

**RELATIONSHIP BETWEEN THE CENTRAL BANK OF KENYA RATE AND
THE NAIROBI SECURITIES ALL SHARE INDEX**

BY:

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DECLARATION

Student's Declaration

I hereby certify that except where due acknowledgement has been made, this project work is mine alone and has not been previously submitted in whole or in part for any other academic award.

Signed í í í í í í í í í í í í í í í í Date í í í í í í í í í í í í í ..

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Supervisor's Declaration

I hereby certify that this project has been presented for examination with my approval as the University of Nairobi supervisor.

Signed í í í í í í í í í í í í í í í í .. Date í í í í í í í í í í í í í í í

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DEDICATION

I dedicate this project to my parents, Mr. & Mrs. Karuri, for the patience and support they have accorded to me during this period. It has been one long journey, which you have made bearable. Thank you!

ABSTRACT

This research study set out to examine whether a relationship between the Central Bank Rate and the Nairobi All Share Index exists. It used data collected over the period 2008 to 2013 which was collected from the Central Bank of Kenya and the Capital Markets Authority. The research was based on the simple regression analysis of secondary data with SPSS version 17 was used to undertake the analysis.

This study is necessitated by the contradictory results from previous studies and the need to establish a relationship between the CBR and the NASI. Some of the previous studies done conclude that a positive relationship exists between the stock indices and the Central Bank Rate, which in some countries is referred to as the Federal Funds Rate, whereas others indicate that an inverse relationship exists. This research seeks to establish whether in Kenya a positive or negative (inverse) relationship prevails.

The research reviews various relevant theories which were used to construct the theoretical foundation for the study. These theories also facilitated the development of an expected relationship between the Central Bank Rate and the Nairobi Securities Exchange All Share Index.

The findings of this research establish that an inverse relationship between the Central Bank Rate and Nairobi Securities Exchange All Share Index exists. This study confirms the researcher's priori argument that a negative relationship exists between the two variables, it however disagrees with a few previous studies and which had established a positive relationship.

The study has developed various recommendations which may aid in the interactions between the central bank and the Nairobi Stock exchange. One such recommendation is that the MPC should avoid frequent adjustments of the CBR as this may result in a highly volatile market that may impact negatively on investments. Thus the MPC should subtly adjust the rates slowly over a period of time to allow the market to adjust to it otherwise sudden large changes in the rate may cause shock waves in the market.

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ABBREVIATIONS

A.P.T. - Arbitrage Pricing Theory

C.B.K. - Central Bank of Kenya

C.B.R. - Central Bank Rate

C.M.A. - Capital Markets Authority

D.T.M. - Deposit Taking Microfinance Institutions

F.F.R. ó Federal Funds Rate

F.T.S.E. - Financial Times Stock Exchange

M.P.C. - Monetary Policy Committee

N.A.S.I. - Nairobi Securities Exchange All Share Index

N.S.E. - Nairobi Securities Exchange

N.P.S. - National Payment System

V.A.R. - Vector Autoregressive

U.S.A. - United States of America

CHAPTER ONE

1.0 INTRODUCTION.

1.1 Background of the Study

In the past few years, the Central Bank Rate has been very much on everyone's lips. Every month as the Monetary Policy Committee (MPC) meets to discuss on how best to change the fiscal and monetary policies, the investing public is always anxiously observing how the MPC will adjust this rate. This, they feel will affect their returns and thus influence their investment strategies.

In the 21st century stock markets have been opened up and have been increasingly used as an investment medium by investors, both foreign and local. This is because such markets are highly liquid and are seen to be quite transparent. Thus when researchers attempt to examine keenly the investing habits of the economy the stock markets are a key area to observe. Once a central bank changes its rates, and wishes to observe how well the economy has responded to its action, it will keenly observe how the stock markets move. This shows that the stock markets are increasingly becoming a source of data of the economy's preferences i.e. investing or consumption.

The central bank rate is often used by various central banks around the world to control the liquidity within the economy and thus accelerate growth and investment activities. The interaction between the central bank rate and the stock market performance has become a critical area of study particularly since the global economic meltdown. This is because central banks attempted to keep their economies afloat by reducing their central bank rates. Years after the crisis, central banks still change this rate in a bid to influence the investing and consumption patterns of the economy.

1.1.1 Central Bank Rate

A central bank can be broadly defined as the entity responsible for overseeing the monetary system for a nation (or group of nations). Central banks have a wide range of

responsibilities, from overseeing monetary policy to implementing specific goals such as currency stability, low inflation and full employment. Central banks also generally issue currency, function as the bank of the government, regulate the credit system, oversee commercial banks, manage exchange reserves and act as a lender of last resort.

In order to achieve its various objectives the central bank is availed with various monetary and fiscal tools one of which is the Central Bank Rate. This rate, also known as the Federal Funds rate in the USA and the Federal Reserve Rate in Australia, refers to the lowest rate that the central bank will charge as interest to loans to commercial banks and other large financial institutions. This rate automatically becomes the lowest interest rate chargeable within the economy, since it represent the cost of funds for commercial banks.

When a central bank wishes to increase the money supply within the economy, it will achieve this by reducing the central bank rate and thus by extension lower the cost of funds in the economy. This lower cost of funds increases access of credit and increased money supply. The converse is also true.

1.1.2 Share Indices

A share index or stock index is a method of measuring the value of a section of the stock market. It is computed from the prices of selected stocks (sometimes a weighted average). It is a tool used by investors to describe the market performance and is used to compare the market return to specific returns from other investments. It is a mathematical construct that attempts to measure the market performance and thus one cannot invest in a stock directly though some fund managers and investors attempt to track their portfolios with the market index.

There are several types of indices which may be categorized as global market index, national index and sector specific index. The global market index is composed of a portfolio of the largest and best performing stocks available in the global market without regarding where these companies are domiciled e.g. S&P Global 100. The national index (also known as the total market index) represents the performance of a stock market of a given nation and reflects investor sentiments to the state of the economy e.g. the

American S&P 500. Finally, we have sector specific indices which are used to represent the performance of a specific sector within the economy e.g. Wilshire US REIT.

Stock market indices are used to measure the market performance and allow for comparison of market between different calendar and financial periods. This allows investors to analyze and in some cases develop a trend of the market performance.

1.1.3 Central Bank Rate and Share price Indices

The central bank rate is used by various governments to affect the monetary and economic conditions within an economy. It is a monetary tool for achieving various fiscal and monetary objectives. Share price indices are used to measure market performance from period to period. They are used to measure this performance by computing a price weighted index of a portfolio that is deemed representative of the market.

When the CBR is reduced we expect that the cost of funds in the economy to drop. The lower cost of funds results in increased availability of investable funds in the economy which is directed to the stock market increasing the demand for securities. Following the law of demand and supply, the prices of securities adjust upwards to reflect the increased demand over supply. Another possible course is that a reduction in the CBR will lead to a lower cost of capital for the firms and thus a higher present value of the expected future earnings (as long as the forecasted earnings are not reduced). Thus fundamentally, we expect that increased present value will lead to increased security prices and increased index values. The converse will also be true should the MPC increase the CBR. We expect a relationship to exist between the central bank rate and the share price indices.

1.1.4 Central Bank of Kenya Rate and the Nairobi All Share Index

The Central Bank of Kenya was formed in 1966 through the Act of Parliament known as the Central Bank of Kenya act of 1966. The sole purpose of establishing the bank was to achieve independence in monetary and financial policies in Kenya.

Under section 36 (4) of the Central Bank of Kenya Act stipulates that the Central Bank shall publish the lowest rate of interest it charges on loans to banks and that rate shall be known as the Central Bank Rate (CBR). The CBR is a monetary tool that the Central Bank of Kenya uses to signal to the market the direction in which the cost of money should go. Banks include the CBR and other factors when calculating their deposit and loan interest rates. (www.centralbank.go.ke)

The level of the CBR is reviewed and announced by the Monetary Policy Committee (MPC) at least every two months. Its movements, both in direction and magnitude, signal the monetary policy stance. The CBR is the base for all monetary policy operations in order to enhance clarity and certainty in monetary policy implementation. Whenever the Central Bank is injecting liquidity through a Reverse Repo, the CBR is the lowest acceptable rate. Likewise whenever the Bank wishes to withdraw liquidity through a Vertical Repo, the CBR is the highest rate that the CBK will pay on any bid received.

Investors who are seeking higher returns than they can generally get from lending may decide to invest in a Securities Exchange. The Nairobi Securities Exchange was constituted as the Nairobi Stock Exchange in 1954 as a voluntary association of stockbrokers in the European community registered under the Societies Act. It helps mobilize a pool of savings from individuals to companies which require these funds to expand their operations. This enables the economy to grow as well as ensure that funds within the economy are efficiently used (www.nse.co.ke). It is a member of the African Securities Exchanges Association, East African Securities Exchanges Association and an affiliate member of World Federation of Exchanges.

The NSE is the sole market where various marketable securities are traded e.g. corporate and treasury bonds and bills, shares of listed companies. It is regulated by the Capital Markets Authority in order to ensure that it is not manipulated by a few people. CMA aims to make the NSE a fair, level playing field where investors do not feel exploited. All companies which wish to be listed on the NSE have to first seek approval from the Capital Markets Authority before their listing. (www.nse.co.ke)

In a bid to measure how the market is performing, investors look at stock market indices available in that market. A stock market index is a measure of changes in the stocks markets and is usually considered to be reasonably representative of the market as a whole. Indices are usually tabulated on a daily basis and involve summarizing sample shares price movements. One cannot invest in an index directly, but you can invest in index related stocks or mutual funds. The ups and downs of the index reflects the future expectation about of the market and its affected by many things including: news about performance of listed firms or the general country's economic performance, changing interest in the market and changing profitability levels of the listed companies which affect dividend payouts. Indices give general information of the market.

There are several indices are used in the Nairobi Securities Exchange. These are NSE 20 share Index, NSE All Share Index (NASI), FTSE NSE Index 15, FTSE NSE Index 25, FTSE Government Bond index and the FTSE Pan African index. These indices attempt to measure the market performance. In this study, we will focus on the NASI, which was introduced in 2008 to capture the overall market performance and is calculated using all shares traded on a single day. This therefore gives a true indication of the performance of the market compared to other indices which are computed from a sample. The NASI thus attempts to establish whether the overall market fell or rose on a given day of trading.

1.2 Problem Statement

The central bank rate is expected to have an inverse relationship with the share price index if all other factors which can influence the share index are held constant. This is explained by the fact that a decrease in the rate will result to increased liquidity and availability of funds and thus increase the demand for securities whereas the supply remains constant. This will push up the prices of the securities following the law of demand and supply.

Numerous researches have been undertaken on this topic in the global arena particularly in the USA. Kunaey (2008) undertook a research on the sector wise analysis of the effect of changes in the FFR on stock markets. The results of this study indicated that a relationship existed between these two variables. Similarly, Tan and Shretha (2005)

undertook a research paper on the impact of the FFR changes on the Asian stock markets. Laopodis (2006), Biru and Figlewski (2010) have also established the existence of a relationship between the FFR and market performance in America. Their research also concluded that indeed a relationship did exist between the two variables as well.

Locally, the research studies undertaken by Mwanza (2012) and Abdallah (2011) have agreed that a decrease in interest rates would result in increased investments thus boosting market performance as observed from the NSE 20 share index. Other studies have looked at the relationship between foreign exchange movements and the NSE 20 share index and concluded that a relationship exists between the variables. The relationship between macroeconomic indicators and the NSE 20 share index as studied by Abdallah (2011) concluded that these indicators affected the performance of the index. Inflation, interest rates, money supply and the exchange rate were the macroeconomic variables included in the study.

This study intended to look at whether a relationship exists between the CBR and NASI, which provides a more realistic view of the overall market performance compared to the NSE 20 share index. The NSE 20 share index is not a good measure of the market performance over a long period, because the stocks selected in the index vary from period to period, and this gives inconsistent results. It also takes a very small sample of the market leaving the larger portion of the market out of the study, thus the results may not be give an inappropriate relationship between the variables under study. Previous studies only consider a sample of the market which more often than not is composed of the best performing securities in the market. The NASI considers all the stocks in the market and thus is a better indicator of the overall market performance. This forms our research gap as many studies have only attempted to relate the FFR to a sample of the market using the S&P 100 index or the NSE 20 share index as is the case in Kenya.

1.3 Objectives of the Study

The objective of this study is to establish the relationship between the Central Bank of Kenya rate and the Nairobi All Share Index.

1.4 Value of the Study

This study will be important to a variety of stakeholders. First, this study will assist the Central Bank to be best placed to adjust the CBR rate in order to achieve the desired response from the market. It will also enable the Central bank to generally predict how the market will respond to a shift in this rate. The central bank will have better knowledge of how a movement in the CBR will affect investment in the economy through the NSE.

Second, the Nairobi Securities Exchange, Investment Banks, Financial advisors and listed companies will use the results of this study to forecast market trends. Financial advisors will thus be able to give their clients advice based on facts rather than their gut-feelings. This will allow investors make the greatest returns from the market. Example; companies will know when it is the best time to list on the exchange in order to generate as much capital from the NSE during an IPO, rights issue or floatation of a bond. This will ensure that corporate are able to meet their fund raising objectives by listing on the exchange when the market is on a bull run. Investors will be able to develop and better understand market trends. The highest profits will be earned by the investor who best determines the break of a stock's price rise. Understanding this relationship will enable investors best manage their investment risks and reduce losses.

Third, the capital markets authority, being the regulatory body of the security exchange, will find the results of this study important since it will be able to monitor the market performance and thus be better placed to identify instances where the market has been artificially manipulated. This will enable the authority to ensure the market retains its integrity and prices in the market, as much as possible, reflect the true value of the firm. It will also be better placed to advise companies which wish to list on the NSE about when is the appropriate time to undertake the exercise and also advice on the amount that can be realistically be raised from the exchange from time to time.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter sets about looking into various relevant theories and empirical studies which are closely related to this research. This chapter thus consist of five areas; first, review of theories; second, review of empirical studies; third, Concept of the Central Bank rate; fourth, Concept of the NASI, fifth, conclusion of the chapter.

2.2 Review of Theories

A theory is a contemplative and rational type of abstract thinking or the results of such thinking. It is a set of seasoned ideas intended to explain facts or events (oxford advanced learners dictionary). Finance is a social science and thus we will make use of social theories. Finance as a science has developed numerous theories; we will thus review relevant theories relevant to this study.

2.2.1 Signaling Theory

The CBR is an indicative rate that is used by the central bank to signal to the market the direction in which the cost of money should go. Signaling theory is useful for describing behavior when two parties have access to different information. Typically, one party, the sender, must choose whether and how to communicate that information and the other party, the receiver, must choose how to interpret the signal (Signaling theory: A review and assessment. Connelly, Ireland, Certo and Reutzel, (2011)). Stephen Ross, the first to apply signaling theory to finance, argues that the market values a firm's perceived returns, not its actual returns.

The signaling theory illustrates that the market is always looking for signals to determine the price of various securities. These signals may take the form of changes in monetary policies, legislative changes, and dividend announcements among others.

2.2.2 Financial Economic Theory

One way of linking macroeconomics variables and stock market returns is through arbitrage pricing theory (APT) (Ross, 1976), where multiple risk factors can explain asset returns. While early empirical papers on APT focused on individual security returns, it may also be used in an aggregate stock market framework, where a change in a given macroeconomic variable could be seen as reflecting a change in an underlying systemic risk factor influencing future returns. Most of the empirical studies on APT theory, linking the state of the macro-economy to stock market returns, are characterized by modeling a short run relationship between macroeconomic variables and the stock price in terms of first difference, assuming trend stationary (Abdallah, 2011).

An alternative to the APT is the discounted cash flow model. This is based on the fundamental principle that the price of an asset is computed from the present value of all its future cash flows. Thus, according to Abdallah (2011), macroeconomic policies (of which CBR is one) affect the future cash flows of any asset within the economy. The advantage of this relationship is that it can be used to focus on the long term relationship between the share price and the CBR. Campbell and Shiller (1988) undertook a research study to illustrate the relationship between stock prices, earnings and expected dividends. They concluded that these expected future cash flows had a strong relationship with the current stock prices.

2.2.3 Interest Rate Parity Theory

Steve Uranovic, in his book *International Trade theory and policy*, 2010, states that interest rate parity is one of the most important theories in international finance. It is probably the best way to explain how exchange rate values are determined and why they fluctuate as they do. Most of the international currency exchanges occur for investment purposes.

S. Uranovic, in the same book, defines Interest Rate Parity as a condition of equality between the rates of return on comparable assets between two countries. Tuck Cheong Tang in his study on the Relationship between the real exchange rate and real interest rate

differentials, a case of Cambodia, concluded that indeed a relationship existed between exchange rates and the interest rates. The CBR is known as the Central Bank base lending rate and thus, financial institutions lend funds at this rate plus a premium for the risk of default, the time value of money and a profit margin. It is therefore clear that a change in the CBR has a direct impact on the lending rate in the economy.

Kenya being an open economy and allowing foreign investment means that foreign investors will only invest when and if the exchange rates are favorable or if the rate of return from their investments covers the loss, if any, they may suffer from a change in the exchange rate fluctuations. Foreign trading, thus adds to the local demand and supply of the stocks influencing the price.

2.3 Review of Empirical Studies

In this subsection we will look at researches undertaken on similar studies that used data derived from actual observation or experimentation. Since there is no research that has been done to illustrate the relationship between the CBR and the NSE performance, we will review studies which are similar to this.

2.3.1 Inflation

Inflation is defined as the general increase in prices and fall in the purchasing power of money. It can also be defined as the sustained increase in the aggregate or general price level in an economy (www.Economicshelp.org).

Kimani and Mutuku (2013) undertook a study on the impact of inflation on the Nairobi Stock Exchange using quarterly data from the CBK and the NSE for the period December 1998 to June 2010. From their co integrating model they concluded that a negative relationship existed between inflation and stock market performance in Kenya. According to Huybens and Smith (1998) they argue that an increase in the rate of inflation could have at first negative consequences on financial sector performance through credit market frictions before affecting economic growth, this is observed as the decline in the performance of the financial sector. However, Azariadis and Smith (1996) emphasize the importance of threshold level of inflation in the relationship between

inflation and financial sector performance. The negative consequence of inflation on financial sector efficiency becomes effective once the rate of inflation exceeds some threshold.

Further evidence of the existence of this relationship, between inflation and the performance of the stock market, is obtained from the case study testing this existence in Malaysia which was done by Geetha, Mohidin, Chandran and Chong. They looked at both the expected and unexpected inflation and concluded that a negative relationship existed between inflation and the performance of the stock market.

This study is relevant to this research in that the CBR is often used to control or indeed check the inflation rate within the economy.

2.3.2 Foreign Exchange Rates

Foreign exchange rate is the rate for which one currency is exchanged for another. In Kenya, a study was done titled, "The impact of foreign exchange rates and foreign exchange rate reserves on the performance of the NSE share index." The aim of this study was to examine the impact of foreign exchange rates and foreign exchange reserves on stock markets performance at NSE. Monthly time series for NSE share index, foreign exchange rates and reserves covering the period 2003-2010 were used. Multiple regression analysis techniques were employed to ascertain long run relationships between the variables. The study was guided by several theories including market efficiency theory, classical monetary, portfolio theory and empirical studies from India, Ghana and Kenya. The study concludes that Foreign exchange rates and foreign exchange reserves had an impact on the stock performance at NSE. Foreign exchange rates had negative impact on stock performance which was more significant. Foreign exchange reserves had positive impact on stock performance which was significant. The study also revealed that no significant relationship between Foreign exchange rates and foreign exchange reserves.

Hondroyannis and Papapetrou (2001) examined foreign exchange rate influences on the stock market for Greece. They concluded that stock prices did not lead changes in real

economic activity but that the macroeconomic activity and foreign stock market changes only partially influenced the Greek stock price movements.

Litali (2013) undertook a similar research study to investigate the relationship between the foreign exchange rate and the performance of the stock market. The study analyzed the relationship between the exchange rate between Kenya Shilling and the Euro, dollar, Sterling pound and the NSE 20-share index monthly closing averages. The study used monthly time series data for a six year period between January 2006 and December 2012. Explanatory research survey was used to explore the relationship between the variables. Empirical analysis employed the Johansen Co-integration test to determine the long run relationship between the variables, Granger causality test to determine any causal relationship between the stock returns and forex rate and VAR model to determine the response of stock returns to a shock on the exchange rates. Empirical results show that there is no co-integrating relationship between the stock returns and the exchange rates, meaning that there is no long term co-movement between the two variables and none of the variable is predictable on the basis of past values of the other variable. Results of Granger causality test indicate that there is no two way causal linkage between the two variables. Lastly, results show a weak relationship between the stock market and the forex market as indicated by the VAR model. From the impulse response analysis, a change in the forex rate is neutralized after three months.

2.3.3 Monetary Policy

The CBR is actively used by the CBK as a tool to implement various monetary policies aimed at alleviating some of the economic problems. The CBR is used to control liquidity in the economy by influencing the lending rates within the economy.

According to Aziza (2010), two types of monetary policy exist and include expansionary policy or contractionary policy. An expansionary policy aims at increasing the total supply of money in the economy rapidly or decreases the interest rate. When the central bank wants to carry out an expansionary monetary policy, it goes to the security market to buy government bonds with money, thus increasing the money stock or the money in circulation in the economy. This may also be achieved by the central bank lowering the

base lending rate, CBR, thereby reducing the cost of funds in the economy. Expansionary policy is traditionally used to combat unemployment in a recession and spur economic growth by allowing investors access to capital. A contractionary policy on the other hand decreases the total money supply. When the central bank wants to implement a contractionary monetary policy, it goes to the security market to sell government bonds for money thus decreasing the money stock or the money in circulation in the economy. Contractionary policy is used to combat inflation. Furthermore, monetary policies are described as follows: accommodative, if the interest rate set by the central monetary authority is intended to create economic growth; neutral, if it is intended neither to create growth nor inflation; or tight if it is intended to reduce inflation. (Mwanza, 2012)

Friedman and Schwartz (1963) explained the relationship between money supply and stock returns they hypothesized that the growth rate of money supply would affect the whole economy and hence the expected stock returns. An increase in M2 growth would indicate excess liquidity available for buying securities, resulting in higher security prices. Empirically, Hamburger and Kochin (1972), and Kraft and Kraft (1977) found a strong linkage between the two variables (liquidity and stock prices), while Cooper (1974), and Nozar and Taylor (1988) found no relation. An increase in money supply would lead to inflation, and may increase discount rate and reduce stock prices (Fama, 1981). Maysami and Koh (2000), who found a positive relationship between money supply changes and stock returns in Singapore, further support this hypothesis.

Moessner and Nelson (International Journal of central banking, December 2008), investigated the impact of the central bank policy rate guidance and financial market functioning, a case study of New Zealand. In the study they established evidence that the central bank policy rate forecast could influence the market prices of stocks.

Thorbecke (1997) attempted to investigate the relationship between monetary policy and stock returns in the United States. He conducted an empirical estimation using the impulse-response functions and variance decompositions from a VAR model depending on US monetary and stock market data. He showed that expansionary monetary policy increases stock returns. Booth and Booth (1997) using Federal funds rate and discount

rate came up with a similar conclusion. They showed also, that a restrictive monetary policy stance lowers monthly returns of both large and small stock portfolio. They concluded that monetary policy has explanatory power in forecasting stock portfolio returns.

Rigobon and Sack (2002) investigated the interaction of monetary policy and asset prices and indicated that increases in the short-term interest rate have a negative impact on stock prices, with the largest effect on Nasdaq index. Bernanke and Kuttner (2003) showed that very little of the market's reaction can be attributed to effect of monetary policy on the real rate of interest.

Laopodis (2006) undertook study on the dynamic interactions among the stock market, federal fund rate, inflation, and economic activity. In his study he established from his bivariate findings that a weak negative relationship existed between the real returns and federal funds in the 1970s and 1980s. Kunaey (2008) undertook a similar study on the sector-wise analysis of the effect of changes in the FFR on stock markets. The FFR is an indicator of monetary policy that investors in the stock market scrutinize very closely. The paper determines the relationship between changes in the federal funds rate and sector stock indices. The results show that the utilities, financials, telecom and basic materials sectors are the most interest rate sensitive in that order and that the relationship exhibited between the stock price and the federal funds rate is positive.

Tan and Shretha (2005) on their working paper on the impact of Fed funds rate target changes on the Asian stock market- Japan, Hong Kong, Thailand, South Korea, Malaysia and Singapore. The response of these markets to the Fed target rate changes vary in degree. Four out of the six markets exhibit higher returns following target rate decreases. However, target rate increases do not cause all markets to react negatively. Only one market reacts significantly to rate increases. The Fed actions also send clear signals to the Asian markets. In particular, only two countries experience higher returns volatility around the three-day window when the FFR increases. When US stock market returns are used as an additional explanatory variable for the returns of the six Asian stock markets,

Fed target rates changes remain dominant. The evidence indicates that Fed signals convey information beyond that contained in US stock market changes.

2.4 Stock Price Behavior

In computing the market indices, a major factor to consider is the determination of the share prices. There are five school of thoughts along which academicians have attempted to explain stock price movements and behavior.

2.4.1 Fundamental Approach

Using this approach, the price of a security is determined by discounting its future expected cash flows. Fundamentalists apply present value principles when valuing a security using some discount factor, which is usually the cost of capital. This cost of capital is deemed to be at least the return the investor would enjoy if he were to invest in a hypothetical riskless asset or the cost of borrowing the funds to undertake the investment. Taking into consideration the risk associated with a particular investment, the investor would then add a mark-up rate to the rate of return he would get from the riskless asset or to the cost of borrowing the funds. This would thus constitute his cost of capital.

2.4.2 Technical Approach

Technicians believe that stock prices follow a predictable pattern. Thus, they conclude that using past economic data; one can forecast future stock prices. Technicians are of the thought that each price is influenced by preceding prices, and successive prices depend on each other.

2.4.3 Random Walk Approach

This approach explains that stock prices are random and cannot be forecasted either using the fundamental or technical approach. It is based on the efficient market hypothesis which states that the market prices instantaneously adjust to new information which is released into the market. This information is released in a random, unpredictable fashion and thus influences the market prices equally randomly. Thus no investor can make abnormal returns by investing using past economic data.

2.4.4 Behavioral Approach

Using this approach we establish that some price movements are as a result of the investor's behaviors and investing habits. This theory holds that investors act irrationally when they do not appropriately process information regarding a company's future performance. Investors may also decide to hold or buy more of a security that they have biasness towards despite it having lower or even negative returns compared to other securities in the market. This results in a security being grossly mispriced.

2.4.5 Macroeconomic Approach

Scholars like Abdallah (2011), have measured macroeconomic factors to explain stock return and found that changes in interest rates and other macro-economic factors affected the returns of a stock and thus influenced its price. They interpreted the observation to be a reflection of changes in the rate of inflation, given the finding of Fama (1977) that changes in the rate of inflation are fully reflected in interest rates (Emenuga, 1994). The macroeconomic approach attempts to examine the sensitivity of stock prices to changes in macroeconomic variables. The approach explains that stock prices are influenced by changes in money supply, interest rate, inflation and other macroeconomic indicators.

2.5 Conclusions

This chapter reviewed literature from studies that were similar to this research. The review found that past studies used different monetary policy and selected macroeconomic factors instruments to assess their effect on stock market performance. These included interest rates, inflation, foreign exchange rates and the 91 day Treasury bill rate (Aziza, 2010). Other researchers used only some selected monetary policy instruments and these include federal funds rate (Thorbecke, 1997), and (Bernanke and Kuttner, 2004); short-term interest rate (Rigobon and Sack, 2002).

The literature review clearly found a research gap in Kenya as most of the studies done in the area are conducted in the USA, where the Federal Fund rate was used, which is somewhat similar to the CBR. The empirical studies also indicated that the researchers only considered some selected monetary policy instruments and none attempted to develop a relationship directly investigating the CBR and market performance. The

researches done on similar macroeconomic factors such as inflation, foreign exchange rate and selected macroeconomic indicators used the NSE 20 share index as a measure of market performance, this leaves out a huge portion of the market and thus may not give a true reflection of the relationship. The current study therefore aimed to contribute towards this research gap by establishing the relationship between the CBR, a monetary policy instrument used by the CBK to manage the economy, and the NSE all share index.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, we will closely look at the procedures and methodology that were used in the study to arrive at the conclusion regarding the relationship between the CBR and the NASI. This chapter is arranged as follows; research design, target population, sample, data collection, and data analysis and model specification.

3.2 Research Design

This study employed descriptive and correlational research design. Descriptive research is used to obtain information concerning the current status of the phenomena to describe "what exists" with respect to variables or conditions in a situation; the correlation study investigates the relationship between variables in the study (www.okstate.edu). This research design is appropriate as we are attempting to describe the reaction of the NASI as a result of a change in the CBR.

This study used secondary time series empirical data from the Nairobi Stock Exchange (NSE) All share index and the CBR as provided by the Central Bank of Kenya website (centralbank.go.ke), to examine the relationship between the CBR and the performance of NSE by establishing correlation coefficients between the NSE All share index and the CBR.

3.3 Population

The population for this study was the NASI and CBR collected of February 2008 to March 2013. The index included all the listed companies on the NSE and were categorized according to their nature of business as Agricultural, Automobiles and accessories, Banking, Commercial services, Construction and allied, Energy and Petroleum, Insurance, Investments, Manufacturing and allied and Telecommunication and technology.

3.4 Study Sample

The study sample was the data collected on the NASI and CBR from February 2008. This index considers all the companies that were listed. Thus, the study sample and the population are the same. This study uses the NASI since it best captures the whole market reaction to a change in the CBR. This is unlike the other indices, like the NSE 20 share index, FTSE 25 index and FTSE 15 index which only take a sample of the market, which may not be a true representation of the market.

Also, the NASI is more consistent since it is computed from all the shares listed on the exchange unlike the NSE 20 share index whose composition may vary from period to period. This is because its composition is determined at the end of the day.

3.5 Data Collection

This study used secondary data collected from the respective institutions and authorities, i.e. the NASI was collected from the Capital Markets Authority (Quarterly Bulletins) and the CBR was collected from the Central Bank of Kenya website (centralbank.co.ke). Secondary data is best used in such a study since we are attempting to illustrate a relationship between the CBR and the NASI based on historical data. The sources of this data are also reputable institutions and authorities which uphold high levels of integrity.

The monthly data was collected over the period of February 2008 to March 2013. The starting year of 2008 was used since this was the first time the NASI was used on the NSE.

3.6 Data Analysis

This study used the statistical software, SPSS version 7, to analyze the data. Given that we are only focusing on a single independent variable, simple regression technique was used to investigate the presence of a relationship between the CBR and the NASI.

3.7 Model Specifications

The variable of the study comprised of the NASI as the dependent variable with the CBR being the independent variable. This can be mathematically represented as;

$$NASI_t = \alpha_0 + \alpha_1 (CBR_t) + \epsilon_t$$

Where;

$NASI_t$ = value of the index at time t ,

CBR_t = Central bank rate at time t ,

α_0 = proportion of the NASI that is independent of the CBR,

α_1 = proportion the NASI that is influenced by the value of the CBR,

ϵ_t = error term.

The error term, ϵ_t , represents the effect of other factor influencing the value of the NASI other than the CBR and helps in stabilizing the model.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents information to determine the relationship the central bank of Kenya rate and the Nairobi Securities Exchange All Share Index. Data collected from NSE and CBK was analyzed using regression techniques. The research period for this study was from 2008 to 2013. This chapter focuses on the results of data analysis, results and discussion of findings. It addresses issues such as the regression method used; regression results and the coefficients of the relationship equation. Data analysis results were presented using tables.

4.2 Data Presentation

4.2.1 Central Bank Rate

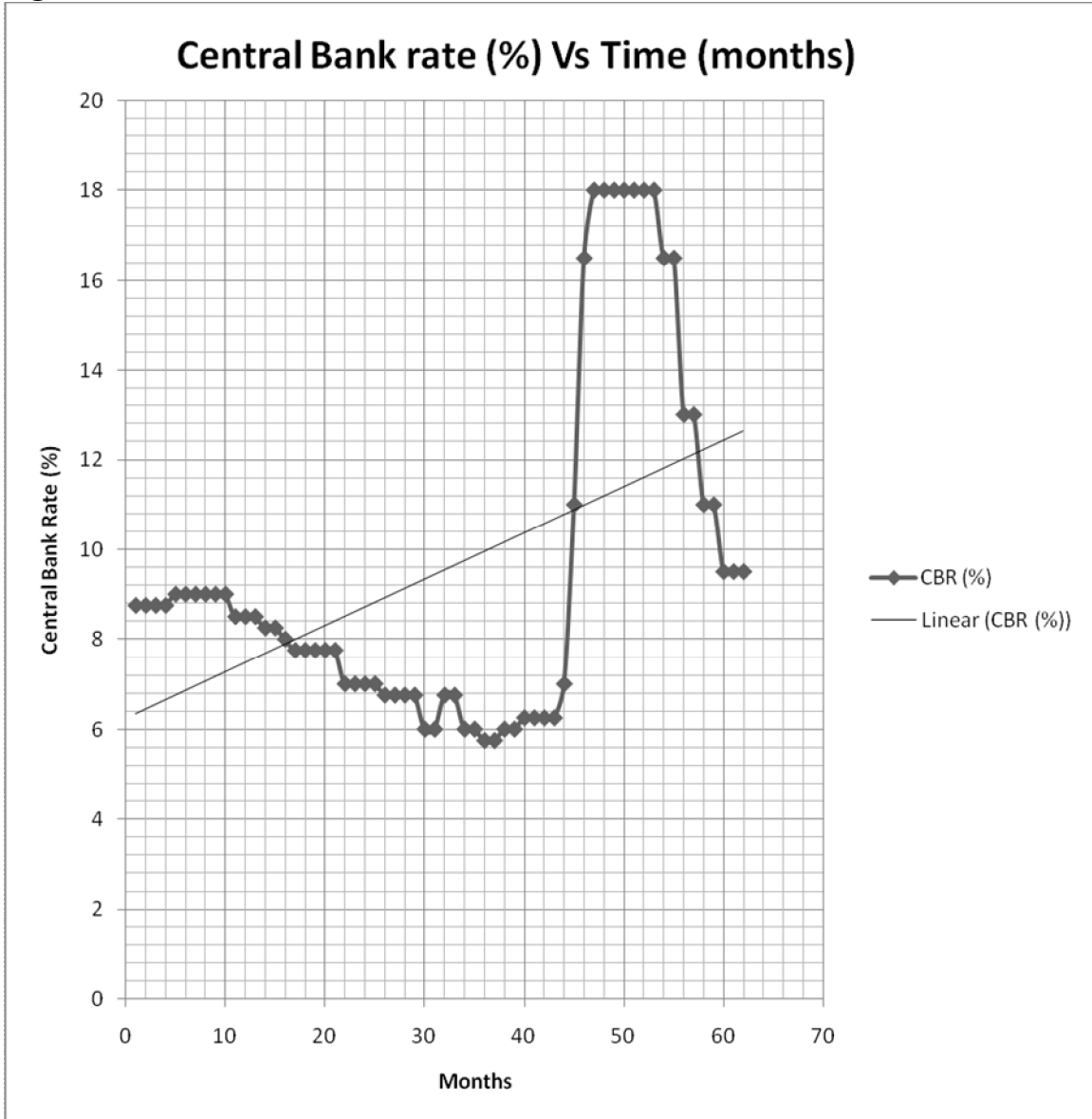
Under section 36 (4) of the Central Bank of Kenya Act stipulates that the Central Bank shall publish the lowest rate of interest it charges on loans to banks and that rate shall be known as the Central Bank Rate (CBR). In order to achieve various monetary policies the government, through the Central Bank, will from time to time vary this rate.

Figure 1 illustrates how the Central Bank has been varied from February 2008 to March 2013. The figure gives a graphical representation of the trend of the Central Bank Rate over time. The Y-axis depicts the values of the central bank rate against the X-axis which depicts the months. The Months on the X-axis were ranked with February 2008 being ranked number 1 and March 2013 being last, number 62. This ranking was based purely on occurrence i.e. February 2008 occurs before March 2008. All the points are ranked with respect to February 2008 which is our starting point.

We can clearly observe that the CBR was on a general decline from February 2008 to a low of 5.75% in February 2011. This shows that the government was exercising lax monetary policies as it sought to boost investments in the economy and increase liquidity. By lowering the rate, the government was looking to boost the role of investments by its

citizens and avoid potentially toxic investments from foreign investors whose countries were succumbing to the effects of the recession.

Figure 1- Trend of the Central Bank Rate over time



The government after February 2011 sharply raised the CBR rate to a high of 18%. This was to make the economy attractive to foreign investors as a viable investment opportunity as well as a measure to guard against the run-away inflation that was being experienced in the economy at the time. Increasing the CBR also served to prevent the Kenyan shilling from losing value against the major currencies i.e. the Euro, Sterling pound and U.S. dollar.

Once the economy was sufficiently stable in July 2012, the Central Bank reduced the rate to 16.5% and has since maintained this decline to reach a low of 9.5% in March 2013.

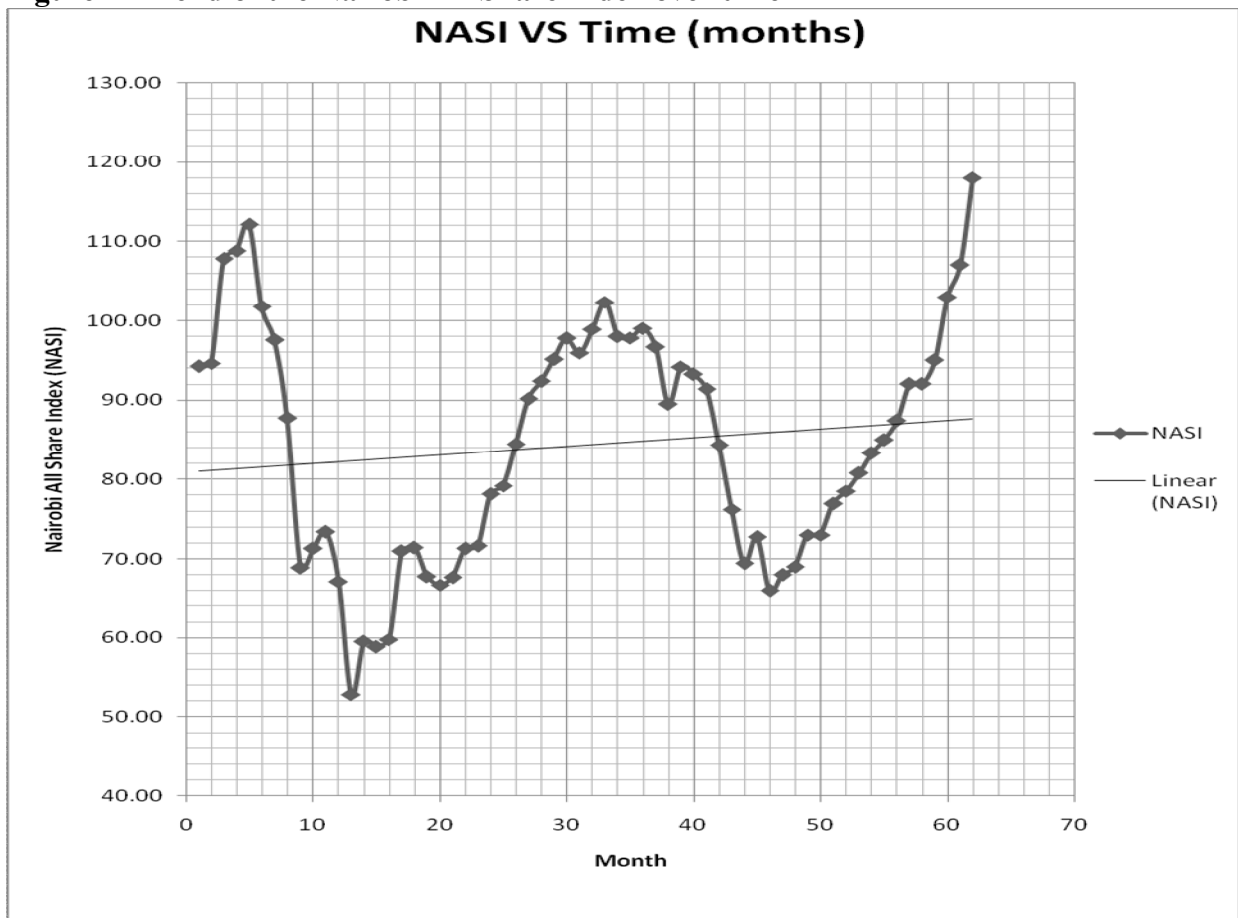
A glance at the line of best fit, Linear (CBR (%)), indicates that the CBR has been on a significantly rapid rise during the study period from February 2008 to March 2013.

4.2.2 Nairobi All Share Index

The NASI is used to measure the performance of the Nairobi Securities Exchange over time and also as a tool to compare its performance with that of other global security exchange markets.

The figure below illustrates how the NASI fared over the study period February 2008 to March 2013.

Figure 2- Trend of the Nairobi All Share Index over time



From Figure 2, we are able to graphically represent the movement of the NASI over the period February 2008 to March 2013. During the study period, as clearly depicted above, the NASI lost value in the first 13 months to reach a low of 52.82 in February 2009. This could be attributed to the global economic recession as foreign investors cashed in on their investments and thus the market was saturated with stocks. This led to the prices of these stocks declining significantly in order to match demand, following the Law of demand and supply. Afterwards the NASI steadily gained value to reach a high of 99.02 in Jan 2011, this was followed another decline which may be attributed to the government implementing strict monetary policies in order to curb the run-away inflation that was threatening to adversely affect the economy. This reduced liquidity and thus investment in the Nairobi securities exchange declined.

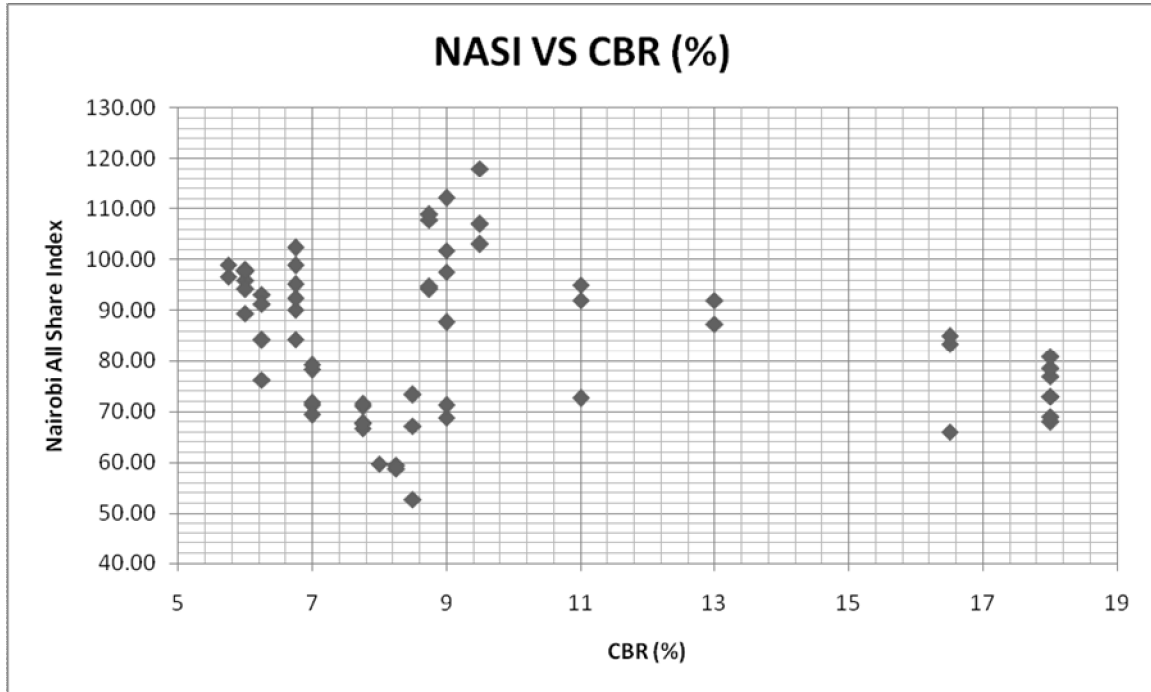
January 2012 saw a turn of fortunes at the bourse as the market steadily appreciated in value as depicted by the NASI increasing to a high of 118 in March 2013. This could be attributed to the recovery of the global markets after the recession and thus foreign investors were investing in the economy once again, since the NSE was perceived to offer superior returns given the risk compared to the other regional countries.

The general trend of the NASI however is a gentle increase in the value of the index. This is depicted by the line of best fit, Linear (NASI), as illustrated in Figure 2.

4.2.3 Nairobi All Share Index and the Central Bank Rate

Figure 3 below illustrates a scatter diagram plotting the NASI against the CBR. This gives a visual appreciation of the study data.

Figure 3- Scatter graph of the NASI against CBR



The above figure plots the NASI against the CBR and illustrates how the Nairobi All Share Index varied given various values of the Central Bank. The scatter graph gives us an opportunity to appreciate, visually, the study data and how the raw data related to each other.

4.2.4 Regression results

Regression analysis on the data was performed using SPSS version 17. The table below illustrates the results of regression.

Table 2: Regression results of NASI against CBR

		Coefficients				
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	0	92.991	4.954		18.772	0.000
	1	-0.912	0.483	-0.237	-1.889	0.064

a. Dependent Variable: NASI

Thus the regression equation is given as;

$$\text{NASI}_t = 92.991 - 0.912 (\text{CBR}_t) + (4.954) \quad (0.483)$$

On plotting the above equation on a graph, we obtain Figure 4 as seen below. The regression equation above is depicted by the line AB in figure 4. This equation proposes the possible relationship that may exist between the NASI and CBR.

Figure 4- Plot graph of the NASI against CBR (Regressed Equation)

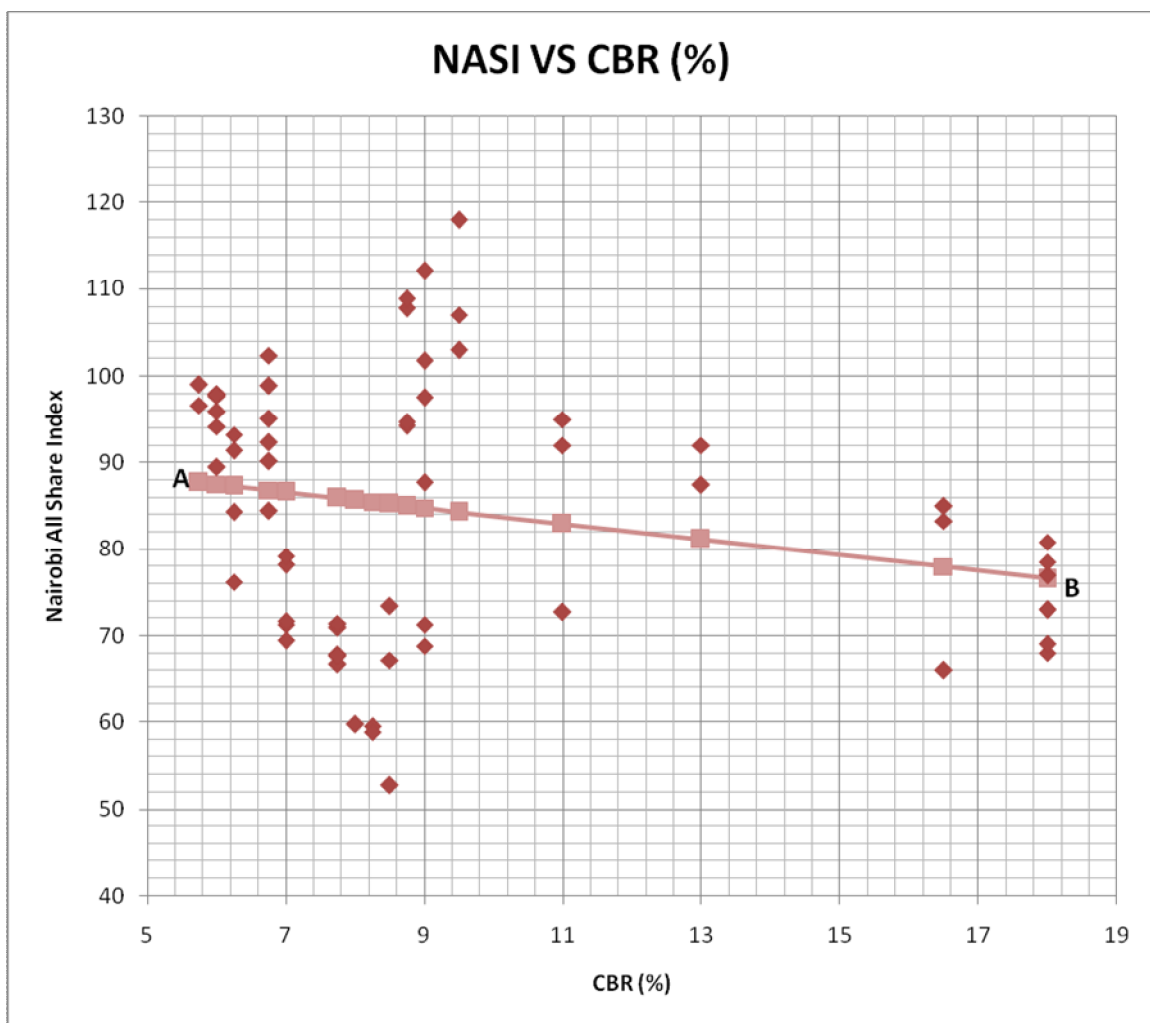


Figure 4 illustrates how the NASI and CBR related to each other. The regression equation when plotted gives the regression line AB as shown in figure 4. At a glance we can observe the inverse relationship that exists between the CBR and the NASI, this means

that as the Central Bank Rate increases, we expect the value of the NASI to decrease, *ceteris paribus*.

We use the CBR as the independent variable since this value is determined by the MPC and thus the economy takes this rate and adjusts itself to reflect the same on prices and market values. The NASI on the other hand is the dependent variable since it is determined by the performance of the shares listed on the Nairobi Stock Exchange. The prices of these shares are affected by various factors such as demand and supply of the stocks, inflation among other factors. This thus makes the NASI dependent on these factors.

The regression line AB has a gradient, β_1 , of -0.912; this means that for every 1 percent change in the CBR, the NASI will change value by 0.912. This change of value by the NASI will be in the opposite direction to that of the change of the CBR. The β_0 as given by the regression equation gives the intercept value on the y-axis. This value is given as 92.991 and is the value we expect when we hypothetically reduce the CBR to zero. It is from this value of 92.991 that the NASI fluctuates from given the value of the CBR.

4.3 Summary and Interpretation of Findings

This study had as its objective to establish a relationship between the CBR and the NASI. This relationship was achieved through regression analysis of the data collected on the CBR and NASI over the period 2008 to 2013.

As a major finding, the study established that an inverse relationship existed between the CBR and the NASI with a gradient of -0.912. This may be interpreted to mean that for every one percent change in the CBR, we expect that the value of the NASI will change by 0.912 in the opposite direction to the change of the CBR.

During the study period the CBR was changed numerous times to reach a low of 5.75% and a high of 18%, which is an indicator of the government's varying monetary policies. The CBR is adjusted upwards when the central bank wants to mop up excess liquidity from the market, reduce the rate of inflation, and increase the dollar inflows through

foreign investors investing in the high interest economy among other reasons. Thus there are various reasons as to why the central bank, through the MPC, may decide to adjust the CBR other than the performance of the NSE.

The adjustments of the CBR over the study period affected the performance of the NASI and this was depicted by the fluctuation from a low of 52.82 to a high of 118. Though it has to be noted that the CBR is not the only factor that affects the value of the NASI, the study established a relationship that indicates that it has an impact on the value of the NASI.

Previous studies done on this topic have come up with varying conclusions. Mwanza (2011) concluded that a positive relationship, with a coefficient of 0.2046, existed between the CBR and the NSE-20 share index. The study was based on data collected over 6 year period from June 2006 to June 2012 and multiple regression used to establish the relationship as he was looking at various other factors other than the CBR. Kunaey (2008) undertook a study on the effects of changes in the Federal Funds Rate on stock markets; he concluded that a positive relationship existed between the FFR and the S&P 500. He analyzed data for the period January 2002 to October 2007 and derived this positive relationship. The studies are in agreement that indeed a relationship exists between the CBR and the market index though both these studies contradict the results of our study since they point towards a positive relationship.

However, Laopodis (2006) undertook a study on the dynamic interaction among stock markets, federal funds rates, inflation and economic activity; and concluded that an inverse relationship existed between the FFR and the S&P 500 index, with a coefficient of -0.0258. This conclusion is wholly concurrent with our findings which indicate the same inverse relationship.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

The study was necessitated by the need to understand whether a relationship existed between the CBR and the NASI. To undertake this research we first defined what is meant by the CBR, and we successfully defined it to refer to the lowest rate that the central bank will charge as interest to loans to commercial banks and other large financial institutions. We also defined the NASI to refer to the price weighted index of all the companies listed on the Nairobi Securities Exchange.

On explaining the variables under study, the research proceeded to look at various theories applicable to this research. Theories such as the signaling theory, interest rate parity theory and the Financial Economic theory were studied and used to build the foundation of the study. They were also vital in coming up with an expected relationship.

The research study reviewed previous similar studies. It reviewed studies on monetary policies, inflation, foreign exchange rates and federal funds rates relationship with the performance of various global stock markets. This provided the basis upon which our study was founded. These previous studies gave an insight on how to undertake the research and also the expected relationship of the CBR and the NASI.

The research study period was from February 2008 to March 2013. Data on the CBR and NASI was collected for this period from the relevant institutions and authorities and regression analysis carried out using SPSS version 17. The analysis established that an inverse relationship existed which matched our expectations.

5.2 Conclusion

The research established that NASI and the CBR are inversely related as observed from the regression analysis. This means that an increase in the central bank rate results in a decrease in the value of the index.

The relationship as established by the study emphasizes that the CBR is a factor in determining the value of the NASI. Previous studies undertaken Laopodis (2006) established a similar inverse relationship between the Federal Funds Rate and the stock market, whereas Kunaey (2008) undertook a sector-wise analysis of the effect of the change in the Federal Funds Rate and stock market, and concluded that a positive relationship existed between the variables under study. This contradicts the results of both Laopodis and this research.

The CBR is adjusted by the MPC for various reasons, these may include but not limited to managing the value of the domestic currency against global currencies, controlling liquidity in the economy in order to fend off runaway inflation, boost economic growth among other reasons. The NASI on the other hand is dependent on various other factors such as inflation, foreign exchange rates, cash reserve ratio and money supply, as established by previous reviewed studies. Thus when the MPC aims to control inflation, manage foreign exchange rates, money supply or the cash reserve ratio by adjusting the CBR, it will also affect the performance of the NASI.

5.3 Recommendations to policy and practice

The study shows that an inverse relationship exists between the CBR and the NASI. The NASI reacted to a change in the rate by shifting in the inverse direction to that of the CBR. These findings thus support that the CBR affects the performance of the NASI.

Firstly, the study recommends that the Central Bank of Kenya should subtly manage the adjustments of the CBR in order to avoid negatively affecting the market. This will ensure that the economy is stable and growing as the securities market covers majority if not all the sectors of the economy.

Second, the study recommends that the MPC undertakes adequate reliable research on the NSE before any change to the CBR is done. This is of particular importance when the market is depressed and thus further increases in this rate will worsen the market conditions. This makes the any changes of the CBR to be quite sensitive and vital to the performance of the NSE.

Third, investors are more willing to invest more of their wealth in a market where there is some degree of predictability and consistency. The MPC should ensure that the CBR is rarely adjusted and any change is made when circumstances demand it. This consistency will enable investors accurately project their investment returns and thus allow them to invest more wealth for a longer period of time. Investors are more active in markets where they are fully confident and perceive the economy to be in good health. This is best illustrated by few variations in the CBR and other monetary policies.

Finally the MPC should not be too theoretical in its policy formulation approach. A pragmatic approach may at times become necessary. This is particularly when the rate is to be significantly adjusted upwards; this change should be done in stages rather than a sudden jump. This is because we would not like to shock the market into a panic and thus cause a crash.

5.4 Limitations of the Study

This study faced several limitations, which can provide avenues for further researches. A major limitation was the effect of inflation on the index over the research period; this affected the value of the NASI giving a sense of value addition when in essence it was just matching inflation.

Another limitation is the effect of Initial public offerings during the study period. The NASI is a price-weighted index of all the listed companies on the NSE, thus when a new company is listed, the market may either over value or under value it. This scenario results in the index being artificially inflated.

The performance of other investment vehicles other than equities traded in the market was also a hindrance. Assuming that most investors are rational and seek to get as much return from their investment as possible, if another investment vehicle say bond, offers greater return on investment compared to an equity portfolio we expect that this investor will sell his equities in favor of the bond. In such a scenario, this would lead to the market being heavily supplied with the equities, pushing down their prices thus devaluing the NASI.

There is a lag between the time when the CBR is changed and the time the impact is felt in the market. This lag period may result in the value of the NASI be higher or lower than should be case and thus increase the error in the results of the regression equation. This was a significant limitation to the results of the study.

The NASI is a price weighted index of all the listed companies. These companies are engaged in various businesses such as agriculture, manufacturing, construction among others; and thus are exposed to other factors such as weather, oil prices and legislation. These other factors limited the study since some factors such as weather, changes in legislation were not considered though they may have affected the value of the NASI.

5.5 Suggestions for further Research

This topic provides a large pool of opportunities for researchers. For future studies and to get a clear understanding of this relationship, researchers can undertake studies on the lag duration between the change in the CBR and that of the NASI. This will be crucial in explaining the reason as to why there is a period before the market adjusts to reflect the effects of the CBR on the index.

Another research opportunity is to establish which among the various investment vehicles available in the market reacts more strongly to a change in the CBR and whether their directions are similar. Such a research would look into which investment vehicles such as unit trusts, treasury bills, bonds and real estate investments trusts are most sensitive to a change in the CBR.

A researcher may also be interested in the sector-wise analysis of the impact of the CBR on the prices of the listed companies. Such a study will determine which sectors are most affected by the changes of the CBR. It will help passive investors identify sectors in which they may choose to invest in particularly during a period when the Central Bank is constantly adjusting the rate. This will reduce the risk of these passive investors are exposed to since they will be investing in sectors that are least sensitive to changes in the CBR and thus are able to enjoy stable returns.

An interesting research opportunity would be to look at the impact of changes in the FFR and the European Union Central Bank Reserve Rate on the performance of the Nairobi Securities Exchange. This will establish to what extent these global market leaders influence the Kenyan market.

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Appendix I

List of companies listed on the Nairobi Securities Exchange.

AGRICULTURAL

Eaagads Ltd Ord 1.25
Kakuzi Ord.5.00
Kapchorua Tea Co. Ltd Ord Ord 5.00
Limuru Tea Co. Ltd Ord 20.00
Rea Vipingo Plantations Ltd Ord 5.00
Sasini Ltd Ord 1.00
Williamson Tea Kenya Ltd Ord 5.00

COMMERCIAL AND SERVICES

Express Ltd Ord 5.00
Hutchings Biemer Ltd Ord 5.00
Kenya Airways Ltd Ord 5.00
Longhorn Kenya Ltd
Nation Media Group Ord. 2.50
Scangroup Ltd Ord 1.00
Standard Group Ltd Ord 5.00
TPS Eastern Africa (Serena) Ltd Ord 1.00
Uchumi Supermarket Ltd Ord 5.00

TELECOMMUNICATION AND TECHNOLOGY

AccessKenya Group Ltd Ord. 1.00
Safaricom Ltd Ord 0.05

AUTOMOBILES AND ACCESSORIES

Car and General (K) Ltd Ord 5.00
CMC Holdings Ltd Ord 0.50
Marshalls (E.A.) Ltd Ord 5.00
Sameer Africa Ltd Ord 5.00

BANKING

Barclays Bank Ltd Ord 0.50
CFC Stanbic Holdings Ltd ord.5.00
Diamond Trust Bank Kenya Ltd Ord 4.00
Equity Bank Ltd Ord 0.50
Housing Finance Co Ltd Ord 5.00
I&M Holdings Ltd Ord 1.00
Kenya Commercial Bank Ltd Ord 1.00
National Bank of Kenya Ltd Ord 5.00

NIC Bank Ltd Ord 5.00
Standard Chartered Bank Ltd Ord 5.00
The Co-operative Bank of Kenya Ltd Ord 1.00

INSURANCE

British-American Investments Company (Kenya) Ltd Ord 0.10
CIC Insurance Group Ltd Ord 1.00
Jubilee Holdings Ltd Ord 5.00
Kenya Re-Insurance Corporation Ltd Ord 2.50
Liberty Kenya Holdings Ltd
Pan Africa Insurance Holdings Ltd Ord 5.00

INVESTMENT

Centum Investment Co Ltd Ord 0.50
Olympia Capital Holdings Ltd Ord 5.00
Trans-Century Ltd

MANUFACTURING AND ALLIED

B.O.C Kenya Ltd Ord 5.00
British American Tobacco Kenya Ltd Ord 10.00
Carbacid Investments Ltd Ord 5.00
East African Breweries Ltd Ord 2.00
Eveready East Africa Ltd Ord.1.00
Kenya Orchards Ltd Ord 5.00
Mumias Sugar Co. Ltd Ord 2.00
Unga Group Ltd Ord 5.00
A.Baumann CO Ltd Ord 5.00

CONSTRUCTION AND ALLIED

Athi River Mining Ord 5.00
Bamburi Cement Ltd Ord 5.00
Crown Berger Ltd Ord 5.00
E.A.Cables Ltd Ord 0.50
E.A.Portland Cement Ltd Ord 5.00

ENERGY AND PETROLEUM

Kenya Power & Lighting Co Ltd
KenGen Ltd Ord. 2.50
KenolKobil Ltd Ord 0.05
Total Kenya Ltd Ord 5.00
Umeme Ltd Ord 0.50

Appendix II

Data collected on the CBR and NASI for the period February 2008 to March 2013.

Month	2008		2009		2010		2011		2012		2013	
	CBR (%)	NASI	CBR (%)	NASI	CBR (%)	NASI	CBR (%)	NASI	CBR (%)	NASI	CBR (%)	NASI
January	-	-	8.5	67.17	7	78.15	5.75	99.02	18	69.00	9.5	103.00
February	8.75	94.24	8.5	52.82	7	79.18	5.75	96.66	18	73.00	9.5	107.00
March	8.75	94.64	8.25	59.49	6.75	84.40	6	89.50	18	73.00	9.5	118.00
April	8.75	107.78	8.25	58.86	6.75	90.13	6	94.18	18	76.90	-	-
May	8.75	108.82	8	59.75	6.75	92.33	6.25	93.21	18	78.50	-	-
June	9	112.11	7.75	70.96	6.75	95.10	6.25	91.36	18	80.80	-	-
July	9	101.74	7.75	71.43	6	97.74	6.25	84.30	16.5	83.30	-	-
August	9	97.55	7.75	67.79	6	95.93	6.25	76.20	16.5	85.00	-	-
September	9	87.75	7.75	66.73	6.75	98.92	7	69.40	13	87.40	-	-
October	9	68.84	7.75	67.68	6.75	102.36	11	72.70	13	92.00	-	-
November	9	71.28	7	71.29	6	98.01	16.5	66.00	11	92.00	-	-
December	8.5	73.37	7	71.64	6	97.82	18	68.00	11	95.00	-	-