

**SELECTED MACROECONOMIC VARIABLES AND STOCK PRICE
VOLATILITY AT THE NAIROBI SECURITIES EXCHANGE**

NAOMI KANANA MBAABU

**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR THE AWARD OF MASTER OF BUSINESS
ADMINSTRATION BY THE UNIVERSITY OF NAIROBI.**

2018

DECLARATION

I declare that this research paper is my original work and has not been submitted in this form or any other form to this institution for examination purposes.

SIGNATURE

DATE.....

NAOMI KANANA MBAABU

D61/5301/1017

This research project has been submitted with my approval as university supervisor.

SIGNATURE

DATE.....

DR. Winnie Nyamute

Senior Lecturer

Department of Finance and Accounting

School of Business

The University of Nairobi.

DEDICATION

I dedicate this research paper to the almighty God for the strength and wisdom throughout this course.

I wish to express a word of gratitude to my family and friends for their support to successfully carry on with my studies.

ACKNOWLEDGEMENT

I would like to thank almighty God for the opportunity he gave me and the grace sustained from the start of my postgraduate studies

I acknowledge and appreciate my supervisor Dr. Winnie Nyamute for her brilliant ideas, intellectual advice and valuable support as she was instructive in the crafting and successful completion of this proposal.

TABLE OF CONTENT

DECLARATION.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENT.....	iv
LIST OF TABLES	viii
ABBREVIATIONS.....	ix
ABSTRACT.....	x
CHAPTER ONE	1
INTRODUCTION.....	1
1.1 Background	1
1.1.2 Stock Price Volatility.....	4
1.1.3 Macroeconomic factors and Stock Price Volatility	6
1.1.4 Nairobi stock exchange.....	7
1.2 Research Problem	9
1.3 Research objective	11
1.4 Value of the Study	11
CHAPTER TWO	12
LITRATURE REVIEW.....	12
2.1 Introduction.....	12
2.2 Theoretical framework.....	12
2.2.1 The Efficient Market Hypothesis	12
2.2.2 The Arbitrage Pricing Theory.	13
2.3 Determinants of Stock Price Volatility.....	15
2.3.1 Economic Growth Rate	15
2.3.2 Interest Rate.....	16
2.3.3 Inflation Rate	16
2.3.4 Balance of Payment (BOP) Position	17
2.5 Conceptual Framework.....	21

2.6 Summary of Literature of Review	22
2.7 Summary	22
CHAPTER THREE	23
RESEARCH METHODOLOGY	23
3.1 Introduction.....	23
3.2 Research Design.....	23
3.3 Population	23
3.4 Data collection	24
3.5 Population	24
3.6 Data collection	24
3.7 Data Analysis	25
3.7.1 Regression Analysis Model.....	25
3.7.2 Regression Diagnostic tests.....	26
3.7.3 Test of Significance.....	27
CHAPTER FOUR.....	28
DATA ANALYSIS, RESULTS AND DISCUSSIONS	28
4.1 Introduction.....	28
4.2 Response Rate	28
4.3 Test Validity.....	28
4.4 Data Description	31
4.5 Correlation Analysis	31
4.6 Regression Analysis.....	33
4.6.1 Regression Analysis Summary	33
4.6.2 F Test Statistic.....	33
4.6.3 Regression Coefficients	34
4.7 Discussion of Results Findings.....	35

CHAPTER FIVE	38
SUMMARY CONCLUSIONS AND RECOMMENDATIONS	38
5.1 Introduction.....	38
5.2 Summary of Research Findings	38
5.3 Conclusion	39
5.4 Recommendations.....	40
5.5 Limitations of the Study.....	41
5.6 Suggestions for Further Research	42
REFERENCES.....	43
APPENDIX I: DATA USED IN ANALYSIS	45

LIST OF TABLES

Table 4.1: Normality Test	29
Table 4.2: Collinearity test table	30
Table 4.3: Descriptive Statistics	31
Table 4.4: Correlation Analysis	32
Table 4.5: Model Summary.....	33
Table 4.6: ANOVA TABLE	34
Table 4.7: Regression Coefficients Table	35

ABBREVIATIONS

ATP	Arbitrage Pricing Theory
BOP	Balance of Payment Position
CAPM	Capital Asset Pricing Theory
CBOE	Chicago Board Options Exchange
GDP	Gross Domestic Product
NSE	Nairobi Securities Exchange
VECM	Vector Error Correction Models

ABSTRACT

Stock volatility is the effectual variations in price of shares which is characterized by big swings in price changes that makes it difficult to project the changes in these prices. The market crashes in the world have been characterized by high stock volatility which makes it a special factor that should be considered and understood by investors and interested parties. This study undertook to look at the effect of selected macroeconomic variables on the volatility of stock returns at the Nairobi stock exchange. The macroeconomic variables that were studied included economic growth, commercial banks' interest rates, inflation rate, government expenditure and balance of payment position. The study collected secondary data from KNBS websites on macroeconomic variables, Trend Economics and from the NSE handbooks. Quarterly data was used for ten years from the year 2008 to 2018. A linear regression model was undertaken to analyze the data and determine whether there exist any significant effect of macroeconomic variables on stock volatility. Diagnostic tests were undertaken in order to test whether the variables conformed to the assumptions made by the regression model. Government expenditure however did not pass multicollinearity test and was therefore dropped from the regression model. The coefficient of determination which showed the strength of the model in predicting the dependent variable was 23.9% that showed a relatively weak model. The F test statistic showed that the effect of the independent variables on the dependent variable was significant as the p value was less than the alpha value. The F critical was less than the F calculated and therefore the analysis rejected the null hypothesis and concluded that there exists a statistically significant effect of selected macroeconomic variables on stock volatility. The relationship between economic growth and stock volatility was negative with the other macroeconomic variables exhibiting positive correlation between the variables on stock volatility.

CHAPTER ONE

INTRODUCTION

1.1 Background

According to Mwaore (2017) studies on the relationship between macroeconomic variables and the performance of stock markets still remain inconclusive hence rendering it an area of great interest in academia. The stock price movements according to literature are closely related to the economic activities of a given environment. Many studies have tried to explain the determinants of stock prices for many years. Contemporary financial theory states that stock price movement is explained by movement of specific macroeconomic variables, this is because stock price movement has a fundamental component about macroeconomic information. Some of the macro variables identified as strong determinants of security prices include gross domestic product, inflation, money supply, interest rates and foreign reserves.

According to theories such as efficient market hypothesis stock costs should consolidate all accessible data anytime. A few investigations have discovered a connection between's adjustments in world economy and large scale financial factors. These examinations likewise recommend that the development of securities exchange records is profoundly delicate to the adjustments in the basics of the economy and to the adjustments in the expectation regarding future prospects. Another theory that addresses the relationship between macroeconomic variables and stock prices is the arbitrage pricing theory. APT states that the price of a security is affected by not one but several factors that have different sensitivity to the market.

Globally, it is now believed that macroeconomic events and in addition government financial policy have large influence on general economic activities and in our our case stock market performance. Studies in both the developed states such as the United States stock market, Japan, Australia, Canada and European states and the developing states such as Ghana, South Africa, Kenya and part of Asiana and south American countries have one thing in common which the significant deterministic power of macro-economic variables on stock price performance. Despite this shared characteristic questions have been raised empirically due to the difference in the way in which economic factors affect stock prices differently in this economic environments (Adam & Tweneboah, 2008)

1.1.1 Macroeconomic Variables

According to Blanchard, Rogoff, and Rajan, (2016) Macroeconomics is an investigation of a nation's financial structure and performance and the government's policies in impacting its financial conditions. Market investigators are interested to know the components that contribute towards a country's money related improvement in such a case, to the point that the economy propels, it will give more openings for work, stock and ventures and at last raise the overall public's lifestyle. Financial specialists refer macroeconomics as a financial field focusing on the connection that exist between two factors, for example, income, purchasing power, price and money.

Theoretically, in the stock market a good GDP score means that the stock market is in good performance. According Fontana and Setterfield (2016) Money supply is refers to the amount of money in circulation in a country or the stock of money held in public. Two

theories are involved in cash supply determination based on the first view, the CBK is responsible for resolving cash supply exogenously. The second view claims that changes in economic activity are responsible for resolving cash supply endogenously. In relation to the securities market, when there is too much money in circulation in the economy the price of stock prices go up due to the increase in demand of holding investments and vice versa. According De Grauwe, and Grimaldi, (2018) Exchange rate instability alludes to the propensity for outside monetary standards to acknowledge or devalue in esteem, therefore influencing the productivity of foreign trade exchanges. At the point when trade rates are skimming trade rates, rather than settled trade rates, they are probably going to go all over in esteem contingent on the quality of the economies included. Subsequently, volatility is something that influences any business undertaking including two distinct nations. In securities markets when the currency is overvalued the demand the for stock prices is low because the currency is expensive compare to what the market is willing to offer and vice versa.

According to Schrey and Hafðísarson, (2017) interest rate refers to the measure of value due per period, as a result of the sum loaned, saved or obtained (called the central aggregate). Loan fee choices made by the focal expert speak to new macroeconomic data for market members. Gay (2016) affirms that Changes in financing costs can influence stock costs in two different ways: First, by affecting the discount rate which market participants use to compute the present estimation of firms' future money streams and second, by impacting desires for companies ' future performance. The primary impact is because of an adjustment in the risk free-rate, which influences the required return for

firms. The second impact is because of changes in by and large monetary factors and the expense of obtaining assets in the market.

1.1.2 Stock Price Volatility

According to Adam, Marcet and Nicolini, (2016) stock price volatility refers to the rate of increase or decline of cost of security for a given arrangement of profits. Volatility is estimated by the calculation of standard deviation yearly returns within a defined timeframe. Unpredictability demonstrates the valuing conduct of the security and helps gauge the variances that may occur in a brief timeframe. In the event that the costs of a security vacillate quickly in a brief span length, it is named to have high volatility.

The stock market is a very volatile place for one to invest money in due to the risk involved in prices. Movement or shift in stock price occurs on a daily, monthly, and quarterly and annually basis and this can be detrimental to some investors. In finance volatility is important as it defines the decision making process of most or all investors in a market. For securities, the higher the risk involved, the greater the dispersion of returns.

Corradi, Distaso and Mele (2013), examined the macroeconomics determinants of stock unpredictability and instability premiums utilizing the Vix record information kept up by the Chicago Board Options Exchange (CBOE) from 2007 to 2009. They created and evaluated a no mediate current where securities exchange unpredictability is unequivocally identified with various macroeconomic and undetectable variables. The authors found that the level and changes of stock instability are to a great extent clarified by business cycle factors and that some unobserved factors adds to about 20% of the general varieties in

unpredictability, in spite of the fact that not its high points and low points. The authors additionally contend that there is solid proof that capital market instability has an extremely prominent business cycle drifting, being higher during economic slowdown than during economic boom.

Engle and Rangel (2008) research the spline GARCH display for low recurrence unpredictability and its macroeconomic causes. They noted, that high recurrence total capital market unpredictability has short-run and long-run part and propose that the long-run, measurement is identified with the variance of financial exercises. Attari and Safdar (2013) analyzed the connection between macroeconomic unpredictability and securities exchange instability in Pakistan. They utilized the EGARCH strategy to produce unpredictability from the Karachi Stock Exchange (KSE – 100 file). The macroeconomic factors incorporate loan cost, growth and gross domestic product. The outcomes demonstrate that macroeconomic factors have critical effect on the security costs.

Adam and Tweneboah (2008), connected multivariate cointegration through blunder revision model to inspect the effect of Foreign Direct Investment (FDI) on the stock exchange advancement in Ghana. Their outcomes demonstrated that there exists a long-run connection between FDI, nominal exchange rate and securities exchange advancement in Ghana. They presumed that a stun in FDI essentially impacts the improvement of securities exchange in Ghana. They additionally utilized cointegration test and Vector error correction models (VECM) to look at both long-run and short-run dynamic connections between the share trading system file and financial factors. Their paper built up that there

is a cointegration between stock market index and stock costs in Ghana. The VECM examination demonstrates that the slacked estimations of loan cost and growth affect money markets.

1.1.3 Macroeconomic factors and Stock Price Volatility

Many investigations have discovered that the current stock levels are decidedly identified with future levels of future financial action, as estimated by Gross Domestic Product (GDP) (Geske & Roll, 1983; Sharma, 2002; Ogutu, 2011). Growth in GDP puts the economy in a better place especially when inflation does not impact the economy. Theoretically, in the stock market a good GDP score means that the stock market is in good performance.

Studies such as Fama (1981), Geske and Roll (1983) support the theory that an expansion in financial development demonstrates abundance liquidity accessible for purchasing stocks, in the long run bringing about higher stock costs because of an expansion of interest to both normal stocks and the good markets.

(Tahir and Ghani, 2004) Portfolio balance model assumes a negative connection between stock costs and trade rates. An ascent in domestic stocks costs would draw in capital streams, which increment the interest for household money and cause swapping scale to appreciate. A rising securities exchange prompts the valuation for domestic money through immediate and aberrant channels. An ascent in costs urges financial specialists to purchase more domestic resources all the while pitching remote advantages for acquire local money

basic for purchasing new household stocks. The depicted moves sought after and supply of monetary standards cause household money appreciation (Stavarek, 2004).

According to Adam & Tweneboah (2008) interest rates are the costs of obtaining capital that is required by the lenders of capital who have excess funds and would wish to transfer the excess funds to the regions in the economy that have less funds at a fee called the interest rates. Increase in interest rates therefore implies that the cost of accessing credit increases and investments decreases which means that the prices of stocks would also decrease. When interest rates increase the stock holders or the shareholders would demand more cash from the companies, the companies that prefer holding high cash reserves would obtain pressure of buying back shares and in the instance they don't succumb to such pressure, then the price of the shares would decrease.

1.1.4 Nairobi stock exchange

The Nairobi Stock Exchange (NSE) was constituted in 1954 as a voluntary association of stockbrokers under the Securities Act (NSE Fact Book, 2003). On achievement of freedom in 1963, securities exchange movement drooped because of vulnerability about the fate of autonomous Kenya. In the initial three years of freedom trust in the market was revived and the trade dealt with various profoundly oversubscribed public issues. Its development was anyway ended when the oil emergency in the mid 1970s presented inflationary weights in the economy, which discouraged offer costs further. A 35% Capital Gains impose (suspended since 1985) was acquainted in 1975 inflicting losses with the trade which in the meantime lost its local character following nationalizations, trade controls and other

between regional confinements which were presented in neighboring Tanzania and Uganda (NSE Fact Book, 2003). The Kenyan government understood the need to structure and execute strategy changes to encourage maintainable monetary improvement with a productive and stable money related framework. Specifically, it set out to upgrade the job of the private segment in the economy, lessen the interest of public enterprises on the exchequer and enhance capital market development (Ngugi, 2003).

The stocks traded in the Nairobi Stock Exchange include ordinary shares, preference shares, debentures, corporate, and government bonds. NSE is fully owned by nineteen licensed stockbrokers. The NSE is currently increasingly experiencing volatility in the share prices, as NSE 20-Share Index fell below the 3,000 psychological mark, lowering the total value of shareholders' wealth (market capitalization) to Sh740.877 billion, from Sh1.3 trillion in June 2008. The market capitalization grew to KSh 1.3 trillion by the end of June 2008 after the listing of Safaricom shares. NSE has four core stakeholders who include; the investors, the listed companies, CDSC and the members/brokers. Investors play a key role in any exchange. There is currently a small number of investors in Kenya as compared to the recent years when the market was attractive. The approximate index of investors in listed companies amounts to 1.5 million based on CDS accounts that have been opened as at April, 2008. NSE has 56 listed companies on Equities board and 2 securities on preference shares board. It also has 9 listed Corporate Bonds and 65 listed Treasury bonds on the fixed income securities board (NSE Fact Book, 2003). In the recent past NSE has undergone some major development on the trading and the settlement platform.

These developments entail establishment of a modern fully automated custody and settlement services which are being provided by the Central Depository System Corporation (CDSC). CDSC became operational in 2004 after decades of manual clearing and settlement system. The shareholders of the CDSC are brokers and some financial institutions. There was a successful implementation of the automated trading system (ATS) in September 2006 on a local area network (LAN) at the trading floor. The system has facilitated efficient trading by reducing the taken in trading. The ATS, CDS and brokers' back office systems implementation enhanced investors' service delivery (Ngugi, 2003).

1.2 Research Problem

Studies have made analysis on the effect of the cost of stock on various selected macroeconomic pointers. There are variations on the findings of these studies as most studies find varying effect of share costs and more significantly on the monetary aspect of the country in the long run and in the short run. Stock costs mirror the desire of public towards the future monetary movement. At the end of the day, the share trading system is forward-looking and stock costs reflect expectations about future monetary movement. In the event that a subsidence is normal, for instance, stock costs mirror this by diminishing in interest while vast increment in stock costs may mirror the desire towards future monetary development (Jefferis & Okeahalam, 2000).

In Kenya price of a stock fluctuates basically dependent on the interaction of suppliers and buyers of funds at the Nairobi securities exchange. The efficient market hypothesis states that the price of a stock follows what we refer to as the random walk. This means that

information in the market is received in a random manner and that stock prices adjust instantaneously to information received. The volatility of share prices is best explained by the random walk theorem where its intrinsic value or par value is dependent solely on all the form of information available in the market (Mwaore 2017).

Many research studies have concluded that there is a significant impact of macroeconomic factors on how the share prices of listed companies behave in the market. Ozlen and Ergun (2012) in a study done in Istanbul stock exchange from 2005 to 2012 sought to establish how macroeconomic variable that is inflation, employment, interest rates and foreign exchange rate affect the trend in stock returns. They employed the use of autoregressive distributed lag method and observed that inflation and unemployment barely affected stock prices and that they didn't have any significant impact.

Conclusions such as that of Ozlen and Ergun (2012) which are different from other findings such as those of Oluseyi (2015) who found inflation to have a significant influence on stock prices, form the basis of our study. It has been observed that different economic zones and different time intervals lead to different findings given the same variable. This study seeks to explore, what are the effects of macroeconomic variables on stock prices in the recent time interval from 2012 to 2017 at the Nairobi Securities Exchange?

1.3 Research objective

To determine the effect of selected macroeconomic variable the impact of macroeconomic variables on stock price volatility a case of companies listed at the Nairobi Securities Exchange

1.4 Value of the Study

Investors: The study findings will be of importance to the investors both institutional and individual in the country. The study will identify the pattern of institutional trading and price momentum and how they affect trading of shares at Nairobi Stock Exchange. This will aid the investors in making sound decisions.

Scholars and academic Researchers: The study information obtained will be of great benefit to future scholars in the field of price movement and GDP of a nation. The research findings will be important and will serve as a source of reference to future scholars.

CHAPTER TWO

LITRATURE REVIEW

2.1 Introduction

In this chapter empirical literature related to macroeconomic factors and their impact on stock price volatility is reviewed. The theoretical framework is established; the conceptual framework is developed and the research gap established.

2.2 Theoretical framework

2.2.1 The Efficient Market Hypothesis

Efficient market hypothesis which is mostly referred as EMH is an investment theory that was first established by Eugene Fama in the 1960s. Fama alluded to a very controversial suggestion where he believed that the stocks always trade at fair prices. He suggested that the prices for the various stocks in the market already incorporate available information. There is therefore no chance for arbitration by investors by analyzing the market and trying to time the market in order to gain abnormal returns since that information is already reflected in the prices of the stocks. The suggestion was that the only way in which an investor would obtain higher returns than the others is by investing in risky assets. The theory states that there are three different levels of efficiency in which markets may operate depending on the improvement of the specific markets. The lowest level is known as weak form of hypothesis where the market reflects only past information. This means that all past information is reflected on the prices of securities and an investor cannot have arbitration chances by relying on past information. The other level is called the semi-strong form of hypothesis where both past and present information are reflected in the prices of

the securities. The last level is called strong form of hypothesis where past present, public and private information is reflected in the prices in the market. It means that no single investor can have arbitrage chances by relying on either public or private information (insider information) as they are all reflected in the prices of the securities. This paper centers around Nairobi Securities Exchange market and determines the level of efficiency in the market, the semi strong theory expresses that all freely accessible data is as of now fused into current costs; that is the advantage costs mirror all accessible public data. In fact, the semi strong hypothesis is utilized to research the positive or negative connection between stock return and macroeconomic factors since it hypothesizes that monetary variables are completely reflected in the cost of stocks.

2.2.2 The Arbitrage Pricing Theory.

The APT theory was first developed by Ross (1976) though he borrowed heavily from prior contributions by various studies. In his work, Ross (1976) tried to connect the macro economic variables to the returns from securities exchange. APT theory is heavily borrowed from CAPM (Capital Asset Pricing Model) suggestions, only that CAPM relies only on factor (beta) whereas APT is a multi factored theory. As such, CAPM depends on is regarded inferior as it only considers a single factor which is risk that influences the return of stocks. CAPM and APT have comparable assumptions which makes a level ground for the operation of the theories; the assumption that there exists homogeneous desires, the markets are deemed to exhibit tendency of markets in perfect competition and there are frictionless capital markets. In any case, Ross (1976) proposes a multifaceted way to deal with clarifying resource valuing through the arbitrage pricing theory (APT). He

suggested that the essential effects on stock returns are some monetary powers, such as, unforeseen moves in risk rates, changes in the normal expected level of industrial production, unexpected expansion and unforeseen developments in the state of the term structure of interest rate. These components are indicated with factor particular coefficients that measure the affectability of the resources for each factor. Adept is an alternate way to deal with deciding resource costs and it gets its premise from the law of one price.. Indeed, in an effective market, two things that are the equivalent can't offer at various costs; generally an exchange opportunity would exists. Able necessitates that the profits on any stock ought to be directly identified with an arrangement of records.

According to Chen & Ross (1986), securities depend on both foreseen and unforeseen elements. They argue that most of the returns that are generated from these securities arise from unforeseen occasions in which case they emanate from the changes in the macroeconomic environment. The ability of the individual stock holders to predict the changes in macroeconomic environment though limited by the various forces that cause multiple changes and variations in the macroeconomic factor, leads to improvement of the stock returns. It is therefore becomes clear that both foreseen and unforeseen changes becomes imperative in deciding the returns on stocks for individual investors.

2.3 Determinants of Stock Price Volatility

This includes the variables that were presumed to affect Stock price volatility. These macro-economic factors include economic growth rate, Commercial banks' lending rates to represent the interest rates, the inflation rate, the government spending and the BOP position.

2.3.1 Economic Growth Rate

Economic growth rate is measured from the real GDP. It is the increase in the market value of goods and services in a country over a period of time. It is considered the increase or decrease of the market value of goods and services produced per head of the population over a period of time. The increase in total output in Gross Domestic Product (GDP) per individual in the population defines economic growth. It therefore means that economic growth shows the contribution of each individual in the economy in generating the total GDP. When this value is increased there is positive performance of the economy and adverse effects such as high stock volatility are not expected in such periods (Schumpeter and Backhaus, 2003).

Kenya has experienced quite a stable economic growth in the recent periods. The stability of this macro - economic variable has indeed enabled the country to be on its way to gain the status of middle income generating economy. It is therefore expected that the slight changes that have been experienced either positive or negative have minimal effect on stock price volatility ((Fanta and Makina, 2017).).

2.3.2 Interest Rate

The money market rate is considered as an intermediary for loan cost. It is a portion of the financial market in which monetary instruments with high liquidity and short developments are exchanged. The currency advertise is utilized by members as a method for acquiring and 18 loaning in short term, from a few days to simply under a year. A development in the advance expense will realize falling stock costs in light of the manner in which that high financing expense will extend the opportunity cost of holding money, causing substitution of stocks for excitement bearing securities. Credit charge is one of the basic macroeconomic factors and is direct related to monetary advancement. From the point of view of a borrower, advance expense is the cost of getting money while from a bank's viewpoint, financing cost is the gain from crediting money. The financing cost is required to be antagonistically identified with stock returns.

2.3.3 Inflation Rate

Inflation rate is explained by the sustained increase in the general price level of products and services in an economy. Inflation rate can be considered as the increase in prices due to the devaluation of the country's currency. Inflation in most cases happens gradually and causes increases in the price of vital products such as fuel, housing, among others. The gradual increase eventually becomes substantial increase and if such increases in the prices are not followed by increase in the income levels of the population, the purchasing power of individuals decrease.

Inflation rate is not always a problem, An inflation rate of 2-3% per year is considered healthy inflation. Most governments aspire to have the inflation rate in the country surpass the economic growth by a small margin. Huge inflation rates are of course chaotic as it crowds out investment and shrinks the economy adversely affecting other macro - economic variables such as the exchange rate fluctuations, economic growth among others. When a country experiences unexpected inflation, then the country suffers adverse grievous adverse effects. The unexpected inflation reduces the purchasing power of individuals which stagnates the economy. In such cases sharp declines in prices of stock are expected and this would lead to high stock volatility which is not healthy for an economy (Wu, 2012).

2.3.4 Balance of Payment (BOP) Position

Schumpeter and Backhaus (2003) Explains BOP position as all the transactions relating to the people in a certain country with the rest of the world. It is the difference between the imports and exports of a country. In Kenya the position is that the country is characterized by high imports than exports. This position is explained as the unfavourable BOP position. It means that the country needs more foreign currency than other countries do require our currency. Kenya is a net importer and therefore it spends most of its foreign currency than it is able to earn foreign currency on exports (Fanta and Makina, 2017).

2.3 Empirical Review

According to Mwaore (2017) in their study on the effect of macroeconomic variables on share price of firms listed on the Nairobi securities exchange. The macroeconomic

variables study included the GDP, the unemployment rate, interest rate and the foreign exchange rate. The dependent variable of the study was the NSE 20 share price index which was used as a proxy for the share price. Multiple regression model was employed to analyze the relationship and the result revealed that 41.9% change in the share price was explained by changes in the above stated four macroeconomic variables. This was an implication that 58.1% of the changes in share price was explained by other factors which were not included in the study. In a more specific analysis it was concluded that the GDP had a significant positive effect, interest's rate and foreign exchange rate had negative effects on share price, while unemployment rate was significant and negatively related to the share price changes.

According to Noor (2017) he observed the effect of macroeconomic variables on the performance share of Nairobi securities exchange. The macroeconomic variables studied were inflation rate measured by the consumer price index, money supply growth measured by change in money supply and interest rate measured by lending rates. The study adopted a descriptive research design targeting all firms making up the 20 share index. The study established that Pearson's coefficient r for inflation showed that it was inversely related with performance and that the effect was significant. Money supply growth in the economy had a weak relation with the performance of NSE, there was a weak inverse but significant relationship between interest rate and performance of NSE. The recommendations of the study were that the CBK should strengthen its monetary policy to regulate and control inflation to sustainable levels. Secondly there is need to balance the supply and demand for money in the economy.

Kirui, et al (2014) studied on macroeconomic variables, volatility and stock Market returns. The researchers selected various variables including GDP, TB rate (risk free rate), exchange rate, and inflation. They concentrated in noting the effect of each variable on stock returns from a shock in each of the macro-economic variables. They used TGARCH model where they found that there was presence of the effects of leverage but absence in stock price volatility.

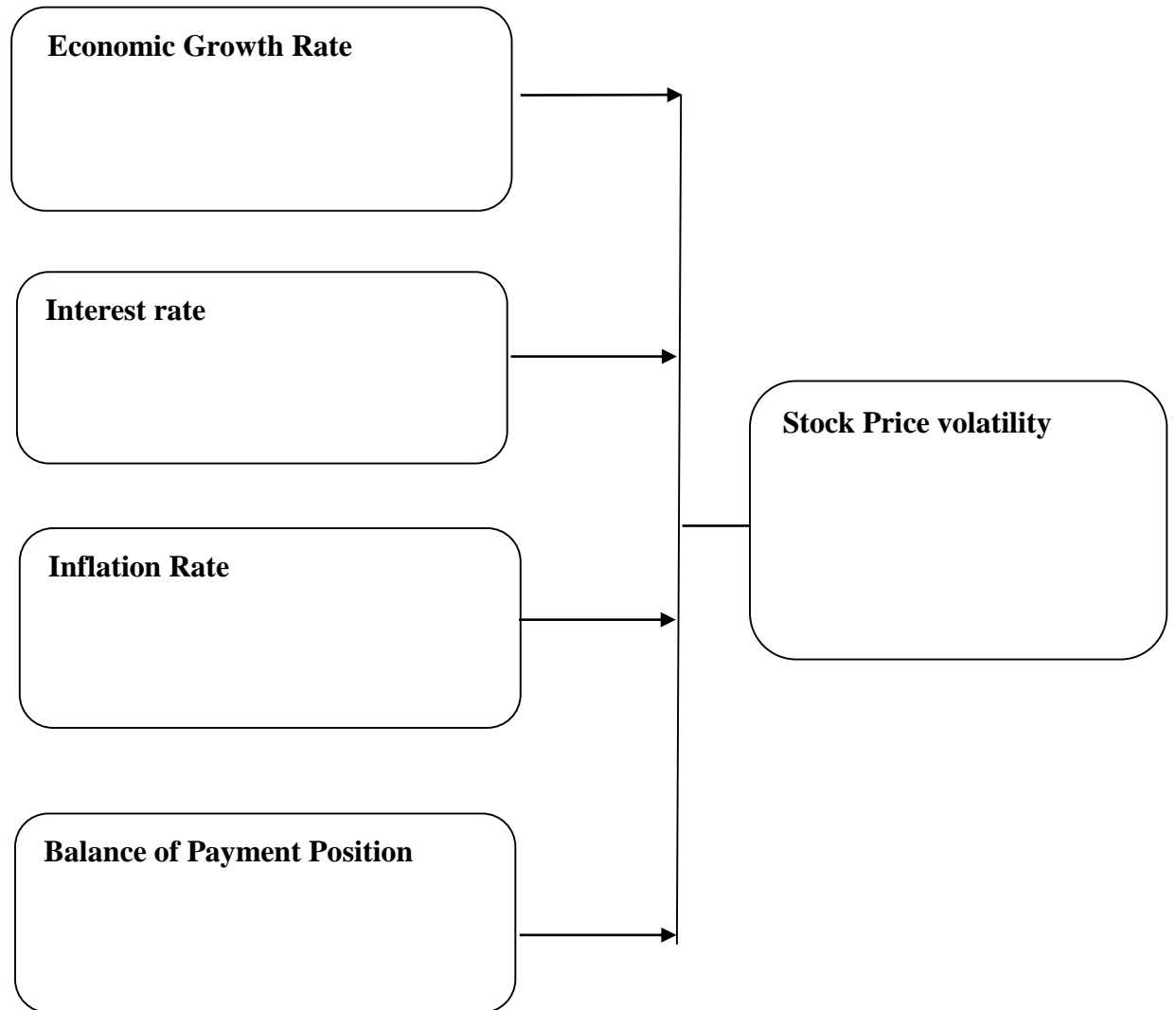
In their examination dependent on six Asian nations, Doong et. al. (2005) studied the connection between securities and the rates of trade that use the Granger causality test. Their study found out a negative relationship between the stock returns and change in the trade rates for all the included nations aside from one. Uddin and Alam (2007) on the other hand, studied the straight relationship between share price and lending rate and also share price and changes of financing cost.

Geetha, et. al. (2011) explored the connection between securities exchange, expected inflation rate, unexpected inflation rate, conversion scale, loan fee and GDP of US, Malaysia and China. They used cointegration test to choose the amount of cointegrating vectors, which exhibits the long-run connection between the elements while the short-run relationship was settled using the Vector Error Correction. Their results demonstrated that there is a long run cointegration relationship between securities trades and those macroeconomic variables. Mohammad (2011) on the other hand used Multivariate Regression Model enlisted on Standard OLS formula and Granger causality test to determine the impact of changes in picked microeconomic and macroeconomic factors on

stock returns in Bangladesh. Month on month data was examined on all the selected variables under scrutiny covering the period from July 2002 to December 2009. The results of the study showed a negative association between stock returns and extension and furthermore remote settlement while market Price/Earnings and advancement in market capitalization influence stock returns. The study did not find any unidirectional Granger Causality between stock returns and any of the free factors and the nonattendance of Granger Causality reveals the evidence of an inefficient market. And after that, he utilizes error-correction models to research both the short-and long run casual relationships and each case is inspected independently. For Germany case, the outcomes demonstrate that the short-run causality keeps running from stock returns to inflation, from industrial production to stock returns The long-run causality keeps running from expansion to stock returns and from conversion standard to stock returns.

2.5 Conceptual Framework

Figure 2.1: Conceptual Framework Diagram



Independent Variables (X)

(Y)

Dependent Variable

Source: Author (2018)

2.6 Summary of Literature of Review

The explanatory power of macroeconomic factors is an important indicator of the trend of stock prices within the capital markets of a given economy. A number of local studies by Mumo (2017), Mugambi and Okech (2016), Zablou and Maithya (2015), Mutuku and Ngeny (2015) have focused on deterministic characteristics of macroeconomic variables such as foreign exchange GDP money supply, inflation and interest rates on share prices at different time periods and their results were very inconsistent. This leads us to do a further investigation into the said variables and determine their impact on share prices.

2.7 Summary

The above literature has looked at the effect the economic influence of a country has on stock price volatility. In general it has been established that there is some relation between macroeconomic factors and the stock price. There is however no clear effect of specific macroeconomic variables and the dependent variable. This has formed the basis of our study by looking at the variables that don't clearly explain the stock price volatility. Therefore the study will include identified variables to establish their explanatory power on the performance of government bonds.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section discusses the research design adopted for analysis, it states the population considered, the type of data to be used and the method of data collection.

3.2 Research Design

The research will use a descriptive research design since it is a study that examines causal and effect relationships. It is also preferred as it allows for an in-depth study of the subject in a quantitative aspect of the overall research. Descriptive research design intends to accumulate information with no control of the exploration setting, concentrating on individual subjects and broadly expounding in depicting them (Kane, 1983). The analysis was undertaken by the use of a multiple regression model for the planned investigation as it means to investigate the noteworthiness measures of macroeconomic factors in deciding stock value volatility.

3.3 Population

According to Mugenda & Mugenda (2003) Population means the total number of possible elements for observations. It is a complete set of all possible observable elements in a study. The target population consists of 64 firms listed at the Nairobi securities exchange in Kenya.

3.4 Data collection

As indicated by Hox and Boeiji (2005) there are two kinds of data primary and secondary data. Primary data is data collected from the surface or perception while secondary data is information collected from past investigations. The examination will consider secondary data as the principle sources to acquire data. The main data sources for this examination will incorporate national bank of Kenya's yearly reports, overviews and productions on recorded firms execution and Kenya National Bureau of Statistics (KNBS).

3.5 Population

A population is a complete set of individuals with the same common observable characteristics Mugenda and Mugenda (2003). The target population consists of 64 firms listed at the Nairobi securities exchange in Kenya.

3.6 Data collection

According to Hox and Boeiji (2005) there are two types of data collection methods; primary and secondary data. Primary data is data collected from the surface or observation while secondary data is data collected from previous studies. The study considered secondary data as the main source to acquire data. The main data sources for this study included trading economics website, Kenya National Bureau of statistics and NSE website.

3.7 Data Analysis

Data analysis was undertaken by the use of a linear regression analysis model. This is because the study tried to identify the effect of independent variables on the dependent variable. The assumptions made by regression model were tested by use of diagnostic tests as described in 3.5.2 below. The regression model is also well explained in 3.5.1 below.

3.7.1 Regression Analysis Model.

A regression analysis model that determined the effect of macro-economic variables on stock price volatility was used in this study in undertaking analysis. In more specific terms a multivariate regression model with four selected macroeconomic variables was used. The selected macroeconomic variables that were determined are; Economic Growth rate, Interest Rate, inflation, and Balance of Payment position as the independent variables as shown by the model below.

$$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_t$$

The general idea of a multiple linear regression model is that the response variable Y is a straight-line function of a given number of explanatory variables. Where the unknown parameters are denoted as α , the independent variables as X and the dependent variable as Y.

Therefore:

More specifically:

$$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon_t$$

Where

Y	=	Stock price volatility for NSE 20 per quarter measured by the standard deviation of the stock price changes
X ₁	=	Economic Growth measured by GDP
X ₂	=	Interest rates measured by prevailing commercial banks' lending rates
X ₃	=	Quarterly Inflation Rates
X ₄	=	Government Expenditure measured by natural log of total public expenditure
X ₅	=	Balance of Payment position measured by natural log of (BOP)
ε_t	=	Error term
$\beta_1, \beta_2 \dots \beta_5$	=	parameters
α_0	=	Constant

The error term (ε_t) accounts for omitted variables and errors in measurement

3.7.2 Regression Diagnostic tests

There are various assumptions that are made by a regression analysis and therefore becomes imperative to look and assess whether data collected conforms to those standards. In order to undertake an autocorrelation test, Durbin Watson test is undertaken. The value should not be more than 4. A value of 2 means that there is no autocorrelation in the sample. Values approaching 0 indicate positive autocorrelation and values toward 4 indicate negative autocorrelation. A value of more than 4 shows presence of residual errors in the model.

Multicollinearity test was also undertaken to determine whether there is presence of collinearity in the variables. Variables with VIF factor of more than 10 are considered to have presence of collinearity, while VIF factor of less than 10 showed absence of multicollinearity. Another diagnostic test that was carried out was normality tests that tests whether data is normally distributed or not. This test was undertaken by the use of kurtosis and skewness. A kurtosis or skewness value of between +3 and -3 considers data normal while vice versa is true.

3.7.3 Test of Significance

The study used F test statistic to undertake a test of significance that showed whether the effect is significant or statistically insignificant. The study was undertaken at 95% degrees of freedom and therefore an alpha value of 5%. In order to test for the significance of the relationship, the calculated significance value (p value) is compared with alpha value. A p value greater than alpha value shows that the data is not statistically significant and the vice versa.

F statistic is also used to determine whether to accept or reject the null hypothesis. The null hypothesis states that there is no effect of macroeconomic variables on stock price volatility. The decision rule applies that if the critical F value is greater than the calculated F value, then the study fails to reject the null hypothesis.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

The study used SPSS software version 20 to undertake regression analysis and other statistical analysis required by the study. The study tests the various assumptions made by the regression model and checks whether data collected complies with these assumptions. A correlation analysis for the data is undertaken before the regression analysis is undertaken. Finally the chapter discusses the findings of the study.

4.2 Response Rate

Secondary data was collected on quarterly basis for a period of 10 years in order to undertake an analysis that determines the effect of selected macroeconomic variables on stock volatility for companies listed at NSE. The study was able to obtain all the information for all the variables and therefore the response rate for the study was 100%. Mugenda & Mugenda (2008) suggests that a response rate of 50% and above is all right for data analysis. However a response rate of 60% and above is excellent. For this study a 100% response rate is excellent to undertake a regression analysis.

4.3 Test Validity

In order to determine the validity and reliability of data, various diagnostic tests were carried out on the data. Normality test was carried out to determine that the distribution of data on the variables is normal. This test used both kurtosis and skewness where by the use of the

rule of thumb principle; a kurtosis or skewness range of between +3 and -3 is considered normal, any other value the data is considered not normal.

Table 4.1: Normality Test

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Y = Stock Volatility	1.329	.374	1.731	.733
X1 = Economic Growth	-1.396	.374	.972	.733
X2 = Interest Rates	.371	.374	-1.013	.733
X3 = Inflation Rates	.875	.374	-.365	.733
X4 = Government Expenditure	.012	.374	-1.495	.733
X5 = BOP	.758	.374	-.928	.733
Valid N (listwise)				

Source: Author, 2018

Kurtosis measures the leanness of data either to the right or to the left while kurtosis measures the tallness or the shortness of the distribution of data. According to table 4.1 all the data variables have kurtosis and skewness value within the range of +3 and -3 which means that the data passed normality test.

The other diagnostic test that would be undertaken is test of autocorrelations. The autocorrelations are tested by the use of Durbin Watson, where as per the standard practice data with Durbin Watson value of more than 4 is considered to have high autocorrelations. Table 4.3 shows Durbin Watson values of 2.873 which shows absence of autocorrelations.

The study also undertook multicollinearity tests for each variable which is measured by VIF factors. The standard practice is VIF factor value of more than 10 indicates presence of multicollinearity that means that the variable has to be left out in the regression analysis.

Variables X1, X2 and X3 had VIF factor values of 7.749, 4.415, and 6.791 respectively. Variable X4 and X5 however had VIF factor values of 13.586 and 16.904 which is greater than 10. The study therefore dropped government spending variable and retained BOP position. The VIF for the resulting model shows absence of multicollinearity as shown on table 4.6.

Table 4.2: Collinearity test table

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
1 X1 = Economic Growth	.129	7.749
X2 = Interest Rates	.226	4.415
X3 = Inflation Rates	.147	6.791
X4 = Government Expenditure	.074	13.586
X5 = BOP	.059	16.904

Source: Author, 2018.

4.4 Data Description

Table 4.3: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
Y = Stock Volatility	40	.0000	.1745	.054292	.0402471	1.329
X1 = Economic Growth	40	1.5000	5.9000	4.759000	1.2256402	-1.396
X2 = Interest Rates	40	13.6400	20.0400	16.018000	1.8822848	.371
X3 = Inflation Rates	40	4.3000	15.1000	8.551250	2.7516484	.875
X5 = BOP	40	-13.2371	-11.3557	-12.566680	.5607604	.758
Valid N (listwise)	40					

Data descriptive table, describes the variables that have been used in the study. Stock volatility had a mean of 5.43% with a standard deviation of 4.02% from the mean. The maximum volatility was 17.45% with the minimum being 0%. Economic growth on the other hand had a mean of 4.76% with a standard deviation of 1.23% and a maximum value of 5.9% and a minimum of 1.5%.

The mean for inflation rate was 8.5% with a standard deviation of 2.75% and a maximum value of 15.1% and minimum value of 4.3%. The BOP position had a mean of -12.57 and a maximum of -11.36 and a minimum of -13.24.

4.5 Correlation Analysis

Correlation analysis describes the relationship between the independent variable and the dependent variable. The Pearson's correlation has values from -1 to +1. +1. A positive value close to one is considered a positive strong correlation which shows that an increase in the independent variable, results to an increase in the dependent variable. The vice versa applies for a negative correlation.

Correlation analysis describes the relationship between the independent variable and the dependent variable. The Pearson's correlation has values from -1 to +1. +1. A positive value close to one is considered a positive strong correlation which shows that an increase in the independent variable, results to an increase in the dependent variable. The vice versa applies for a negative correlation.

Table 4.4: Correlation Analysis

	<i>Y = Stock Volatility</i>	<i>X1 = Economic Growth</i>	<i>X2 = Interest Rates</i>	<i>X3 = Inflation Rates</i>	<i>X5 = BOP</i>
<i>Y = Stock Volatility</i>	1				
<i>X1 = Economic Growth</i>	-0.26726714	1			
<i>X2 = Interest Rates</i>	-0.338456264	0.168543006	1		
<i>X3 = Inflation Rates</i>	0.224760592	0.846527776	0.21956296	1	
<i>X5 = BOP</i>	0.279724404	0.692570907	-0.44040408	0.46416615 4	1

Source: Author, 2018

Stock volatility had a negative but weak correlation with Economic growth at -0.27 and Interest rates at -0.34. The negative relationship shows that when economic growth increases then stock volatility decreases, while increase in interest rates decreases stock volatility and the vice versa. The inflation rate and BOP position have weak but positive relationship with stock volatility. Increasing inflation rate increases stock volatility and increase of BOP position also increases stock volatility albeit in small quantities.

4.6 Regression Analysis

In order to determine the effect of macroeconomic variables on stock volatility for the NSE 20 index, the study employed a regression model which was represented by;

$$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_5 X_5 + \varepsilon_t$$

The dependent variable (Y) was stock volatility and X1, X2, X3 and X5 were represented by economic Growth, interest rates, inflation and BOP position respectively.

4.6.1 Regression Analysis Summary

Table 4.5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.488 ^a	.239	.152	.0370729	2.815

a. Predictors: (Constant), X5 = BOP, X2 = Interest Rates, X3 = Inflation Rates, X1 = Economic Growth

b. Dependent Variable: Y = Stock Volatility

The regression model summary uses coefficient of determination to predict changes in stock volatility. The coefficient of determination is calculated by the use of R squared and according to the table 4.5, the regression model used, predicts the dependent variable to the extent of 23.9% only. The other 86.1% is predicted by factors that are not in the model. This shows that the model is weak though 24% of the changes in stock volatility can be explained by changes in macroeconomic variables.

4.6.2 F Test Statistic

The F test statistic is used to show whether to reject or fail to reject the null hypothesis. We reject the null hypothesis if the calculated F value in the ANOVA table is greater than the

F statistic in the F distribution table at an alpha value of 0.05 and degrees of freedom of 4 and 35. This critical F value is 2.62 while the calculated F value is 2.74. We therefore reject the null hypothesis.

Table 4.6: ANOVA TABLE

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	.015	4	.004	2.741	.044 ^b
Residual	.048	35	.001		
Total	.063	39			

Source: Author, 2018.

In order to determine the significance of the relationship, we compare the calculated significance value (p Value) and the alpha value. If the P value is less than the alpha value, then the relationship is significant. According to the table 4.6 the p value is 0.044 while the alpha value is 0.05. There is a significant effect of the macroeconomic variables on the stock volatility for the NSE 20 index.

4.6.3 Regression Coefficients

Table 4.7 shows the coefficients for the regression model $Y = \alpha_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_5X_5 + \varepsilon_t$

They help us determine the value of the dependent variable after a unit change of a single independent variable, while all the others are held constant.

Table 4.7: Regression Coefficients Table

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	.087	.175		.495	.623	-.268	.441		
X1 = Economic Growth	.015	.013	.442	1.086	.285	-.013	.042	.131	7.613
X2 = Interest Rates	-.012	.005	-.575	-2.610	.013	-.022	-.003	.449	2.230
X3 = Inflation Rates	.011	.006	.727	1.899	.066	-.001	.022	.148	6.742
X5 = BOP	.000	.016	-.005	-.022	.983	-.034	.033	.413	2.424

Source: Author, 2018.

The resulting equation therefore becomes

$$Y = 0.087 + 0.015 X_1 - 0.012 X_2 + 0.011 X_3 + 0.175$$

4.7 Discussion of Results Findings

There are various results that have been found by this study. The basic result is that there is a statistically significant effect of macroeconomic variables on stock volatility. The study rejected the null hypothesis that stated that there was no effect of macroeconomic variables on stock volatility. This was because, the calculated F value was greater than the critical F value. The effect was significant since the p value was less than the alpha value.

The effect of macroeconomic variables differ from variable to the other. The economic variable has a weak but negative correlation with stock volatility. This is because if economic growth increases it means that the market will stabilize in form of performance.

The effect is low stock volatility. The Interest rates also have a negative correlation with

stock volatility. This means that an increase in stock value leads to a decrease in stock volatility. This could be explained by the fact that increasing interest rates means that there is more demand of money than the supply. As a result of market demand forces the interest rate increases and as a result the prices of the stock do not fluctuate significantly since there are more available investment opportunities in the economy than the resources required to implement the projects with positive NPV. On the other hand the increase in inflation rate increases stock price volatility, as inflation hampers real growth of the various sectors of the economy.

The results of this study are consistent with EMH theory that proposes that for a certain level of efficiency in a market, the activities and changes that affect the market are communicated to the market and the information is reflected in the prices of the stocks accordingly. The study shows that the NSE has market efficiency to a certain extent since changes in macroeconomic variables are reflected in the changes in stock price volatility. The efficiency is however limited as the prediction of the stock volatility was only to the extent of 24% and the correlation between the independent variables and the dependent variable is weak.

The results of this study also agrees with studies conducted by Mwaore (2017) who found a significant effect of macroeconomic variables on prices of firms listed at NSE. Noor (2017) also found out that the performance of share prices at the NSE was significantly affected by the macroeconomic variables. Similar results were also observed by Doong et. al (2005) and Geethe et. al (2011).

However there exists a contradictory study that contradicted with the results of this findings. Mahedi (2012) found out that firms in United Kingdom showed an insignificant relationship between inflation and stock returns in the short run.

CHAPTER FIVE

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter contains the summary of the research findings, the conclusions made from those findings, recommendations, limitations of the study and areas suggested for further research.

5.2 Summary of Research Findings

The main findings of the study was that there was statistically significant effect of macroeconomic variables on stock volatility. The macro economic variables had differing effect on stock volatility. Economic growth in Kenya showed a negative but significant effect on stock volatility. This means that when the country experienced high economic growth, then there was little stock volatility. This is explained by the fact that economic growth shows the growth in GDP of the country. Economic growth therefore shows that in general, the industries improved in creating their output and this would mean that the firms experienced good returns that were reflected in favourable stock prices and stock returns. This ultimately leads to decline in stock volatility.

The other macroeconomic variable was interest rate. The effect of high interest rates in the economy characterized low stock volatility. This could be explained by the fact that interest rates dictate the amount of borrowing that takes place in the country. High interest rates entices lenders in the economy to give out credit in large quantities so as to benefit from

the high interests. Borrowers on the other hand are thus able to access credit that can help them to implement projects with positive NPVs that would lead to improved performance. This therefore decreases stock price volatility as firms improve their performances and stock returns.

The effect of inflation rate on stock volatility was however positive. This implied that increase in inflation rate increases stock volatility. Inflation rate increase means that the general prices increase, which has the effect of crowding out investments. The crowding out of investments means that the performance of firms in the economy is adversely affected. Shareholders demand increased returns from their investment and the demand of shares decreases as compared to the supply. The market tends to be bearish that means stock prices fluctuates significantly hence increasing stock volatility.

The effect of BOP position on stock volatility is positive. The BOP position in Kenya is always negative, which means that the country is a net importer of products. Increasing imports as compared to exports means that there is less output in the economy which has the ability of increasing the exchange rate fluctuations and thereby increasing stock volatility.

5.3 Conclusion

In conclusion, the macroeconomic variables have significant effect on stock volatility for firms listed at NSE. In more specific terms, the economic growth has negative but significant effect on stock volatility. This means that a unit increase in economic growth is

characterized by decrease in stock volatility. In other words increase in GDP enables stock prices at NSE to be stable. The market therefore becomes more predictable and chances of arbitration are highly reduced.

Interest rates also have negative and significant effect on stock volatility. The lenders are more willing to lend when the interest rates are high. This boosts the economy due to the money multiplier effect and the money creation concept by the commercial banks. Lending by the commercial banks have a multiplier effect and the money creation concept that ensures that it improves the capital market index and therefore reduces the stock price volatility.

On the contrary the effect of Inflation rate and Balance of payment position has a positive effect on stock price volatility. Increase in these variables increase stock price volatility. Inflation rate increases the general price level but does not increase the real value of the products and services. Increase in inflation rate therefore impacts an upward pressure on prices, that means that investors and shareholders demands more returns which means that stock price volatility increases.

5.4 Recommendations

Various recommendations are suggested by this study. First the study recommends that the government has to employ both fiscal and monetary policies in order to ensure that there is constant economic growth in the economy. This helps to reduce the stock price volatility in the stock market which works to protect investors from losing their investments as a

result of high stock price volatility. The effect of high stock price volatility is clear from the market shocks that crashed the entire US market and other large stock markets in the world. Such calamities can be avoided by ensuring that there is constant economic growth in the country. The study also recommends that anti-inflationary measures would need to be undertaken by the government so as to address the issue of increasing inflation rate.

5.5 Limitations of the Study

The time available for undertaking this study was limited. This therefore meant that we could not be in position to look at all the macroeconomic variables and their effect on stock price volatility. The study also looked at the effect of stock price volatility for the NSE 20 companies. Given enough time and resources the study could use the stock price volatility for the entire market which would give even better conclusive results.

Data was also limited to quarterly data for 10 years. Daily data could give better results as stock volatility changes daily. The macroeconomic factors would nevertheless be difficult to obtain on daily basis. This data is collected by various government agencies and it would only be available to the general public at best on monthly basis.

Data collected was obtained from Trend Economics websites and Kenya National Bureau of Statistics Websites. The secondary data obtained was not ascertained on its accuracy of which in the instance there were errors in the data published in the various websites, then this error would be replicated in the findings of our study.

5.6 Suggestions for Further Research

The limitations of the study helps us to obtain areas where further research may be undertaken. The study therefore recommends that a similar study be undertaken but consider more macroeconomic variables such as exchange rate depreciation among others. The results of the study would then be compared to the results of this study and consistency in findings or lack of it thereof discussed accordingly, A similar study would also be undertaken but increase the period of study and also the variables should be considered in a less span such as monthly data. The results would again be compared with the results of this study.

The researcher also recommends similar study to be undertaken in the economies of other countries more so eastern African countries and comparative results noted with the results of this study. A similar study would also be undertaken in developed countries such as the United States and in the developed markets such as New York Securities Exchange.

REFERENCES

- Adajaski, C.K.D. and N.B. Biekpe, (2005) Stock market development and economic growth: The case of selected African countries. *Afr. Dev. Rev.*, 18: 144-161.
<http://www3.interscience.wiley.com/journal/11856/5413/abstract>
- Adam, K., Marcet, A., & Nicolini, J. P. (2016). Stock market volatility and learning. *The Journal of Finance*, 71(1), 33-82.
- Adam, A., & Tweneboah, G. (2008). Macroeconomic factors and stock market movement: Evidence from Ghana.
- Attari, M.I.J.; Safdar, L. (2013) the relationship between macroeconomic volatility and stock market volatility: Empirical evidence from Pakistan. *Pakistan Journal of Commerce and Social Sciences*, 7(2), pp.309-320
- Blanchard, M. O. J., Rogoff, M. K., & Rajan, R. (Eds.). (2016). *Progress and confusion: the state of macroeconomic policy*. International Monetary Fund.
- Callen, T. (2014). Gross domestic product: an economy's all. International Monetary Found. *Finance & Development*.
- Chittedi, K. R. (2015). Macroeconomic Variables Impact on Stock Prices in BRIC Stock Markets: An Empirical Analysis. *Journal of Stock & Forex Trading*, 4(2), 1-7.
- Corradi, V.; Distaso, W.; Meler, A. (2013) Macroeconomic determinants of stock volatility and volatility premiums. *Journal of Monetary Economics*, 60, pp.203-220
- De Grauwe, P., & Grimaldi, M. (2018). *The exchange rate in a behavioral finance framework*. Princeton University Press.
- Engle, R.F.; Rangel, J.G. (2008) The spline GARCH model for low frequency volatility and its macroeconomic causes. *Review of Financial Studies* 21, pp.1187-1222
- Fontana, G., & Setterfield, M. (Eds.). (2016). *Macroeconomic theory and macroeconomic pedagogy*. Springer.
- Gay, R. D. (2016). Effect of macroeconomic variables on stock market returns for four emerging economies: Brazil, Russia, India, and China. *The International Business & Economics Research Journal (Online)*, 15(3), 119.
- Geske, R. and Roll, R. (1983) The fiscal and monetary linkage between stock returns and inflation', *The Journal of Finance*, Vol. 38, No. 1, pp.1-33.

- Hox, J. J., & Boeije, H. R. (2005). Data collection, primary versus secondary.
- Jefferis, K. and C. Okeahalam, 2000. The impact of economic fundamentals on stock markets in Southern Africa. *Dev. South. Afr.*, 17: 23-51.
<http://www.informaworld.com/smpp/title~db=all~content=g713413759>
- Mauro, P., 2003. Stock market returns and output growth in emerging and advanced economies. *J. Dev. Econ.*, 71: 129-153.
http://www.elsevier.com/wps/find/journaldescription.Cws_home/505546/description#description
- Mugenda, O. M., & Mugenda, A. G.(2003). *Research methods quantitative and qualitative approaches*.
- Mullineux, A., Bissoondeal, R., Karoglou, M., Hagstromer, B., & Binner, J. (2014). Stock Market Volatility, Risk Attitude and the Demand for Money in the UK.
- Nasseh, A. and J. Strauss, 2000. Stock prices and domestic and international macroeconomic activity: A cointegration approach. *Q. Rev. Econ. Finance*, 40: 229- 45.
- Ngugi, R. W. 2003. Development of the Nairobi Stock Exchange. KIPPRA Discussion, pg 1 to 20
- Schrey, A. R., & Hafðísarson, A. R. (2017). *Effect of interest rate changes on stocks: is the Icelandic market efficient?* (Doctoral dissertation).
- Shirai, S., 2004. Testing the three roles of equity markets in developing countries”: the case of China. *World Dev.*, 32: 1467-1486.
http://econpapers.repec.org/article/eeewdev/v_3a32_3ay_3a2004_3ai_3a9_3ap_3a1467-1486.htm
- Stavarek, Daniel (2004), Stock Prices and Exchange Rates in the EU and the USA: Evidence of their Mutual Interactions, MPRA Paper No. 7297
- Tahir, R. and Ghani, A. A. (2004), Relationship between Exchange Rates and Stock Prices: Empirical Evidence from Bahrain’s Financial Markets, EcoMod2004 International Conference on Policy Modeling.
- Wongbangpo, P., & Sharma, S. C. (2002). Stock market and macroeconomic fundamental dynamic interactions: ASEAN-5 countries. *Journal of Asian Economics*, 13(1), 27-51.

**APPENDIX I:
DATA USED IN ANALYSIS**

Y = Economic Growth	Y = Stock Volatility	X1 = Economic Growth	X2 = Interest Rates	X3 = Inflation Rates	X5 = BOP	X4 = Government Expenditure
5.63	0.066906	5.63	13.71	7.00	-11.36	13.41
4.25	0.092754	4.25	14.10	9.70	-11.53	13.42
2.88	0.133887	2.88	14.48	12.40	-11.67	13.42
1.50	0.076586	1.50	14.87	15.10	-11.80	13.43
1.80	0.040975	1.80	14.84	13.98	-11.78	13.45
2.10	0.174527	2.10	14.82	12.85	-11.76	13.47
2.40	0.027406	2.40	14.79	11.73	-11.75	13.50
2.70	4.93E-05	2.70	14.76	10.60	-11.73	13.52
3.48	0.109087	3.48	14.54	9.03	-11.85	13.56
4.25	0.03827	4.25	14.32	7.45	-11.96	13.60
5.03	0.050494	5.03	14.09	5.88	-12.05	13.64
5.80	0.049716	5.80	13.87	4.30	-12.14	13.68
5.45	0.037303	5.45	15.41	6.73	-12.33	13.71
5.10	0.018865	5.10	16.96	9.15	-12.48	13.74
4.75	0.065644	4.75	18.50	11.58	-12.62	13.78
4.40	0.051127	4.40	20.04	14.00	-12.74	13.81
4.45	0.041348	4.45	19.57	12.85	-12.75	13.88
4.50	0.072726	4.50	19.10	11.70	-12.77	13.94
4.55	0.021479	4.55	18.62	10.55	-12.78	14.01

4.60	0.008261	4.60	18.15	9.40	-12.79	14.06
4.93	0.039332	4.93	17.86	8.48	-12.83	14.11
5.25	0.051395	5.25	17.57	7.55	-12.87	14.16
5.58	0.034659	5.58	17.28	6.63	-12.91	14.20
5.90	0.040669	5.90	16.99	5.70	-12.94	14.24
5.78	0.049865	5.78	16.74	6.00	-13.02	14.31
5.65	0.012042	5.65	16.49	6.30	-13.10	14.37
5.53	0.030616	5.53	16.24	6.60	-13.17	14.43
5.40	0.022288	5.40	15.99	6.90	-13.24	14.49
5.48	0.015591	5.48	16.57	6.83	-13.17	14.50
5.55	0.075107	5.55	17.15	6.75	-13.10	14.51
5.63	0.043484	5.63	17.72	6.68	-13.03	14.52
5.70	0.049745	5.70	18.30	6.60	-12.95	14.53
5.75	0.027264	5.75	17.15	6.53	-12.92	14.56
5.80	0.010697	5.80	16.00	6.45	-12.89	14.59
5.85	0.088072	5.85	14.84	6.38	-12.87	14.61
5.90	0.079632	5.90	13.69	6.30	-12.84	14.64
5.65	0.040243	5.65	13.68	6.73	-12.93	14.69
5.40	0.16114	5.40	13.67	7.15	-13.01	14.74
5.15	0.009541	5.15	13.65	7.58	-13.09	14.79
4.90	0.112869	4.90	13.64	8.00	-13.16	14.84