

**EFFECTS OF MACROECONOMIC VARIABLES ON EQUITY PRICES OF
COMMERCIAL BANKS LISTED AT THE NAIROBI SECURITIES EXCHANGE
IN KENYA**

BY

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DECLARATION

I declare that, this Dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this Dissertation contains no material written or published by other person except where due reference is made.

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I do hereby confirm that I have examined the master's Dissertation of

.....

And I have approved it for examination

Sign..... Date.....

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Dissertation Supervisor

DEDICATION

This Dissertation is dedicated to my family and in particular to my wife, **Cate**, My two children; **Ryan and Ray** for their support, encouragement, and understanding for the time I was not be there for them when working on this Study.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACF	Autocorrelation function.
ADF	Augmented Dickey-Fuller (1979) unit root test.
ARDL	Autogressive Distributed Lag
ARIMA	Autogressive Integrated Moving Average
CBK	Central Bank of Kenya
CDSC	Central Depository and Settlement Corporation
CMA	Capital Market Authority
NSE	Nairobi Securities Exchange
NASI	NSE all Share Index
OLS	Ordinary Least Square
VAR	Vector Autogressive
VECM	Vector Error Correction Model

DEFINITION OF TERMS

- Exchange rate:** The price of one country's currency expressed in another country's Currency. In other words, the rate at which one currency can be exchanged for another. (Mishkin& Eakins, 2009).
- Equity Price:** A stock (also known as equity or a share) is a portion of the ownership of a corporation. A share in a corporation gives the owner of the stock a stake in the company and its profits. (Mishkin& Eakins 2009). Equity price is the market price of a single share.
- Inflation:** Means a sustained increase in the aggregate or general price Levels in an economy. (Frisch, 2010)
- Interest rate:** Percentage a bank or financial institution charges you for borrowing money.
- Market trend:** Is a tendency of a financial market to move in a particular direction over time. (Norris, 2001)
- Money Supply:** The Money Supply refers to the entire stock of currency and other liquid instruments in a country's economy as of a particular time. According to US central bank, Federal Reserve (1977) published report there are various types of money supply and these are labeled as M1, M2 and M3.
- Stock Market:** The market in which shares are issued and traded either through exchanges or over-the-counter markets. It is also known as the equity market. (Mishkin& Eakins 2009)

ABSTRACT

A number of studies have been undertaken to identify the factors influencing stock prices in different stock markets. The extant literature available strongly supports the movement of stock price as a consequence of firm specific factors (micro economic) such as dividend, book value, earnings etc. This study sought to establish the effects of macroeconomic variables on equity prices of commercial banks listed at NSE in Kenya. The main objective was to analyze the effects of macroeconomic variables on equity prices of commercial banks listed at NSE in Kenya. The selected macro-economic variables included inflation rate, exchange rate and interest rate. The study followed descriptive research design. Secondary time series data was utilized for the period between 2008 and 2014. The researcher used a time series data analysis approach. First, the data was tested for stationarity. Differencing was done to attain stationarity and subsequently analysis was done using the first lags. Lag order selection was then undertaken. This procedure indicated that the optimum number of lags is one. The researcher then undertook a Johansen cointegration test on the study variables. Since there were no cointegration vectors, a Vector Autoregressive (VAR) was fitted to the study data. The VAR model showed that only lagged Forex rates had a significant effect on other indicators. The influence of other lagged indicators wasn't significant. This underscores the important of the currency market in determining macroeconomic trends and movements of the stock market in Kenya. Further, granger causality testing showed that the Forex rates unidirectionally granger cause all other time series, i.e. the mean share price, interest rate, and inflation. This implies that the foreign exchange rate is an importance driver of other macroeconomic fundamentals in Kenya. Finally, the researcher tested for residual autocorrelation. The residuals were found to be uncorrelated – an indication that the model was correctly specified.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The stock market plays a significant role in the economy of a country and an important role in the allocation of resources, both directly as a source of funds and as a determinant of firms' value and its borrowing capacity (Tease, 1993). Stock market can be defined as the market in which shares of public companies are issued and traded either through exchanges or through over-the-counter (Irfan&Nishat 2002).

Stock market provides an avenue for investment and capital formation and can act as an indicator of overall economic situation in a country. The stock market has been of significant interest to financial managers due to its ability to provide access to capital for companies and returns to investors with minimum risk (Gatua, 2013). Equity markets are also important in sustaining growth in an industry and a country's economy as a whole and serves as a measurement tool for future growth (Nirmala, Sanju& Ramachandran, 2011). Through Equity investment, other benefits such as dividend income, capital gain, limited liability, control and ownership are experienced. According to Gill et al (2012), the share price is one of the most important indicators available to the investors for their decision to invest in or not a particular share. This is particular true because share prices are used as proxies to signal the overall strength and financial health of a company. The equity investments are therefore dependent on share prices because they serve as indicators on whether investors should invest in a particular share.

1.1.1 Equity Prices

Various factors can influence the price movement of Equity from day to day, and thus, volatility of a stock market index. Factors internal to the firm, like favorable earnings, may push its share price up due to increased demand since investors like to put their money on winners. Other factors are beyond the control of the firm including the macroeconomic, social, political and legal environment in which it operates. Potential investors therefore evaluate the overall climate and other firm specific factors to formulate expectations about the stock market before making

investment decisions. Past studies have concluded that changes in stock prices are linked to macroeconomic factors. According to Liu and Shrestha (2008), macroeconomic activities of a country influence the returns of its stock market. Muradoglu et al (2000) pointed out that change in stock prices are linked with macroeconomic behaviour in advanced countries. In local studies, Kimani and Mutuku (2013) showed that there is a negative relationship between inflation and stock market performance in Kenya. Anene (2011) studied the relationship between exchange rate and stock prices in Kenya. The study showed that there is a unidirectional causal relationship between exchange rates (Ksh /US \$) and stock prices at NSE.

The Stock prices, hence stock returns are generally believed to be determined by some fundamental macro-economic variables such as interest rates, inflation, exchange rate, and Gross domestic Product (Kirui, Wawire and Ono, 2014). Knowledge of these factors will convey valuable information to management in general and financial managers in particular thus enhancing their firm's value. These factors are also important to investors as they help them make important investment decisions. In Kenya, the trading of stock takes place in Nairobi Securities Exchange (NSE)

1.1.2 Macro-Economic Variables

The selected macro-economic variables were considered based on the scholars finding, economic importance of the variables and the performance indicators of the growth and development of the economy of Kenya.

Inflation Rate

Inflation means a sustained aggregated increase in general price levels in an economy (Frisch, 2010). Inflation rate is a key macroeconomic variable in the Kenyan economy. Unexpected inflation causes a rise in the living cost, which will tend to shift the resources from the investment to consumption expenditure. According to Talla (2013), as inflation goes up, discount rate used to determine intrinsic values of stocks would therefore increase which will reduce the present value of net income leading to lower stock prices.

Exchange Rate

According to Mishkin and Eakins(2009),exchange rate is the price at which one country's currency exchanges for another country's currency. The exchange is important in determining the price of a nation's especially of goods imported from abroad. When currency appreciates, in a situation where the country is export-oriented, it is expected that there will be a reduction in the competitiveness of her exports, and would therefore have a negative impact on the domestic stock market. This is because the export-oriented companies quoted on the stock exchange market would be less profitable and this may in turn become less attractive to investors (Muthike & Sakwa, 2012). The opposite happens in a scenario where currency depreciates as exports become competitive. The witnessed fluctuations in Kenya shilling will have an effect on the stock prices depending on whether it appreciates or depreciates. As of May 16th 2013 the Kenya shilling exchange rate remained fairly stable against major international world currencies. The Kenya shilling firmed up against US,Dollar to trade at an average rate of Ksh 83.81 (Republic of Kenya, 2013). This change in exchange rates may have a bearing on stock returns in NSE depending on the behavior of currency, whether it appreciates or otherwise.

Interest Rate

Interest rate is the cost of borrowing expressed as a percentage per year (Thomas, 2006). The real, interest adjusted for inflation influences consumption and investment expenditures and the way in which wealth is redistributed between borrowers and lenders. If real interest rates are unusually high lenders benefit at the expense of borrowers. If real interest rates are abnormally low, borrowers benefit at the expense of the lenders (Thomas, 2006). Interest rates rank among the most crucial variables in macroeconomics and in the practical world of finance. Interest rate changes influence many economic phenomena, including the level of consumer expenditures on durable goods, investment expenditures on plants, equipment and technology and the way wealth is redistributed between borrowers and lenders. Interest rates influence the prices of key financial assets such as stocks, bonds, and foreign currencies (Thomas, 2006)

1.1.3 Nairobi Securities Exchange

Nairobi Securities Exchange (NSE) is the principal bourse in Kenya, offering an automated platform for the listing and trading of multiple securities. The Nairobi securities exchange (NSE, 2011) was established in 1954 as a voluntary association of stockbrokers with the objective to facilitate mobilization of resources to provide long-term capital for financing investments. The NSE is regulated by Capital Markets Authority (CMA, 2011) which provides surveillance for regulatory compliance. The exchange has continuously lobbied the government to create conducive policy framework to facilitate growth of the economy and the private sector to enhance growth of the stock market (Ngugi, 2005).

The NSE is also supported by the Central Depository and Settlement Corporation (CDSC) which provides clearing, delivery and settlement services for securities traded at the Exchange. It oversees the conduct of Central Depository Agents comprised of stockbrokers and investments banks which are members of NSE and Custodians (CDSC, 2004). These regulatory frameworks are aimed to sustain a robust stock market exchange that supports a cogent and efficient allocation of capital allowing price discovery to take place freely based on the market forces.

In Kenya currently, NSE has 68 listed companies and a market capitalization of 2.248 trillion. Listed companies fall into two main segments, the main market segment and the alternative investment market segment. The NSE has classified these companies into ten sectors. These are; agriculture, Automobiles and accessories, Banking, commercial and services, Construction & Allied, Energy & Petroleum, Insurance, Investment, Investment services, Manufacturing and Allied, Telecommunication & Technology, Real Estate Investment Trust and Exchange Traded Fund. (www.nse.co.ke). The volatility in NSE share prices are as a result of changes in the economic environment which if not closely monitored may impact negatively on the shares returns. Of great concern to share price volatility are fluctuations of the macro variables, which have been seen to be the reason behind the assortment of ills that beset the fluctuations in the

stock market returns in Nairobi Securities Exchange Limited (Nairobi Securities Exchange, 2013)

1.2 Statement of the problem

The share price is one of the most important indicators available to the investors for their decision to invest (Gill *et al*, 2012). Share prices may rise or fall in response to fluctuations in both micro-economic and macro-economic factors. Investors are interested in making investments in firms that promise good returns. The changes in share prices could determine the timing and extent to which people are willing to invest, since share prices at every point in time tends to reflect public perception about the firm's worth (Oliver Inyama and Ozouli, 2014). The stock prices may go up or down in short run as well as long run. It is important therefore, for investors at NSE, to have adequate information on the effect of macro-economic variables such as, inflation rate, exchange rate and interest rate on the equity prices.

Several studies conducted earlier focused on advanced economies, however in recent years we have experienced huge inflows into emerging markets like Kenya, due to liberalization and increased liquidity, which drives the need to conduct a study to ascertain the association between the macro-economic factors and Equity prices. The few studies conducted locally, focused on the entire stock market share index, which brings the argument in this current study; that the entire NSE share index includes non-performing firms that will distort the outcome of the study (Ochieng' and Oriwo,2012). Such distorted outcome may not be reliable in investment decisions.

In an attempt to identify macro-economic factors, one researcher, Oyama (1997) who investigated the relationship between macroeconomic variables and of share prices for companies in Zimbabwe stock exchange from 1993 to 1994, concluded that, share price movements are caused by movements of monetary policies and market interest rate. This conclusion did not consider other Macro economic factors such as exchange rate and the inflation rate. Also this study considered the whole stock market in a very short time span. In another Asian study, Aurangzeb (2012) examined the factors that affect the share prices in

Pakistan, India and Sri Lanka. The results indicated that, exchange rate impacts positively on share prices whereas interest rate has a significant negative relationship to share prices. Aurangzeb (2012) concluded that appropriate macro-economic policies should be in place to take full advantage of stock market and which will maximize share prices. The conclusion of this study recommends further study on other macro-economic factors on various sectors in the economy.

Locally, Aduda, Masila and Onsongo, (2012), indicated that, several prior empirical studies from developed economies have shed light on the effect of various macro-economic factors on the share price of firms but few of these have focused on emerging markets like Kenya. Mongeri (2011) established that foreign exchange rates have a negative significant impact on stock market performance. Ochieng and Adhiambo (2012) established that 91 – day T-bill rate has a negative relationship with the NASI while inflation has a weak positive relationship with the NASI. According to Ochieng and Oriwo (2012), an earlier study cannot give much credence to policy due to the fact that, most previous study employed data for the entire share index which includes even non-performing firms at the NSE, which distorts the outcome. The Study also noted that it is important to review the prevailing economic condition to model the investment strategies. Reinforcing the above view, Kiboi and Katuse (2015), reported that investors should constantly review the prevailing economic conditions, based on the patterns of the determinant macroeconomic factors to model their investment strategies.

This research sought to contribute further to the works of Ochieng and Oriwo (2012), Kiboi, and Katuse (2015), by eliminating non-performing sectors in the study. The study attempted to find out how Equity Prices movement of specific active sectors in the market (share Index) is influenced by the macroeconomic variables and if those influences are of any different from the overall market Performance. This study selected banking sector as an active sector in the economy, to analyze the Effects of Macroeconomic Variables on Equity Prices of Commercial Banks listed at NSE in Kenya, to fill in on this existing knowledge gap.

1.3 Objective of the Study

1.3.1 General objective

To analyze the Effects of the Macroeconomic Variables on Equity prices of Commercial Banks listed at the Nairobi Security Exchange in Kenya.

1.3.2 Specific Objectives

1. To establish the effect of inflation rate on Equity prices of Commercial Banks listed at Nairobi Security Exchange in Kenya.
2. To establish the effect of interest rate on Equity prices of Commercial Banks listed at Nairobi Security Exchange in Kenya.
3. To establish the effect of exchange rate on Equity prices of commercial Banks listed at Nairobi Security Exchange in Kenya.

1.4 Hypothesis of the Study

H₀₁: Inflation rate has no significance effect on Equity prices of Commercial Banks listed at NSE in Kenya

H₀₂: Interest rate has no significance effect on Equity prices of Commercial Banks listed at NSE in Kenya

H₀₃: Exchange rate has no significance effect on Equity prices of Commercial Banks listed at NSE in Kenya

1.5 Significance of the Study

1.5.1 Management

The contribution of this study is important in the management of the investment firms formulate and implement sound policies that that will enable the firm achieve its wealth maximization objective and enhance the firm's value

1.5.2 Government

In terms of policy implications, the study is important in the formulation of policies by the government with regard to control of inflation, interest rate and exchange rate and promotion of investment in the stock market.

1.5.3 Investors and investment managers

This study equips the existing and potential investors with the knowledge about interest rates, inflation and exchange rate that will help them forecast, analyze and manage well their portfolios to maximize their returns.

1.5.4 Academicians

The study is important to the body of knowledge in this area and equips future researchers with sufficient foundation to further conduct further researcher in this area.

1.6 Justification of the study

The few studies done in Kenya have focused on the impact of macroeconomic variables on general stock market returns. This study will contribute to the limited literature by evaluating the relationships between selected macroeconomic variables and stock returns of the banking sector in particular. According to Ochieng and Oriwo (2012), an earlier study cannot give much credence to policy due to the fact that most previous study employed data for the entire NSE share index, which includes even non-performing firms at the NSE. Also, the views by Kiboi and Katuse (2015), reported that investors should constantly review the prevailing economic conditions based on the patterns of the determinant macroeconomic factors to model their investment strategies. Based on above views it is important to consider the prevailing economic condition and ignore the non-performing sectors in the economy in order to correctly establish the macroeconomic determinants of stock prices of commercial banks listed at NSE in Kenya. It is also clear that little attempt has been made to find out how stock Performance of different

sectors in the same market is influenced by the macroeconomic variables and if those influences are any different from the overall market Performance. This research singles out banking sector as an active sector in the study in order to ignore other likely non-performing sectors at NSE, and also consider the prevailing economic conditions, in order to establish the Effects of the Macroeconomic Variables on Equity prices of Commercial Banks listed at the Nairobi Security Exchange in Kenya.

1.7 Scope of the Study

This study embarked on the all the listed firms comprising the banking sector. The data was analyzed for a period of 7 years, from 2008 to 2014. The time span was selected in such a way to accommodate the data from all the eleven (11) Commercial Banks Listed at the NSE as at December 2016. The study only considered three external factors as the determinants of the equity prices.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter examines the concepts and theories on determinants of stock market performance with major focus on macro-economic variables; Exchange rate, inflation rate, money supply, and interest rate. The chapter also considers empirical literatures from diverse past authors' experiments, experiences, observation and summary of the literature review. The chapter forms the conceptual framework of the study on Effects of Macroeconomic Variables of stock prices of commercial banks listed at NSE in Kenya and also shows the operationalization of variables to be used in this study.

2.2 Theoretical Review

Theoretical review is the theoretical foundation of a study. A theoretical research has its findings based on existing theories and hypothesis such that there is no practical application in the research. Ensuing are the theories upon which this study is founded upon which include; The Efficient Market Hypothesis, Fisher's Effect Theory, Purchasing Power Parity Theory (PPP) and Quantity Theory of Money.

2.2.1 Efficient Market Hypothesis (EMH)

The basic idea underlying the EMH developed by Fama (1965, 1970) is that asset prices promptly reflect all available information, past, current and future such that abnormal profits cannot be produced regardless of the investment strategies utilized. This situation is referred to as strong or perfect market hypothesis. The weak form of the EMH stresses that asset prices today incorporate all relevant past information, which include past asset prices, security dividends, and trading volume. Knowing the past behavior of stock prices provides no indication of future stock prices. The semi-strong form of the EMH states that current asset prices fully reflect all available public information. Public information includes not only information about

an asset 's past price, but includes all information related to the company's performance, expectations regarding macroeconomic factors, and any other relevant public information such as GDP, the money supply, interest rates, and the exchange rate. The implications of the EMH are broad. From an investor's perspective, participants in the stock market should not be able to generate an abnormal profit regardless of the level of information they may possess. As mentioned before, in the world of a perfect capital market, investors cannot consistently beat the market. This is consistent with the financial idea that the maximum price that investors are willing to pay is the current value of future cash flows. The current value of future cash flows is usually evaluated by a discount rate, which represents the degree of uncertainty associated with the investment, considering all relevant available information.

From an economic standpoint, an efficient stock market will assist with the efficient allocation of economic resources. For instance, if the shares of a financially poor company are not priced correctly, new savings will not be used within the financially poor sector. In the world of the EMH, the level of asset price fluctuations, or volatility, fairly reflects underlying economic fundamentals. Along these lines, Levich (2001) who used this theory in his study argues that policymaker's interventions may disrupt the market, and cause it to be inefficient. In the literature, the three forms of the EMH are usually used as guidelines rather than strict facts (Fama, 1991). Also, most empirical studies have examined the EMH in its weak or semi-strong forms, partly because the strong form is difficult to measure, and there is a high cost associated with acquiring private information (Timmermann & Granger, 2004). This model will be important in this study to guide the researcher on to what extent the knowledge of macroeconomic variables will affect the performance of equity prices of commercial banks listed at NSE in Kenya.

2.2.2Fisher's Effect Theory

Fisher (1930) hypothesized that the expected nominal return on common stocks consists of a "real" return plus one expected rate of inflation. Fisher effect theory states that nominal interest

rates in two or more countries should be equal to the required real rate of return to investors plus compensation for the expected amount of inflation in each country (Dimand, 2003). Results of empirical studies have shown that expected inflation, changes in expected inflation, and unexpected inflation are negatively correlated to stock returns (Kaul, 1987).

According to the generalized Fisher (1930) hypothesis, equity stocks represent claims against real assets of a business; and as such, may serve as a hedge against inflation. If this holds, then investors could sell their financial assets in exchange for real assets when expected inflation is pronounced. In such a situation, stock prices in nominal terms should fully reflect expected inflation and the relationship between these two variables should be positively correlated ex ante (Ioannides, et.al, 2005). This argument of stock market serving as a hedge against inflation may also imply that investors are fully compensated for the rise in the general price level through corresponding increases in nominal stock market Performance and thus, the real Performance remain unaltered. Further extension of the hedge hypothesis posits that since equities are claims as current and future earnings, then it is expected that in the long run as well, the stock market should equally serve as a hedge against inflation. Application of this model in this study will guide the researcher on answering the question whether expected inflation, changes in expected and unexpected inflation has effect on stock returns of commercial banks listed in NSE in Kenya.

2.2.3 Purchasing Power Parity Theory (PPP)

Purchasing Power Parity can be traced back to sixteen-century Spain and early seventeen century England, but Swedish economist Cassel (1918) was the first to name the theory PPP. Cassel once argued that without it, there would be no meaningful way to discuss over-or-under valuation of a currency. The starting point of exchange rate theory is purchasing power parity (PPP), which is also called the inflation theory of exchange rates. Purchasing power parity is a theory which states that exchange rates between currencies are in equilibrium when their purchasing power is the same in each of the two countries. Ever since PPP has been used by central banks as a guide in their monetary policy activities to determine exchange rates (Schapiro, 2006).

Absolute PPP theory was first presented to deal with the price relationship of goods with the value of different currencies. The theory requires very strong preconditions. Generally, Absolute PPP holds in an integrated, competitive product market with the implicit assumption of a risk-neutral world, in which the goods can be traded freely without transportation costs, tariffs, export quotas, and so on. However, it is unrealistic in a real society to assume that no costs are needed to transport goods from one place to another. In the real world, each economy produces and consumes tens of thousands of commodities and services, many of which have different prices from country to country because of transport costs, tariffs, and other trade barriers (Kanamori & Zhao, 2006). Application of this theory would be an assumption that there would be no transaction costs associated with stock transactions. Due to a rising number of foreign investors in stock market in Kenya, especially in the banking sector, the PPP theory will assist the researcher to form a strong basis of the conclusion in determining the effect of exchange rate on equity prices of commercial banks listed at NSE in Kenya.

2.2.4 Quantity Theory of Money

This theory was first developed by Simon Newcomb, Alfred de Faville, Irving Fisher and Ludwig Von Mises in the late 19th and early 20th century. The quantity theory of money (QTM) states that the general price level of goods and services is directly proportional to the amount of money in circulation, or money supply. Money supply refers to the total amount of money in circulation or in existence in a country. The theory was challenged by Keynesian economics, but updated and reinvigorated by the monetarist school of economics.

By applying this theory, the modern theorists, Ben Bernanke and Kenneth Kuttner (2005) argue that the price of a stock is a function of its monetary value and the perceived risk in holding the stock. A stock is attractive if the monetary value it bears is high. On the other hand, a stock is unattractive if the perceived risk is high. The authors argue that the money supply affects the

stock market through its effect on both the monetary value and the perceived risk. Money supply affects the monetary value of a stock through its effect on the interest rate. The authors believe that tightening the money supply raises the real interest rate. An increase in the interest rate would in turn raise the discount rate, which would decrease the value of the stock as argued by the real activity theorists (Bernanke and Kuttner, 2005). The authors argue that tightening of the money supply would increase the risk premium that would be needed to compensate the investor for holding the risky assets. They believe that tightening the money supply symbolizes a slowing down of economic activity, which reduces the potential of firms to make a profit. Investors would be bearing more risk in such a situation and, hence, demand more risk premium. The risk premium makes the stock unattractive, which would lower the price of the stock (Bernanke and Kuttner, 2005). This view is agreeing with by Sellin (2001) findings who also used this theory in his study. This theory will therefore guide the researcher in his finding by using the changes in money supply in determining stock market prices of commercial banks listed at NSE in Kenya.

2.3 Empirical Review

The empirical literatures consider work from diverse past authors, their experiments, experiences, observation and conclusions. The following illustrates past research work on determinants of stock prices both globally and locally.

2.3.1 Interest rate and Equity prices

Interest rate is an important macroeconomic variable, which is directly related to economic growth. The interest rate is generally considered as the cost of capital, or, the price paid for the use of money for a period. Addo and Suyuze (2013) studied the joint impact of interest rate and Treasury bill rate on stock market returns on Ghana Stock Exchange over the period between 1995 and 2011 using Johansen's Multivariate Cointegration Model and Vector Error Correction Model. Based on the Multiple Regression Analysis, the results showed that the Treasury bill rate

and interest rate both have a negative relationship with stock market returns but are not significant. Saeed and Akhter (2012) examined the impact of macroeconomic factors on a banking index that included twenty-nine listed banks on Karachi Stock Exchange from 2000 to 2010. Regression results indicated that short term interest rates affects the banking index negatively. In Al-Albadi and Al-Sabbagh (2006) study of interest rate sensitivity, market risk, inflation and banks' stock returns, the multifactor model used on the data of 13 commercial and investment banks resulted in the researchers concluding that the interest rate has a significant and negative impact on stock returns.

Alam and Uddin (2009) examined evidence supporting the existence of share market efficiency based on the monthly data between 1988 to 2003 of stock indices and interest rates for fifteen developed and developing countries. The study found that, for all of the countries, interest rate has significant negative relationship with share price and, for six countries, that changes in interest rate has significant negative relationship with changes of share price. Mehwish (2013) conducted a study on Determinants of Stock Market Performance in Pakistan. The data was analyzed quantitatively through regression analysis using E-views. Using a time series data for the period between 1988 and 2008, the study established that there is a negative relationship between real interest rate and stock market performance, whereas the banking sector development has no significant impact on stock market performance.

Lee (1997) used a three-year rolling regression to analyze the relationship between stock market Performance and the short-term interest rate. He found out that the relationship is not stable over time. Arango, Gonzalez and Posada. (2002) found that some evidence of the nonlinear and inverse relationship between the share prices on the Bogota stock market and the interest rate as measured by the interbank loan interest rate, which is to some extent affected by monetary policy. The model captures the stylized fact on this market of high dependency of Performance in short periods. Zordan (2005) said that historical evidence illustrates that stock prices and interest rates are inversely correlated, with cycles observable from well back in the 1880's. Uddin and Alam

(2007) examined the linear relationship between share prices and interest rate, share prices and changes of interest rates, changes of share prices and interest rates and changes of share prices and changes of interest 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 prices.

Hsing (2004) adopted a structural VAR model that allows for the simultaneous determination of several endogenous variables such as, output, real interest rate, exchange rate, stock market index and found that there is an inverse relationship between stock prices and interest rates. Focusing on the determinants of equity market indices in Kenya, Kimani and Mutuku (2013) found a negative relationship between deposit interest rate and Nairobi Securities Exchange's 20-share index.

2.3.2 Inflation rate and Equity prices

Numerous studies in this area have produced conflicting results. Adrangi, Charath and Shank (2000) investigated the relationship between inflation, output and stock Performance for the developing markets of Peru and Chile. They found weak long run equilibrium. Yeh and Chi (2009) used Autoregressive Distributed Lag (ARDL) model to test the validity of the various Hypotheses that explain this relationship. The empirical result of this study of 12 OECD countries shows that these countries exhibit a short-run negatively significant co-movement between stock Performance and inflation. Moreover, countries like Australia, France, Ireland and Netherland do not display a long-run relationship between the two variables in equilibrium. This result is consistent with the hypotheses of Fama (1981), which suggested that an increase in inflation reduces real Performance on stock. This result is also in line with Rapach (2002). He argued that there exists a negative significant effect of inflation on real stock Performance after controlling for output shock and that inflationary trends do not erode Performance on

stocks. Crosby (2001) investigates the relationship between inflation and stock Performance in Australia from 1875 to 1996 and found out that the Australian economy does not experience permanent changes in inflation or stock Performance. The result shows that there exist short-run negative relationships between these two variables that depend on the period of time that is considered.

Spyros (2002) tested Fisher's Hypothesis using Vector Autogressive (VAR) model. His results reflect a contrary view that Performance on stocks hedges inflation. This study shows that there is negative but not a statistically significant relationship between inflation and stock Performance in Greece from 1990 to 2000. Kullapom and Lalita (2010) conducted a study on the relationship between inflation and stock prices in Thailand. The study was carried out in the period January 2000 to March 2010. The statistical method vector auto regression (VAR) was used to find and analyze the association. Interview was also conducted to gather opinions of investors in stock exchange of Thailand on how inflation affects equity value. The findings demonstrate that movement to stock prices is irrelevant to inflation.

On the contrary, Lee et al (2000) used the ARIMA model to examine the impact of German hyperinflation in the 1920s on stock Performance. This result of this study shows that the hyperinflation in Germany in early 1920s cointegrates with stock Performance. The fundamental relationship between stock Performance and both realized and expected inflation is highly positive. They concluded that common stocks appear to be a hedge against inflation during this period. Choudhry (2001) in his study on the impact of inflation on stock Performance in some selected Latin and Central American countries (Argentina, Chile, Mexico and Venezuela) from 1981-1996, also used an ARIMA model. His result reveals that there is one- to-one relationship between the current rate of nominal performance and inflation for Argentina and Chile. Their result also reveals that the lag values of inflation affect stock Performance and this result infer that stocks act as a hedge against inflation.

Ugur (2005) in a study on the effect of inflation on performance on stocks in turkey from 1986 to 2000 reveal that expected inflation and real Performance are not correlated. The results suggest there is a negative relationship between inflation and stock Performance which may be caused by the negative impact of unexpected inflation on stock Performance. This result did not contradict the Fisherian hypothesis because of the non-correlation of inflation and real Performance but the results is in line with the proxy hypothesis for a negative significant relationship exists between the two variables. Lee and Wong (2000) in their study on ten pacific countries and the US reveal that all the countries except Malaysia experience the negative relationship between inflation and stock Performance. Another researcher, Kurtan and Aksoy (2006) found that inflation and interest rates had a high influence on stock market Performance in Turkey.

Kimani and Mutuku (2013) investigated the impact of inflation on Central Depository System (CDS) and other macroeconomic variables (including deposit rate, gross domestic product terms of trade and the net effective exchange rate) on the Nairobi stock market performance using quarterly data from the Central Bank of Kenya (CBK) and the Nairobi Stock Exchange (NSE) for the period December 1998 to June 2010. The cointegrating model showed that there is a negative relationship between inflation and stock market performance in Kenya. In addition, the CDS is shown to have a positive and significant impact on the stock market performance. Ochieng and Adhiambo (2012) contributed to DBA Africa Management Review 2012 with an article, which investigated the relationship between macroeconomic variables on NSE All share index (NASI) seeking to determine whether changes in macroeconomic variables can be used to predict the future NASI. Three key macroeconomic variables included lending interest rate, inflation rate and 91 day Treasury bill (T bill) rate. The secondary data was for the periods March 2008 to March 2012. They established that 91– day T bill rate has a negative relationship with the NASI while inflation has a weak positive relationship with the NASI. Based

on these findings, the study recommended a closer monitoring of the macroeconomic environment since their changes have an effect on the stock market performance.

2.3.3 Exchange rate and Equity prices

The relationship between exchange rate fluctuations and stock market returns has differed according to numerous past studies. Kutty (2010) examined the relationship between stock prices and exchange rates in Mexico. The data for this study consisted of weekly closing of Bolsa, Mexico's equity index, a market capitalization weighted index of the leading 35-40 stocks. Mexican Peso per US dollar starting from the first week of January 1989 to the last week of December 2006 was obtained from the International Monetary Market. After eliminating some of the incompatible data, a total of 849 data points was generated. The Granger causality test shows that stock prices lead exchange rates in the short run, and there is no long run relationship between these two variables. This finding corroborates the results of Bahmani-Oskooee and Sohrabian (1992), but contradicts the findings of other studies which reported a long term relationship between exchange rates and stock prices (Kutty, 2010).

In another study Aydemir and Demirhan (2009) investigated the causal relationship between stock prices and exchange rates, using data from 23 February 2001 to 11 January 2008 about Turkey. The results of empirical study indicate that there was bidirectional causal relationship between exchange rate and all stock market indices. While the negative causality exists from national 100, services, financials and industrials indices to exchange rate, there is a positive causal relationship from technology indices to exchange rate. On the other hand, negative causal relationship from exchange rate to all stock market indices is determined (Aydemir & Demirhan, 2009). Adjasi (2008) determined whether movements in exchange rates have an effect on stock market in Ghana. The Exponential Generalised Autoregressive Conditional Heteroskedasticity (EGARCH) model was used in establishing the relationship between exchange rate volatility and stock market volatility. It was found that there is negative relationship between exchange rate volatility and stock market Performance depreciation in the local currency leads to an

increase in stock market Performance in the long run; whereas in the short run it reduces stock market Performance. Additionally, there is volatility persistence in most of the macroeconomic variables; current period's rate has an effect on forecast variance of future rate (Adjasi, 2008).

DesislavaDimitrova (2005) studied if the link between the stock market and exchange rates that might explain fluctuations in either market. He argued that, in the short run, an upward trend in the stock market may cause currency depreciation, whereas weak currency may cause decline in the stock market. To test these assertions, he used a multivariate, open-economy, short-run model that allows for simultaneous equilibrium in the goods, money, foreign exchange and stock markets in two countries. Specifically, this paper focused on the United States and the United Kingdom over the period January 1990 through August 2004. It found support for the hypothesis that a depreciation of the currency may depress the stock market and the stock market will react with a less than one percent decline to a one percent depreciation of the exchange rate. This also implies that an appreciating exchange rate boosts the stock market (Dimitrova, 2005). Anene (2011) studied the relationship between exchange rate and stock prices in Kenya. He used Granger Causality (GC) model. The study showed that there is a unidirectional causal relationship between exchange rates (Ksh /US \$) for the five-year period, that is Granger causes stock prices at NSE. The study was strong and significant at 90% confidence level.

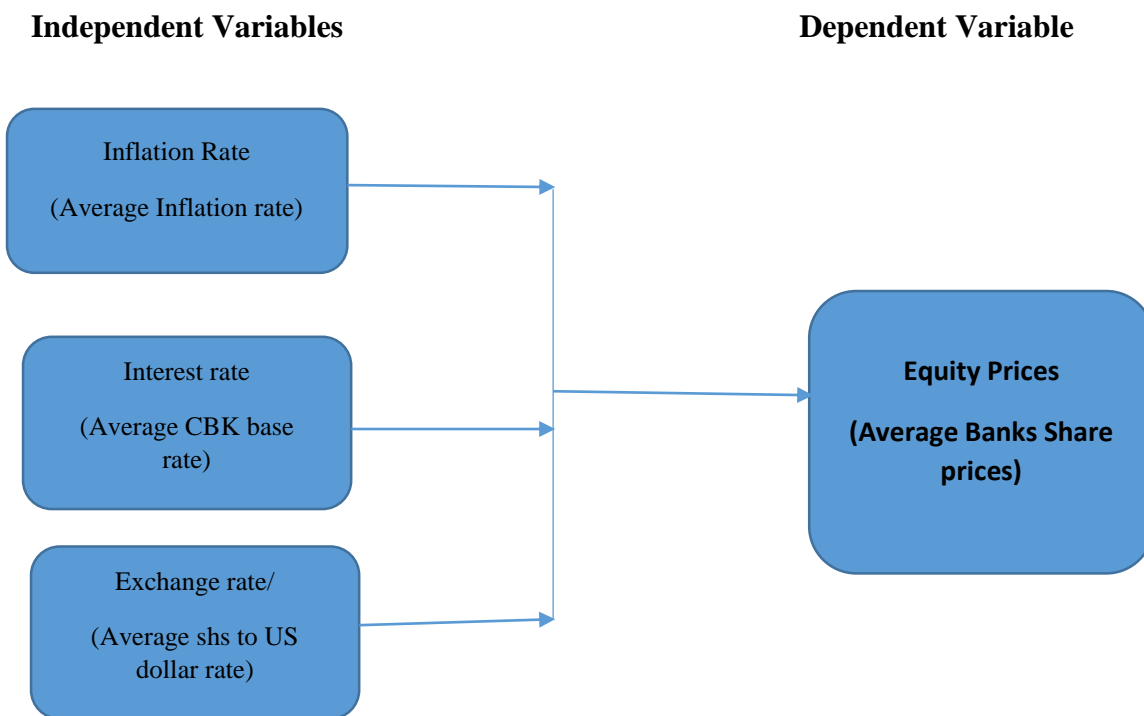
Monger (2011) examined the impact of foreign exchange rates and foreign exchange reserves on stock markets performance at NSE using monthly time series data of NSE share index, foreign exchange rates and reserves for the period 2003-2010. The study established that foreign exchange rates had negative significant impact on stock market. Anene (2011) studied the relationship between exchange rate and stock prices in Kenya. He used Granger Causality (GC) model. The study showed that there is a unidirectional causal relationship between exchange rates (Ksh /US \$) for the five-year period, that is Granger causes stock prices at NSE. The study was strong and significant at 90% confidence level. Sifunjo and Mwasaru (2012) analyzed the casual relationship between NSE stock prices and foreign exchange rate using monthly data from

November 1993 to May 1999. Johansen consideration procedure and error correction model were used for analysis. The empirical results indicate that in Kenya, nominal exchange rate of shillings per dollar Granger causes stock price. The study also found out a unidirectional causality from exchange rates to stock prices.

2.4 Conceptual Framework

Miles and Huberman (1994) defined a conceptual framework as a visual or written product, one that explains, either graphically or in narrative form, the main things to be studied the key factors, concepts, or variables and the presumed relationships among them. The review of theoretical and empirical literature above suggests that the following macroeconomic factors can potentially affect the Equity Prices of commercial banks listed at NSE in Kenya. These factors are, Inflation rate, Interest rates and Exchange Rate. Using the these variables, the conceptual framework can be summarized as follows;

Figure 2.1: Conceptual Framework



SOURCE: (Author 2017)

2.5 Critique of the Literature Review

The objective of the study is to determine Effects macroeconomic variables on Equity prices of commercial banks listed at the Nairobi Securities Exchange in Kenya. From the literature reviewed, empirical studies have sought to explain the effect between various macroeconomic variables and stock market performance. However, the study suggests that macroeconomic variables would affect different industries or sectors differently to the extent that, while stock Performance in some industries would be negatively related to a macroeconomic variable, others would be positively related to the same macroeconomic variable in the same market and this was in agreement with Gonsel and Cukur(2007).

Kurtan and Aksoy (2006) found that inflation and interest rates had a high influence on stock market Performance in Turkey. This contradicted the findings of Adrangi, Charath and Sharma (2000) who found a weak relationship between inflation and stock market performance of Chile and Peru. Chen et all (2001) found a strong positive relationship between inflation and stock

market Performance in Chile further contradicting the findings of Adrangi et al (2000). Spyrou (2001) found a negative strong relationship between inflation and stock market Performance in Greece. This again contradicts with the findings of Ratanapokarn et al. (2007).

Kimani and Mutuku (2013) investigated the impact of inflation, Central Depository System (CDS) and other macroeconomic variables (including deposit rate, gross domestic product terms of trade and the net effective exchange rate) on the Nairobi stock market performance and established relationship between inflation and stock market performance in Kenya. This contradicts the finding of Ochieng and Adhiambo (2012) who contributed to investigation of the relationship between macroeconomic variables on NASI seeking to determine whether changes in macroeconomic variables can be used to predict the future NASI. Three key macroeconomic variables included lending interest rate, inflation rate. He concluded that inflation has a weak positive relationship with the NASI.

Anene (2011) studied the relationship between exchange rate and stock prices in Kenya. The study showed that there is a unidirectional causal relationship between exchange rates (Ksh /US \$) and stock prices at NSE. The study was strong and significant at 90% confidence level. This contradicted the study done by Mongeri (2011) who examined the impact of foreign exchange rates and foreign exchange reserves on stock markets performance at NSE. The study established that foreign exchange rates had negative significant impact on stock market.

2.6 Summary and Gap of the Study

This study is meant to investigate how the stock Performance at the Nairobi Securities Exchange is influenced by the macroeconomic variables and we could not rely on the contradicting past studies to explain the relationship. Therefore, it is clear from past studies that there is no agreement on the relationship between the macroeconomic variables and stock Performance. Each market responds differently to changes in macroeconomic variables. Most of the past studies have tended to investigate the effect of one or a combination of two macroeconomic

variables on the stock market Performance and a study combining more than two variables would contribute greatly in explaining the stock market Performance. It is also clear that no consistent attempt has been made to find out how stock Performance of specific sector in the same market is influenced by the macroeconomic variables and if those influences are any different from the overall market Performance. This view has been reinforced by the finding of Ochieng and Oriwo (2012), who observed that an earlier study cannot give much credence to policy due to the fact that the period of study is not long enough to establish a reliable trend. This study therefore seeks to bridge this literature gap, by selecting the banking sector only to conduct the study.

2.7 Operational definition and measurement of Variables

The description and measurement of variables is explained in table 2.1 below

Table 2.1 Operationalization of Variables

Type	Variable	Variable Measure	Description
Dependent Variable	Stock Prices of commercial Banks listed At NSE in Kenya	Average bankshare prices	Measured by monthly average share prices of 11 companies in the banking sector listed at NSE
Independent Variable	Inflation rate	Average inflation rate	It is a persistence increase in general prices of goods and services. Measured by monthly average inflation rates.
Independent Variable	Interest Rate	Average CBK base rate	Used as proxy for domestic rate of interest measured as the Annual Monthly CBK base rate.
Independent Variable	Exchange rate	Average Kshs per USD (forex rates)	Measured by Monthly average rate at which Kenya shillings exchanges with one US dollar.

SOURCE: (Author 2017)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodology used to conduct the study. The chapter explains the methods used to collect secondary data necessary for the study. The chapter discusses the research design used, the target population, data collection methods and diagnostic tests conducted. The researcher gives a detailed data analysis and explains the model and statistical tools that was used to analyze the data.

3.2 Research Design

Lavrakas (2008) defines research design as general plan or strategy for conducting a research study to examine specific testable research questions of interest. The choice of research strategy according to Sounders, Lewis & Thornhill (2009) is guided by the research question(s), objective(s), the extent of existing knowledge, amount of time and resources available as well as the philosophical underpinning. Research design also refers to a detailed outline on how the research will take place. It specifies the methods and procedures that will be used to collect and analyse data (Borg *et al.* 2007). This study adopted a descriptive research design. Descriptive research design is a statistical method that quantitatively synthesizes the empirical evidence of a specific field of research. Flick (2009) notes that descriptive research design has become widely accepted in the field of finance and economics since it is proving to be very useful in policy evaluations. The study sought to investigate the determinants of stock prices of commercial banks at NSE in Kenya. The researcher considered a banking sector data as a case study at the Nairobi Securities Exchange in Kenya

3.3 Target Population

Newing (2011) describes a population as the set of sampling units or cases that the researcher is interested with in the study. According to Borg and Gall (2007) a target population consists of

all members of a real or hypothetical set of people, events or objects from which a researcher wishes to generalize the results of their research while accessible population consists of all the individuals who realistically could be included in the sample. The target population for this study comprised of all eleven (11) banking sector firms listed at the Nairobi Securities Exchange and whose data was available for the period from January 2008 to December 2014.

3.4 Sample Size and Sampling Technique

Kothari (2004) describes a sample as a collection of units chosen from the universe to represent it. Black (2004, 2011) defines sampling as the selection of individuals from within a population to yield some knowledge about the whole population, especially for making predictions based on statistical inference. Gay (2003) recommends that where the target population is less than 100, the whole population should be included in the study and a census survey undertaken. For this study, a census survey was undertaken since our target population was less than 100; hence, no sampling was required.

3.5 Data collection

Creswell (2002) defines data collection as a means by which information is obtained from the selected subjects of an investigation. Data collection is the process of gathering and measuring information in order to be able to answer questions that prompted the undertaking of the research (Flick, 2009). This study adopted secondary data from external records. The data was collected using the data collection Sheet (Appendix I). The sources of the data was as follows; the data for stock Prices was obtained from the Nairobi Securities exchange, data on exchange rate, money supply and interest rates was obtained from the Central Bank of Kenya while data on inflation was obtained from the Kenya National Bureau of Statistics.

3.6 Diagnostic Tests

In a series of papers by Durbin (1954), Wu (1973, 1974) and Hausman (1978) tests were proposed to be applied to the problem of detecting endogenous regressors to test the regression results for the usual challenges associated with time series data. In this study, the following tests were performed.

3.6.1 Unit Root test

A stationary time series data is one that exhibits near constant mean, variance and autocorrelation. Time series data is often known to have problems with non-stationarity. Therefore, it is important to determine whether a series is stationary (do not contain a unit root) or not stationary (contains a unit root) before using it. One can obtain a high R^2 with non-stationary data even though there is no meaningful relation between variables, otherwise known as a spurious regression between unrelated variables. A stationary test was conducted to determine the statistical properties of the time series data using the Phillips-Perron (PP) test. If the test statistic of this test will be more negative than the critical value at 1%, 5%, and 10% level of significance, then the null hypotheses of a unit root will not be rejected. In this study the null hypothesis was accepted.

3.7 Testing for Cointegration

The researcher used the Johansen cointegration test to test the time series for cointegration. This was an important juncture in the analysis since the results of this test guided the model selection. Essentially, a Vector Autoregressive (VAR) should be fitted if there is no cointegration in the data. On the other hand, a Vector Error Correction (VEC) model should be fitted if there are cointegrating relations in the dataset.

3.8 Optimal Lag Order Selection

Before fitting a time series model, the correct order of lags must be set. This is because too many lags can lead to loss of degrees of freedom while too few lags can lead to the problem of model

inadequacy. The researcher used four lag order selection criteria, i.e. Akaike Information Criteria, First Prediction Error (FPE) Hannan Quinn Information Criteria (HQIC), and Schwarz Bayesian (SBIC) information criteria. The lag order which is selected by the highest number of criteria should be utilized in the study. For this study, this lag order was one.

3.9 Data Analysis

Data Analysis is the process of systematically applying statistical and or logical techniques to describe and illustrate, condense and recap, and evaluate data. According to Mugenda and Mugenda (2003) data must be cleaned, coded and properly analysed in order to obtain meaningful information. Secondary data gathered was organized in spreadsheets for the purpose of analysis. To analyze the relationship between the stock market, the forex market, and macroeconomic indicators of inflation and interest rate, the Vector Auto regression (VAR) model was used. The use of VAR is justified since it is possible to estimate the response over time of any variable in a set to either its own lagged movements or lagged movements of any other variable in a system of equations (Sichei, 2002). VAR entails estimating regression equations in which current value of each variable is expressed as a function of lagged values of itself and of each of the selected variables (Orden, 1986). The VAR model that was fitted in this study is of the form:

$$Y_t = A_0 + A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + e_t$$

Where A_0 is 4×1 vector of constant terms, A_1, A_2, \dots, A_p are 3×3 matrices of coefficients, Y_t is a 4×1 vector of endogenous variables (mean share prices of banking stocks, forex rate, inflation rate, and interest rate) and e_t is a 4×1 vector of serially uncorrelated error terms that are assumed to have a mean of zero and a covariance matrix Ω .

3.10 Post Estimation Procedures

Post Estimation Procedures are undertaken to evaluate how robust the just fitted model is in explaining the relationship between study variables. Two post estimation procedures were undertaken in this study. These are testing for granger causality and for residual autocorrelation

3.10.1 Testing For Granger Causality

The Granger causality test was used infer the direction of influence between the time series of the study. A time series X is said to Granger-cause Y if it can be shown that lagged values of X provide statistically significant information about future values of Y.

3.10.2 Testing For Residual Autocorrelation

The researcher used the Ljung Box Portmanteau test to test for autocorrelation of model residuals. This was done to verify that the model was indeed specified correctly. If there is residual autocorrelation, most likely there are too few lags in the model.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1 Introduction

This chapter discusses the relationship between macroeconomic variables, i.e. Inflation rate, Interest Rate, Exchange rate and the mean share prices of commercial banks in Kenya. First, the researcher outlines the descriptive statistics. He then conducts Exploratory Data Analysis to look at the trend of each time series over time. Diagnostic testing is conducted next. Finally, an empirical model is fitted to the study data.

4.2 Descriptive Statistics

The mean share price was 53.52 with a standard deviation of 9.94, a minimum of 35.35 and a maximum of 77.04. Forex rate had a mean of Kshs/\$ 82.15, a maximum of Kshs/\$ 132.964, a minimum of Kshs/\$ 62.122 and a standard deviation of 12.467. The maximum level for interest rate over the study period was 20.55% while the least was 13.85%. The mean interest rate was 16.323% and the standard deviation was 2.00. Finally, inflation had a low of 3.18%, a high of 19.72%, a standard deviation of 4.32 and a mean of 4.32%. This is indicated in table 4.1 below.

Table 4.1 Descriptive Statistics

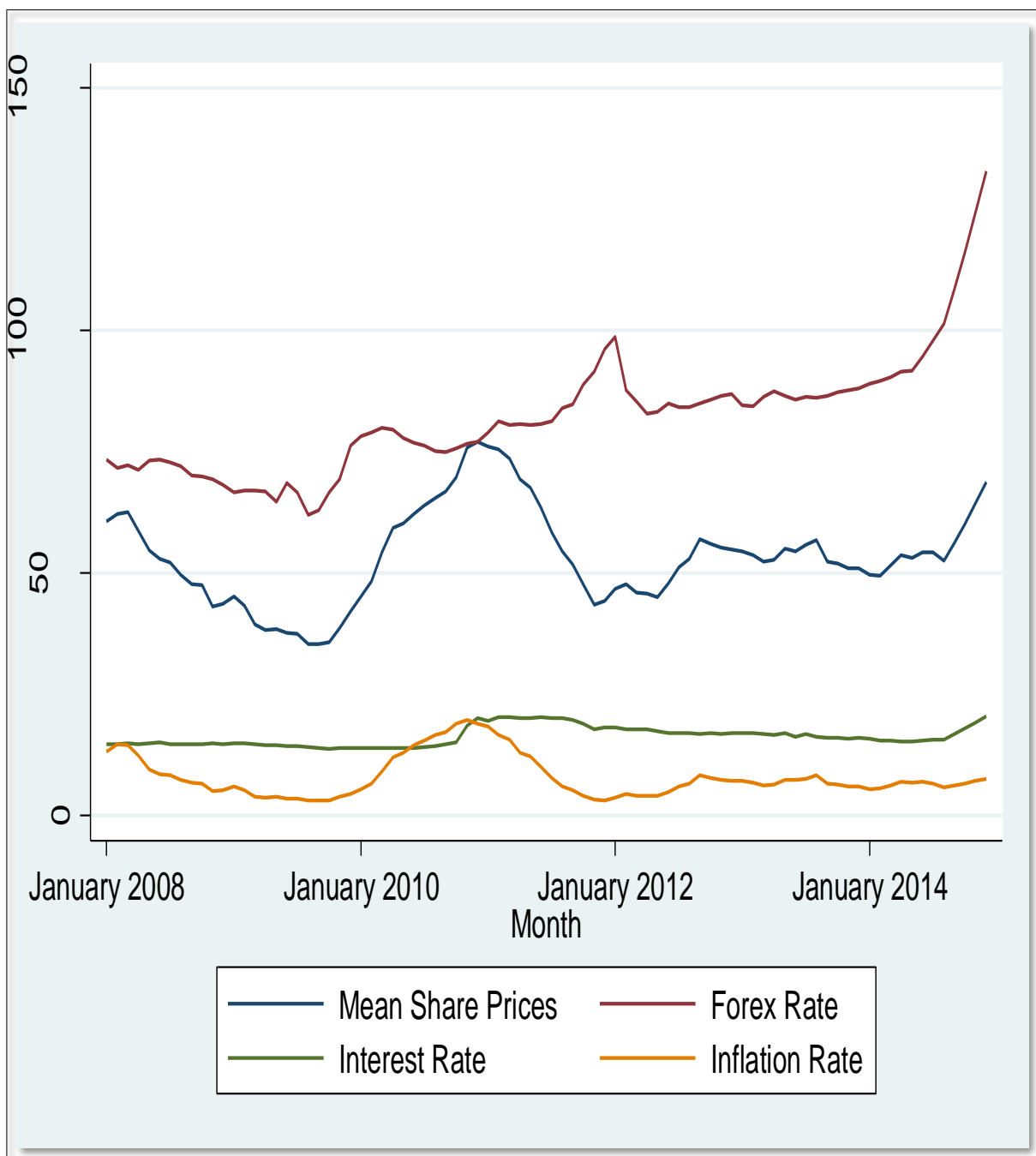
Variable	Obs	Mean	Std. Dev.	Min	Max
Mean_S_Price	84	53.52262	9.933867	35.35761	77.04457
forexrate	84	82.15902	12.46705	62.12293	132.964
interestrate	84	16.323	2.004115	13.85	20.55328
Inflation	84	8.017909	4.323282	3.18	19.72

Source: Author (2017)

4.3 Exploratory Data Analysis

Figure 4.1 shows the general trends of the four time series over the study period. As evident, all time series indicated a considerable level of volatility, with the Forex rate showing the greatest level of fluctuations while the interest rate was most stable.

Figure 4.1: Time plots



Source: Author (2017)

4.4 Diagnostic Testing

The researcher carried out diagnostic tests to evaluate the appropriateness of the data for time series analysis.

4.4.1 Testing for Stationarity

Stationarity is a key requirement before embarking on time series analysis. This is because data that is not stationary might lead to spuriousness of results (Wooldridge, 2012). According to Brooks (2010), a time series is deemed stationary if it has a mean, variance and autocorrelation that don't change with time. The researcher used the Phillips Perron (PP) test to test the study's data for stationarity. There was no stationarity in any of the time series since the test statistics for the four variables were not significant at all levels of significance. According to Wooldridge (2012), a time series is stationary if its test statistic is more negative than the critical values of all levels of significance. This is shown in table 4.2 below.

Table 4.2: Philips Perron Test

	Z(rho)	1% Critical Value	5% Critical Value	10% Critical Value
Forex Rate	6.117	-19.494	-13.564	-10.898
Interest Rate	-4.324	-19.494	-13.564	-10.898
Inflation Rate	-6.917	-19.494	-13.564	-10.898
Mean Share Price	-5.977	-19.494	-13.564	-10.898

Source: Author (2017)

4.4.2 Testing for Stationarity after First Differencing

The researcher differenced all four-time series and conducted the Philips Perron Test on the differences. This is in accordance with Sims (2007) who noted that non-stationarity in time series data can be remedied through differencing. As per table 4.3, all the four series became stationary after first differencing and are hence integrated of order one. Subsequent analysis was conducted using the first differences.

Table 4.3: Philips Perron Test after First Differencing

	Z(rho)	1% Critical Value	5% Critical Value	10% Critical Value
d.Forex Rate	-39.175	-19.494	-13.564	-10.898
d.Interest Rate	-50.237	-19.494	-13.564	-10.898
d.Inflation Rate	-32.786	-19.494	-13.564	-10.898
d.Mean Share Price	-30.611	-19.494	-13.564	-10.898

Source: Author (2017)

4.5 Optimal Lag Order Selection

In order to settle in the optimum number of lags for this analysis, the researcher undertook Optimal Lag Order Selection. This is to prevent inclusion of too many lags or too few lags. Usage of excessive lags leads to a loss of degrees of freedom while utilization of an inadequate number of lags might lead to model misspecification. As per table 4.4 below, the optimal number of lags is one. This lag order was settled on by all four information criteria, i.e. Final Prediction Error (FPE), Akaike Information Criteria (AIC), Hanan Quinn Information Criteria (HQIC), and Schwarz Bayesian Information Criteria (SBIC). As such, analysis was done at a single lag.

Table 4.4: Optimal Lag Order Selection

Selection-order criteria								
Sample: 6 - 84				Number of obs = 79				
lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-437.157				.832796	11.1685	11.2166	11.2885
1	-373.309	127.7*	16	0.000	.248172*	9.9572*	10.1975*	10.5571*
2	-365.052	16.515	16	0.418	.30291	10.1532	10.5858	11.233
3	-353.109	23.885	16	0.092	.338412	10.2559	10.8808	11.8156
4	-341.907	22.405	16	0.131	.387991	10.3774	11.1945	12.4169

Endogenous: dMean_S_Price dforexrate dinterestrates dInflation
 Exogenous: _cons

4.6 Testing for Cointegration

Testing for cointegration was important since it guides the researcher in model selection. If a collection of time series is integrated of order one (i.e. they become stationary after first differencing) and another time series which is a linear combination of the said collection is integrated of order zero (i.e. it's already stationary), then the said collection is termed as cointegrated. If there is at least a single cointegrated pair of time series, the researcher should fit a Vector Error Correction (VEC) model. On the other hand, a Vector Autoregressive (VAR) model should be fitted if there are no cointegrated time series in an analysis. The researcher used the Johansen cointegration test to test for cointegration. As evident in table 4.5, there was no cointegration in the four time series of this study. As such, a VAR model should be fitted.

Table 4.5: Testing for Cointegration

Johansen tests for cointegration						
Trend: constant			Number of obs =		81	
Sample: 4 - 84			Lags =		2	
				5%		
maximum			trace	critical		
rank	parms	LL	eigenvalue	statistic	value	
0	20	-419.16153	.	68.7969	47.21	
1	27	-405.4198	0.28773	41.3135	29.68	
2	32	-394.65017	0.23350	19.7742	15.41	
3	35	-388.03175	0.15076	6.5374	3.76	
4	36	-384.76306	0.07754			

Source: Author (2017)

4.7 VEC Model fitting

Since there was one cointegration, the researcher fitted a VEC model to the study data. The results of this model are as per table 4.6 below.

Table 4.6: Vector Error Correction Model

Vector error-correction model						
Sample: March 2008 - December 2014		No. of obs	=	82		
Log likelihood = -384.3557		AIC	=	10.03307		
Det(Sigma_ml) = .138487		HQIC	=	10.35123		
		SBIC	=	10.82552		
Equation	Parms	RMSE	R-sq	chi2	P>chi2	
D_dMean_S_Price	6	1.8927	0.5007	76.20299	0.0000	
D_dforexrate	6	2.38859	0.3263	36.81192	0.0000	
D_dintrate	6	.458678	0.3778	46.15509	0.0000	
D_dinflation	6	.816221	0.4394	59.57837	0.0000	
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
D_dMean_S_Price						
_cel						
L1.	-.2972875	.1218817	-2.44	0.015	-.5361713	-.0584038
dMean_S_Price						
LD.	.3709332	.3478329	1.07	0.286	-.3108067	1.052673
dforexrate						
LD.	.268467	.1042826	2.57	0.010	.0640769	.4728571
dintrate						
LD.	-.6993162	.6863063	-1.02	0.308	-2.044452	.6458194
dinflation						
LD.	.4009733	.7868893	0.51	0.610	-1.141302	1.943248
_cons	.031129	.218075	0.14	0.886	-.3962901	.4585481

D_dforexrate						
_cel						
L1.	.0375582	.1538147	0.24	0.807	-.2639131	.3390295
dMean_S_Price						
LD.	-.4160196	.4389651	-0.95	0.343	-1.276375	.4443363
dforexrate						
LD.	.593176	.1316046	4.51	0.000	.3352357	.8511163
dintrate						
LD.	.9032989	.8661186	1.04	0.297	-.7942624	2.60086
dinflation						
LD.	.7650979	.9930544	0.77	0.441	-1.181253	2.711449
_cons	.3962548	.2752107	1.44	0.150	-.1431482	.9356578
D_dintrate						
_cel						
L1.	-.1143866	.0295368	-3.87	0.000	-.1722777	-.0564955
dMean_S_Price						
LD.	.0038786	.0842939	0.05	0.963	-.1613343	.1690916
dforexrate						
LD.	.0288411	.0252719	1.14	0.254	-.0206908	.078373
dintrate						
LD.	.2118304	.1663196	1.27	0.203	-.1141499	.5378108
dinflation						
LD.	-.0008135	.1906949	-0.00	0.997	-.3745685	.3729416
_cons	.0677114	.0528483	1.28	0.200	-.0358694	.1712922
D_dinflation						
_cel						
L1.	-.0327747	.052561	-0.62	0.533	-.1357924	.0702431
dMean_S_Price						
LD.	-.0698386	.1500017	-0.47	0.642	-.3638365	.2241593
dforexrate						
LD.	.0865924	.0449715	1.93	0.054	-.0015501	.1747349
dintrate						
LD.	-.1563753	.2959671	-0.53	0.597	-.7364602	.4237096
dinflation						
LD.	.7584417	.3393432	2.24	0.025	.0933412	1.423542
_cons	-.0645902	.0940441	-0.69	0.492	-.2489132	.1197328

Source: Author (2017)

The mean share price equation had an r squared of 50.07%. This implies that 50.07% of variability in share prices can be attributed to variability in lagged share prices, Forex rates, interest rates and inflation. On Forex rate, the r squared was 32.63%. 32.63% of variability in Forex rates can be explained by variability in the lagged values of the study variables.

Likewise, the r squared of 37.78% shows that 37.78% of variability in the interest rates is attributable to single lags of mean share prices, Forex rates, interest rate, and inflation. Finally, inflation equation had an r squared of 43.94%.

The results show that there was a statistically influence on mean share prices from lagged Forex rates (p value = 0.01) and the error correction adjustment (p value = 0.015). All other lagged variables had an insignificant influence on lagged mean share prices. On Forex rates, only the lagged Forex rates (p value = 0.000) had a significant effect on current Forex rates. Likewise, current interest rates had a significant relationship with the error correction term (p value = 0.000) alone. Finally, there was a significant relationship between lagged inflation and current inflation (p value = 0.025)

4.8 Post Estimation Procedures

4.8.1 Testing for Autocorrelation of Residuals

The researcher used the Ljung Box portmanteau test to test for autocorrelation of residuals. As evident in table 4.8, the p value of this test was 0.0000, implying that there was no residual autocorrelation. The model is therefore deemed to have been correctly specified using the right number of lags.

Table 4.7: Ljung Box Portmanteau Test

Portmanteau test for white noise	
Portmanteau (Q) statistic =	191.4938
Prob > chi2(39) =	0.0000

Source: Author (2017)

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussions and conclusions based on the findings of the study, recommendations and areas for further research.

5.2 Summary of Findings

This study was motivated by the need to investigate the dynamic interrelationship between macroeconomic variables and performance of the banking stocks. Essentially, the influence of the macroeconomic environment was of key interest to the researcher. To achieve this, the researcher analyzed monthly time series data collected over a range of 84 periods, i.e. from January 2008 to December 2014. Data were tested for stationarity and then analyzed using inferential statistics. Johansen cointegration testing implied that there was one cointegrating vector in the time series. As such, the study employed a Vector Error- Correction model with one lag. Finally, the Ljung Box test was used to examine the presence of residual autocorrelation. The results show that there was a statistically influence on mean share prices from lagged Forex rates (p value = 0.01) and the error correction adjustment (p value = 0.015).

All other lagged variables had an insignificant influence on lagged mean share prices. On Forex rates, only the lagged Forex rates (p value = 0.000) had a significant effect on current Forex rates. Likewise, current interest rates had a significant relationship with the error correction term (p value = 0.000) alone. Finally, there was a significant relationship between lagged inflation and current inflation (p value = 0.025)

The results here are in line with Tsuji (2011) who in his study used the VEC model for the period 1995-2011 and established a weak positive relationship between the Forex market and banking stocks variables in Japan. On the other hand, Dimitrova (2005), in a study explaining the relationship between the stock market and Forex market in the UK and US, found a positive

linkage between the stock market and the Forex market. The findings were also supported by Amare and Mohsin (2000) who also established a positive relationship. Granger, Huang and Yang (2000) established a negative relationship between the Forex market and banking stocks. Ong and Izan (1999) also supported the negative relationship between the prices of banking stocks and both the macroeconomic indicators and Forex market.

Empirical results from the postestimation procedures further found no evidence of residual autocorrelation. As such, the model was deemed correctly specified with the correct number of lags.

5.3 Conclusion and Recommendation

Going by the findings, the researcher concludes that the study variables are non-stationary and integrated of order one. Additionally, there is long-term cointegration between one pair of macroeconomic indicators. Results indicate a positive relationship between Forex market and most of other study variables. The conclusion therefore is that the fluctuations in the foreign exchange market have the highest prediction ability for variability in the banking stocks and indeed to other variables of the study. Suggested areas for further research include identification of other macro-economic factors that could significantly affect stock returns or other time series of interest. This will assist in making rational investment decisions and aid in policy formulation.

5.4 Limitations of the Study

The study was restricted only to companies listed in the Nairobi Stock Exchange and Kenyan macroeconomic indicators and therefore caution should be taken in generalizing the findings of the study. The analysis has also been constrained by the sample size, which is the listed commercial banks. This could have affected the generalizability of the results.

5.5 Suggestion for Further Study

This research considered four variables; exchange rates, interest rates, inflation and share prices. In addition, the study considered the exchange rates between Kenya shilling and the US dollar. Other studies may be done using additional variables. Future research should not be restricted to the exchange rates between Kenya shillings and the US dollar, but can consider other major exchange rates. Significance of the results could possibly be improved upon by applying weekly data. The use of more frequent observations may better capture the dynamics of stock price and its determinants.

REFERENCES

- Addo, A, &Sunzuoye, F. (2013). The Impact of Treasury Bill Rate and Interest Rate on The Stock Market Returns: Case Of Ghana Stock Exchange. *Research Journal of Economics, Business and ICT*; Vol. 8.
- Adrangi, B, Charath, A. and Shank, M.T (2000) Inflation, Output and Stock prices. Evidence from Latin America, *Managerial and Decision Economic*,.20(2), 63-74
- Aduda, J., Masila, J. M., and Onsongo, E. N. (2012). The Determinants of Stock Market Development: The Case for the Nairobi Stock. *International Journal of Humanities and Social Science*, 2(9), 214-227.
- Alam, M.M.,& Uddin, M.G. (2009). Relationship between interest rates and stock prices: empirical evidence from developed and developing countries. *International Journal of Business and Management*, IV (3), pp. 43-50.
- Almumani, M.A. (2014). Determinants of equity share prices of the listed banks in Amman stock exchange: Quantitative approach. *International Journal of Business and social Science*. 5(1): 91-104
- Anene, J. (2011). Relationship between exchange rate and stock prices in Kenya. *Unpublished MBA Project, University of Nairobi*
- Aurangzeb. (2012). Factors affecting performance of stock market: Evidence from South Asian countries. *International Journal of Academic Research in Business and social sciences*. 2(9): 1-12.
- Bernanke, B. and Kuttner, K.N. (2003). What explains the stock market's reaction to federal Reserve policy? *Journal of Finance*, 60 (3), 122-157.
- Chen & Choudhary, R.(1986). Economic Forces and the Stock Market, *Journal of Business*, 59(3), 383-403 .
- Dimand, R.W. (2003). Irvin Fisher on the International Transmission of booms and depression through monetary standards. *Journal of money, credit and banking*.35 (1), 49. *Economics*, .20(2),63-74
- Gill, A., Biger, N., & Mathur, N. (2012). Determinants of Equity Share Prices: Evidence from American Firms. *International Research Journal of Finance and Economics*, 90, 176- 191.

- Granger, C.W., Huang, B. & Yang, C.W (2000), A Bivariate Casualty between Stock Prices and Exchange Rates: Evidence from recent Asian Flu, *The Quarterly Review of economics and Finance*, 40, 337-54
- Irfan, C. M. and Nishat, M. 2002, Key Fundamental Factors and Long-run Price Changes in an Emerging Market - A Case Study of Karachi Stock Exchange (KSE). *The Pakistan Development Review*, 41(4): 517–533.
- Jane Kiboi, Paul Katuse, (2015). Nairobi Stock Exchange: A Regression of Factors Affecting Stock Prices ISSN: 2315-5051. Vol. 4(6), pp. 1093-1098, June 30th, 2015 [www.primejournal.org/PJSSJournal of Economics Surveys 15\(4\), 491-541](http://www.primejournal.org/PJSSJournal of Economics Surveys 15(4), 491-541)
- Kirui, E., Wawire, H.W., & Onono, P.O. (2014). Macroeconomic Variables, Volatility and Stock Returns: A Case of Nairobi Securities Exchange, Kenya. *International Journal of Economics and Finance*, 6(8).
- Kothari, C. (2004). *Research methodology: methods & techniques*, (2nd ed.). New age International Publishers, New Delhi, India
- Kutan, A. M. & Aksoy T. (2003). Public Information Arrival and the Fisher Effecting Emerging Markets: Evidence from Stock and Bond Markets in Turkey; *Journal of Financial Services Research*, 23(3), 225
- Lee, W. (1997). Market timing and short-term interest rates. *Journal of Portfolio Management*, 23(3), 35-46.
- Levich, R. M. (2001). *International financial markets: prices and policies*. (2nd Ed.), McGraw-Hill Publishing Co.
- Malhotra, N. and Tandon, K. (2013). Determinants of stock prices: Empirical evidence from NSE 100 Companies. *International Journal of Research in Management & Technology*. 3(3):89-95 *Emerging Trends in Economic and Management science*. 2 (2):124-130.
- Miles, M. B., & Huberman, M. A. (1994): “Qualitative Data Analysis: An Expanded Sourcebook” (2nd edition). Beverley Hills, Sage.
- Mishkin, F. S., & Eakins, S. G. (2006). *Financial markets and institutions*. Pearson Education India.
- Muradoglu, G., Metin, K., & Argac, R. (2001). Is There a Long-Run Relationship between Stock Returns and Monetary Variables: Evidence from an Emerging Market.
- Mutuku, A. K & Kimani, M. (2012). Investigating Wagner’s Law-cointegration and causality tests for Kenya. *Current Research Journal of Economic Theory*, 4(2), 43–52.

- Newing, H. (2011). *Conducting research in conservation: social science methods and practice*. New York: Routledge
- Norris, G. A. (2001), Integrating Economic Analysis into LCA. *Environmental Quality Management* .10: 59–64.
- Nyamute, M. (1998). The relationship between stock prices and exchange rate, Interest rates, Money Supply, inflation rate *Unpublished MBA Project, University of Nairobi*.
- Ochieng, D. & Adhiambo, E. (2012), the relationship between macro-economic Variables And stock Market performance in Kenya, *DBA African management review* 3(1), 38-49
- Ochieng, D. E., & Oriwo, E. A. (2012). The relationship Between Macro Economic Variables and Stock Market Performance in Kenya. *DBA Africa Economic Review, Vol 3*(No 1), 38-49.
- Ochieng, D. E., and Adhiambo, E. O. (2012). The Relationship between Macro Economic Variables and Stock Market Performance in Kenya. *DBA Africa Management Review 2012, Vol 3 No 1 pp., 3*(1), 38-49.
- Oyama, T. (1997). Determinants of stock prices: The case of Zimbabwe. Working paper of the International monetary fund.
- Sellin, P. (2005) Monetary Policy and Stock Markets: Theory and empirical evidence
- Sharma, S. (2011). Determinants of equity share prices in India. *Journal of Arts, Science & commerce*. 2(4):51-60
- Sifunjo, K. (1999). The causal relationship between exchange rates and stock prices in Kenya. *Unpublished MBA Project, University of Nairobi*.
- Songole, R. K. (2012). *The Relationship between Selected Macroeconomic Variables and Stock Return at the Nairobi Securities Exchange*. Nairobi: University of Nairobi.
- Srinivasan, P. (2012). Determinants of Equity share prices in India: A panel data approach. *The Romanian Economic Journal*. 46(6):205-228

APPENDICES

Appendix I: Commercial Banks Listed at NSE in Kenya as at December 2014

	Commercial Bank	Year Listed
1	Barclays Bank Ltd	1986
2	CFC Stanbic Holdings Ltd before merger with Stanbic traded as CFC Bank	1955
3	I&M Holdings Ltd	2005
4	Diamond Trust Bank Kenya Ltd	2003
5	HF Group Ltd	1992
6	KCB Group Ltd	1988
7	National Bank of Kenya Ltd	1994
8	NIC Bank Ltd	1971
9	Standard Chartered Bank Ltd	1989
10	Equity Group Holdings	2006
11	The Co-operative Bank of Kenya Ltd	2008

Source: Nairobi Securities Exchange

Appendix II: Data for the Study

Year	Average Commercial banks NSE prices	Exchange Rate	Interest Rate	Inflation rate
2008				
2009				
2010				
2011				
2012				
2013				
2014				

SOURCE: (Author 2017)