by Lintner (1973), Fama and Schwert (1977), Mandelker (1977). However, our finding conforms to studies by Mohanasundaram, 2012 and Firth (1979). According to these studies, high inflation erodes the benefit of higher return from the equity market. A few other studies by Gjerde and Saettem (1999) and Chen, Roll and Ross (1986) have however shown that there is no significant relationship between inflation and NSE share index.

Theoretically, expected inflation occurs when demand exceeds supply, causing an increase in prices to stimulate more supply. Since this is expected by the NSE firms, increase in prices would also increase their earnings which would lead to them paying more dividends and hence increase the price of their stocks as well. On the other hand when inflation is unexpected, an

increase in price will lead to the increase in cost of living and this will shift resources from investment to consumption. Indeed, as inflation increases, nominal interest rates will also increase. The discount rate used to determine intrinsic values of stocks will therefore increase, and thus this will reduce the present value of net income leading to lower stock prices. Moreover, if the price elasticity of demand for the firms' products is high, a rise in inflation may cause a decline in firms' sales and net incomes, and thus stock prices.

On the relationship between money supply and NSE index, our results reveal that money supply positively impacts the NSE share index. This corresponds to empirical studies by (Sellin (2001), Jess & Alred (2009), Alam (2009), Kimani and Mutuku (2013) which found out that expansionary monetary policy (increased money supply) increases the stock returns. This contradicts studies by Ying Wu (2001) which found out that there is no effect of money supply on stock prices. An increase in the money supply positively affect stock prices because when money stock grows, it stimulates the economy which leads to greater credit being available to firms to expand production and then increases sale resulting in increased earnings for firms. This results in better dividend payments for firms leading to an increase in the price of stocks.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction of Findings

This paper has empirically examined effect of inflation, money supply, growth of money supply and the monthly Interest Rates (182 Day Treasury Bill) on NSE All Share Index in Kenya using latest monthly data i.e. data from July 2010 to July 2015. The long-run estimation findings confirm that inflation, 182 day Treasury bill, and money supply are significant determinants of NSE All Share Index in Kenya.

5.2 Summary

The role of the stock market in the economy is to raise capital and also to ensure that the funds raised are utilized in the most profitable opportunities. This empirical study performed the necessary analysis to answer, "Does changes in interest rates (represented by 182 Day Treasury bill in Kenya), Inflation (represented by the CPI) and Money Supply affect the Market Index in Kenya?" To answer this question, the study used monthly data for the period July 2010 – June 2015 (60 observations) to examine the determinants of market index at the NSE in Kenya; to examine the overall relationship between NSE index and the determinants of NSE index with key focus on interest rates, money supply and inflation; and to give policy recommendations based on the findings. To answer the question, the study used time series model which was estimated using OLS.

Since time series data is prone to non-stationarity issues, the data was the data were subjected to unit root tests using both Augmented Dickey-Fuller (ADF) test and Phillips-Perron test methodologies to establish the stationarity of the various variables and also to establish the order of integration. From the tests, the results indicate that the dependent variable, NSE All Share

Index **(NASI)** and money supply (**M3**) are integrated of order zero i.e. are stationary at levels. Since the dependent variable had a no unit root, there was no need to test for cointegration. On the other hand, inflation **(INF),** and 182 Day Treasury bill **(IR)** are integrated of order one i.e. are stationary after first difference.

The study reveals that 182 day Treasury bill significantly affects NSE share index negatively in Kenya implying that high 182 day Treasury bill interest rates prevent capital outflow, hinder economic growth and consequently hurt the economy as interest rates directly affects growth of the economy. Besides, inflation is found to have a significant positive relationship with NSE share index in Kenya. This contradicts theory where high inflation erodes the benefit of higher return from the equity market. Finally, money supply and NSE share index relates positively implying that expansionary monetary policy (increased money supply) increases the stock returns. This contradicts studies by Ying Wu (2001) which found out that there is no effect of money supply on stock prices.

5.3 Conclusion

This paper has empirically examined effect of inflation, money supply and interest rates (182 Day Treasury Bill) on NSE All Share Index in Kenya using latest monthly data i.e. data from July 2010 to July 2015. The empirical analysis found interesting results. First, all the three independent variable: inflation, 182 day Treasury bill and money supply are found to significantly determine NSE All Share index. Secondly, the long-run estimation findings confirm that inflation positively affect NSE All-Share index. The same result is found between NSE All Share index and money supply (positive and significant). Finally, 182 day Treasury bill, and is found to significantly determine NSE All Share Index in Kenya negatively. These results are generally in agreement with the theoretical and empirical literature.

Specifically, the results show that increased inflation and money supply increases the NSE All Share Index. The greatest effect is realized from the money supply (169 percent); followed by inflation rate (8.42 percent); while 182 Day Treasury bill reduces NSE All Share Index by 11%. One possible implication of the significant positive relationship between inflation and NSE All share index is that the Kenya stock market is an effective hedge against inflation.

The evidence presented in the econometric estimations imply that while pursuing price stability by keeping inflation low is admirable and pursued, it's advisable to check on it keenly as it can yield to unnecessary negatively impact on the NSE All Share Index thereby causing macroeconomic instability in the economy. Similar check need to be put on interest rates as investors would not consider the Nairobi Securities Exchange market when the interest rate is high.

5.4 Recommendation to policy and practice

As indicated in the introduction of this research paper, understanding the NSE All Share Index in an economy is significant to the government in policy making as a prerequisite to improving the efforts to grow the economy and in encouraging more NSE listed companies to increase their bottom line profitability and to offer their shareholding to the public. In the light of the recent significant changes in the macroeconomic landscape such as increasing inflation, interest rate among others poses great changes in the economy that may cause shifts in the parameters of the NSE All Share index over time, making the function unstable. As a result, it is necessary to investigate the NSE All Share Index in the country using available annual data with some of these variables in consideration.

Based on the results, the researcher recommends that:

The significant factors determining the NSE All Share index in Kenya (interest rate negatively, money supply and inflation positively) imply that investors in the Nairobi stock market should look at the systematic risks revealed by the money supply 182 day treasury bill (interest rates) and inflation when structuring portfolios and diversification strategies. Financial regulators and policymakers also need to take these macroeconomic variables into account when formulating economic and financial policies.

Particularly, the government and policy makers should have a concerted effort to ensure that prudent measures are in place to ensure inflation rates are kept low to keep the levels of interest rate stable over a period of time which will as such move in the same direction as the stock market. By so doing, investors will wish to invest in both short term and long term portfolios and will also encourage foreign investors into NSE to boost the economy.

One possible explanation for the negative and significant interest rates (182 day Treasury bill) relationship with NSE All Share index is that investors would not consider the Nairobi Securities Exchange market when the interest rate is high; hence the money and capital markets in the Kenyan economy are substitutable. Consequently, potential investors should pay attention to 182 day treasury bills (interest rate dynamics) due to its existing relationship with the NSE share index.

Similarly, investors should also consider inflation and its performance in their NSE investment decisions. This is because inflation serves as a guide in forecasting NSE share index and to decide if it is worthwhile to invest in such portfolios.

5.5 Limitation of the Study

In terms of the limitations of our empirical study, the research was macro-analysis of various monthly variables which missed out on other macroeconomic variables such as GDP, bank credits, price of oil (balance of payment) and exchange rates which other past studies have shown to impact on NSE Share index.

Besides macroeconomic conditions, there are many other factors that affect the prices of stocks and its movements. A host of such factors are found in the microeconomic variables. The idea is that the performance of particular companies and their results matter in determining the price of a stock. Indeed, high corporate profits lead to higher stock prices due to high demand. Moreover rumors of positive news for firms and the re-purchase of shares listed give a positive impact and lead to higher stock prices.

There were difficulties in getting annual data for NSE share index as the NSE share index data was only available for less than 10 years. The use of annual dataset would give a more accurate analysis and avoid the stochastic nature of monthly data sets used in this analysis. In addition to the unavailability of the annual data, use of the annual data would not have also met the minimum sample requirement of n=30. We therefore resorted to using monthly dataset between July 2010 and June 2015 resulting to 60 observations.

Finally, given the high values of money supply used, the explanations does not relate to the GDP growth and how the two variables relate. This is an important factor to consider in the analysis so as to try and link money supply with growth.

5.6 Suggestion for further Studies

Based on the above identified limitations:

We suggest that future studies in this field, where applicable should discuss the role of micro economic factors on stock price and how an investor can reduce microeconomic risk by undertaking a strong portfolio diversification strategy.

Another possible extension of this study is to consider the impact of other macroeconomic variables such as GDP, Bank credits, Price of oil (Balance of payment) or and exchange which were not included in the analysis because monthly data for these variables. In fact, inclusion of these variables would be a significant addition.

Since it is not possible to get annual data for NSE All share index for at least 25 years, future studies in this area could be improved by doing panel analysis where the performance of NSE is compared with the performance of other stock markets in the region. This way, the difficulties in getting annual data for NSE share index shall have been addressed.

Money supply values could be improved by linking them to GDP in future studies. That is, using money supply as a function of GDP values instead of just using the nominal values of money supply.

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APPENDICES

Appendix 1: The data set used for the study

Year	Period	NASI Last Price	Inflation (month-on-month) %	Extended Broad money, M3 = M2 + FCDs(Foreign Currency Deposits) Kshs Millions	182-days Tbill	Monthly M3 percentage Growth
2010	Jul	97.74	3.57	1213212	1.72	1.19
	Aug	95.93	3.22	1216829	2.03	0.30
	Sep	98.93	3.21	1243601	2.14	2.20
	Oct	102.37	3.18	1254488	2.10	0.88
	Nov	98.01	3.84	1258812	2.28	0.34
	Dec	97.83	4.51	1271638	2.59	1.02
2011	Jan	99.02	5.42	1285452	2.70	1.09
	Feb	96.66	6.54	1306395	2.76	1.63
	Mar	89.51	9.19	1324685	3.06	1.40
	Apr	94.18	12.05	1334898	3.51	0.77
	May	93.21	12.95	1351392	4.57	1.24
	Jun	91.36	14.48	1380732	9.93	2.17
	Jul	84.66	15.53	1412702	9.85	2.32
	Aug	76.16	16.67	1436877	10.15	1.71
	Sep	69.39	17.32	1484198	11.28	3.29
	Oct	72.71	18.91	1513656	14.68	1.98
	Nov	66.34	19.72	1489751	15.90	-1.58
	Dec	68.04	18.93	1514152	18.30	1.64
2012	Jan	68.94	18.31	1505764	20.69	-0.55
	Feb	72.07	16.69	1504776	19.88	-0.07
	Mar	73.48	15.61	1517126	18.24	0.82
	Apr	76.91	13.06	1536287	16.92	1.26
	May	78.48	12.22	1561573	12.71	1.65
	Jun	80.75	10.05	1595059	10.67	2.14
	Jul	83.26	7.74	1613069	12.21	1.13
	Aug	84.66	6.09	1638708	11.77	1.59
	Sep	87.38	5.32	1671318	9.36	1.99
	Oct	91.67	4.14	1703001	10.33	1.90
	Nov	92.20	3.25	1740657	10.47	2.21
	Dec	94.86	3.20	1727686	9.25	-0.75
2013	Jan	103.50	3.67	1729897	8.09	0.13
	Feb	106.91	4.45	1747890	8.40	1.04
	Mar	117.91	4.11	1755742	9.89	0.45
	Apr	118.07	4.14	1802280	10.75	2.65

Year	Period	NASI Last Price	Inflation (month-on-month) %	Extended Broad money, M3 = M2 + FCDs(Foreign Currency Deposits) Kshs Millions	182-days Tbill	Monthly M3 percentage Growth
	May	126.80	4.05	1823398	10.04	1.17
	Jun	116.31	4.91	1820879	7.12	-0.14
	Jul	122.86	6.03	1835803	6.23	0.82
	Aug	119.96	6.67	1849974	9.57	0.77
	Sep	127.35	8.29	1885780	10.15	1.94
	Oct	133.24	7.76	1900194	10.28	0.76
	Nov	141.17	7.36	1953621	10.54	2.81
	Dec	136.65	7.15	1996241	10.41	2.18
2014	Jan	134.66	7.21	2026568	10.36	1.52
	Feb	141.05	6.86	2030488	10.35	0.19
	Mar	143.89	6.27	2060313	10.08	1.47
	Apr	151.13	6.41	2100610	9.83	1.96
	May	150.20	7.30	2147479	9.86	2.23
	Jun	150.37	7.39	2152132	10.50	0.22
	Jul	151.69	7.67	2190076	10.74	1.76
	Aug	157.94	8.36	2253316	8.85	2.89
	Sep	163.45	6.60	2251762	8.61	-0.07
	Oct	159.23	6.43	2260023	8.91	0.37
	Nov	163.27	6.09	2295147	9.18	1.55
	Dec	162.89	6.02	2329979	9.49	1.52
2015	Jan	165.80	5.53	2350802	10.19	0.89
	Feb	175.70	5.61	2407825	10.37	2.43
	Mar	175.11	6.31	2398762	10.35	-0.38
	Apr	173.20	7.08	2464482	10.26	2.74
	May	162.13	6.87	2501589	10.37	1.51
	Jun	164.41	7.03	2552995	10.55	2.05

Source: Central Bank of Kenya complemented with Nairobi Securities Exchange for the NSE All Share Index. The money supply growth variable was computed by the author using the formula already mentioned in the chapter three.

Appendix II: STATA Do File

STATA DO FILE

```
tsset myr

gen linf=log(inf)

gen lm3=log(m3)

gen lir=log(ir)

gen lm3growth=log(m3growth)

dfuller nasi, lags(0)

pperron  lnasi, trend

dfuller linf

pperron  linf

gen dlinf=d.linf

dfuller dlinf

pperron  dlinf

dfuller lm3

pperron lm3

dfuller lir

pperron lir

gen dlir=d.lir

dfuller dlir

pperron dlir

dfuller lm3growth

pperron lm3growth

gen dlm3growth=d.lm3growth

dfuller dlm3growth

pperron dlm3growth

reg  nasi dlinf lm3 dlir dlm3growth, robust

estat dwatson
```