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The Effect of macroeconomic variables on stock return volatility in the Nairobi Securities Exchange (NSE)

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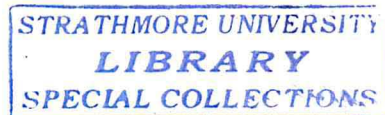
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**The Effect of Macroeconomic Variables on Stock Return Volatility in
the Nairobi Securities Exchange (NSE)**



Siongo Kisoso

MBA/07684/15

**Submitted In Partial Fulfilment of the Requirements for the Degree of
Master of Business Administration at Strathmore University**

**Strathmore Business School
Strathmore University
Nairobi, Kenya**

June, 2019

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Siongo Kisoso

June 2019

Approval

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Under the Kenya vision 2030, the financial services sector aims at creating a vibrant and globally competitive financial sector promoting high-levels of savings and financing for Kenya's investment needs. It also aimed to ensure macroeconomic stability as well as reducing the volatility of returns in Nairobi securities exchange. This study aimed at investigating the macroeconomic variables and stock market return volatility in Nairobi securities exchange limited. The study focused on of inflation, exchange rates, economic growth, emerging markets emerging markets portfolio flows, financial account of balance of payment changes and interest rates as the macroeconomic variables under study. Arbitrage pricing theory was used to link the macroeconomic variables and the stock market return. Annual published time series data from 2007 to December 2017 was sourced from CBK, KNBS and NSE. The secondary data was analyzed by first calculating the monthly averages for each variable in Excel. The averages were then be transferred to STATA version 12.1 software for further analysis. Descriptive statistics such as mean score, skewness, kurtosis and standard deviation was estimated for all the variables. Toda and Yamamoto Granger causality was applied to establish the causal relationship between the set of macroeconomic variables and the NSE 20 share index while Power Garch model was employed to determine the volatility. Regression analysis technique is used to determine the relationship between two variables. Information was presented inform of tables. The study found that emerging markets portfolio flows, financial account of balance of payment and interest rates explained 76.4% of the changes in stock market return volatility in Nairobi Stock Exchange. It was also established that changes in emerging markets portfolio flows would lead to 0.812 increase in stock market return volatility in NSE Listed firms, that changes in financial account of balance of payment would lead to 0.743 increase in stock market return volatility in NSE listed firms and that interest rates would lead to 0.419 increase in stock market return volatility in NSE listed firms. The study concluded that emerging markets portfolio flows had the greatest impact on the stock market return volatility in NSE listed firms followed by financial account of balance of payment while interest rates had the least impact on financial account of balance of payment and interest rates. The study recommends the government through its policy makers should come up with policies that will help stabilize Foreign exchange rate, Interest rate and Inflation rate fluctuation thus creating investor confidence in the securities market. Further the study recommends that the independent regulatory bodies such as Capital Markets Authority and visionary system of government can contribute towards the development of an efficient working and development of the Kenyan Stock Market.

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LIST OF ABBREVIATIONS

AFC	-	Asian Financial Crisis
APT	-	Arbitrage Pricing Theory
ATS	-	Automated Trading System
BOP	-	Balance of Payments
EMH	-	Effective Market Hypothesis
Ems	-	Emerging Markets
FDI	-	Foreign Domestic Investment
GDP	-	Gross Domestic Product
GEMS	-	Growth Enterprise Market Segment
IR	-	Interest Rate
KNBS	-	Kenya National Bureau of Statistics
NER	-	Nominal Exchange Rate
NSE	-	Nairobi Securities Exchange
SDRs	-	Special Drawing Rights

CHAPTER ONE: INTRODUCTION

1.1 Background

Globally, stock return volatility has been a main concern in the financial sector. The main factor behind the attention on the stock return volatility is that it informs on the stock price movement which in turn correlates to volatility in the entire stock market. This is further informed by the fact that a well-functioning stock market is vital for stability in the financial sector of any economy. A highly volatile stock return is unfavorable for the investors given the uncertainty in the market thus eroding their confidence in the same market. Growth is sustained through accessing of stages to propel that also promotes the profitability of the business through a conducive macroeconomic environment (Black & Scholes, 1973).

Among many other factors, the real GDP growth rate, rate of inflation, the exchange rate, fiscal position, the debt position measure the economy's performance as they are the measurement barometers. The economy's growth is measured and determined by the macroeconomic factors. These factors therefore are the main factors that are used by most organizations to measure their level of performance as their major indicators. During times of volatility, the stocks from the blue-chip companies, which usually have a history of stability during uncertain times in the market, are safer than those of smaller companies (Pal & Mittal, 2011).

There have been reported leveling off of FDI and other capital flows in Africa due to tripleness in capital flows that was experienced between 2005 and 2010. The growth rate of portfolios has continued to rise over the years due to the flows in investment and flow of capital to about 7 percent of the total value. Demand pull inflation is created by constant rises in total demand therefore the organizations reacting by raising costs and partly by rising output. Cost push inflation is related by constant increment in the costs experienced by firms (McKinsey Global Institute Analysis, 2016). High volatility of stock returns is a source of great risk, as majority of the investors are reluctant to risk, they intend to keep off from the business because of doubt in likely profits. High market

volatility increases the market risk of a bourse and eventually increases economy constancy so as to better the efficiency of the decisions of assets allocation (Aroni, 2009).

According to Murungi (2012), any investor who wishes to be successful by increasing the returns must ensure that focus is given on the consideration of those macroeconomic variables that shape and influence the prices in an economy. Therefore, the efficiency of stock market returns and the volatility of stocks require to be investigated continuously to infer proper and quality formulation of policies geared towards attraction and retaining of potential investors (Malik and Hassan, 2004). The opinion of Bekaert and Harvey (2016) is that the presence of and challenges emanating from volatility in various emerging stock exchanges is almost a common phenomenon.

According to Easterly and Kraay (2013), most emerging markets are likely to continue experiencing volatility unless these economies formulate quality policies and implement them. Volatility of stocks has been witnessed in the Nairobi securities exchange which calls for an intervention. When a trader is able to before the stock goes up and is able to sell the same product before the prices fall, they are bale to outwit the market and that makes the trader successful. Changes in prices are vital in determining the future success of the company and that why they employ numerous market strategies and technical analysis to ensure that they keep track of changes in prices. When they are able to keep track of prices, then they are bale to ensure that they buy when prices are low and sell when prices are higher.

Turning of prices happens when the traders are still in the gambling and guessing period. Constant anxiety is the main source of the market's volatility which is used by small investors which holds the long term stock. Enhancing macroeconomic stability as well as significantly reducing the volatility in the stock exchange indices is one of the main objectives of the Kenya capital market master plan 2014 to 2023 (CMA, 2016). The vision 2030 financial sector aim in stimulating capital market growth is to formulate

quality policies so as to raise stock market capitalization from 50% to 90% of GDP (KIPPRA, 2013)

1.1.1 Macroeconomic Variables and Stock Return Volatility

Macroeconomic variables over the years enacted various policy measures aimed at remedying the situation; however, the balance of payments situation does not seem to have improved despite these policy measures (Mambo, 2012). The competitiveness in the Kenyan market has risen in high rates and this has made its demand in the markets to rise due to its declining in sectors such as domestic prices, including food, energy and transport which then affected the overall rate of competitiveness. There was declining in manufacturing sectors while services and construction which are the non-tradable sectors recorded growth rates (Stratlink, 2012). Consumption is the main driver of growth in Kenya. Service sectors are recording growth rates while domestic sectors are recording decline in growth.

The exchange rates economic modelling was balanced by first approach of balancing payments According to Fuller (2018). In a given period of time, a country's financial flows are tracked through approach of balance of payments. Zero is the final balance while credit treats all financial transactions. International trade, payment for service, income received, foreign direct investment, portfolio investments, short- and long-term capital flows, and the sale of currency reserves by the central bank are the many types of international transactions.

The balancing of payments and current accounts are used in comparison of export and import prices ration in terms of trade. There is improvement in terms of trade to a country if there is rise in export prices than in imports. Most of the countries record increase in terms of trade when it records high demands in its exports. Increase in demand for a country's exports leads to the country's increase of value for its currency. A decrease in exports and an increase in imports leads to decrease of the country's value for currency compared to that of its trading partners (Fuller, 2018). Most of the countries have a difficulty in recording rise in markets and demand for their products. This is due

to the fact that prices tend to change over time according to the flow of currency globally. Most of the countries have tried to balance how their imports and exports flow per a given time but still this affects their level of cash flow as it sometimes goes up and sometimes it declines. Most of the investments in a country are controlled by how high or how low a currency is which is also controlled by the price in imports and exports per a given period. A company has its investors and shareholders who are controlled by the activities of the management as they are responsible for all that takes place in the company (Adedoyin, Babalola, Otegunri & Adeoti, 2016).

The connection between macroeconomic factors and stock price or stock return is essentially connected to the arbitrage evaluating hypothesis in finance. Sangmi and Hassan (2013) studied the effect of macroeconomic factors on the stock price in the Indian Stock Market. They found that there is a huge relationship between macroeconomic factors, (for example, inflation, exchange rate, interest rate, cash supply, gold cost, and modern generation) and stock cost in India. Corradi, Distaso & Mele (2013), examine the macroeconomics determinants of stock volatility and volatility premiums utilizing the Vixindex information kept up by the Chicago Board Options Exchange (CBOE) from 2007 to 2009.

1.1.2 Nairobi Securities Exchange

In 1954, the Nairobi Stock Exchange was founded as a voluntary organization of stockbrokers enrolled under the Societies Act. In July 2011, the Nairobi Stock Exchange Limited changed its name to the Nairobi Securities Exchange (NSE) Limited mirroring its key arrangement to develop into a full administration securities trade which supports exchanging, clearing and settlement of values, obligation, subordinates, and other related instruments (NSE, 2013). Demutualization process was started in 2006 by the foundation of a demutualization council and this procedure would enhance administration of the recorded shares in the NSE; the procedure would see 51% of the NSE being publicly possessed and in this manner raising the browse to global measures by delinking proprietorship from administration.

In the same year 2006, NSE saw the foundation of the automated trading system (ATS) and an increased number of trading hours to 1500hrs. There was cross listing of listed firms taking after the marking of the update of comprehension in NSE and the Ugandan Stock Exchange thus permitting dualism for organizations listed in both trades (NSE, 2015). MSCI Barra classified Kenya as a frontier market (MSCI, 2013) in June 2013. As defined by the International Finance Corporation in 1992, frontier markets are markets that are investable but have lower market capitalization and liquidity. They are considered a subset of the emerging markets (EMs). Further, the expansion of the market has seen the introduction of Growth Enterprise Market Segment (GEMS), short selling and margin buying which are likely to increase volatility (NSE, 2013). The frontier equity markets are commonly sought after by investors seeking high, long term returns and low connections with different markets. The proposition of a nation being named as frontier is that, after some time, the market will turn out to be more liquid and exhibit comparable risk and return attributes as the greater, more liquid developing markets.

1.2 Statement of the Problem

Stock return volatility has been a predominant issue that is of concern in the financial sector all over the world. This is due to the fact that a highly volatile market may cause investors to shy away from trading in that market, in turn impacting the economy in a negative way. Emerging markets portfolio flows has a positive relationship to the development of the country and have had an effect on the developing country's growth rate as a major role. There has been failure in how the world's proportion is being saved in the past years.

Volatility of security return erodes confidence in the capital market, reduces liquidity and discourages wide participation (Daly, 1999). The sessional paper No. 10 of 2012 on Kenya Vision 2030 highlights market volatility as one of the leading problems facing the Nairobi Securities Exchange. According to The Kenya Financial Sector Stability Report, 2015 Interest Rate Risks were elevated in the second half of 2015, with Treasury bills average rates ranging between 8 per cent and 23 per cent, while Treasury bond yield curve had yield spreads of 600bps between the lowest and the highest maturity. This

volatility was in response to increased government borrowing as well as monetary policy tightening amid liquidity distribution challenges facing the banks.

Locally, Kirui, Wawire and Onono, (2014), did a study which sought to evaluate the relationship between Gross Domestic Product, Treasury bill rate, exchange rate, inflation and stock market return in Nairobi Securities Exchange Limited.. Olweny and Omondi (2011), investigated 2001 and 2010's economic growth and performance related in Kenya.. These studies were however carried out a long time ago, given that the factors at play in a stock market at any trading day are so dynamic, there is need to investigate them on a continuous basis. It is therefore imperative there is an understanding of the interplay of factors that cause volatility in the market. The current research addressed these concerns using data from 2007 to 2017. Furthermore there are no studies that have been undertaken to determine the effects of emerging market portfolio flows and the financial account of the balance of payments on stock market return volatility on NSE.

1.3 Objectives of the study

The general objective of the study was to establish the effect of macroeconomic variables on stock return volatility in the NSE.

The specific objectives of the study were to:

- i. Examine the effect of emerging markets portfolio flows on stock market return volatility in Nairobi Stock Exchange
- ii. Establish the effect of financial account of balance of payment on stock market return volatility in Nairobi Stock Exchange
- iii. Establish the moderating effect of Interest rates on the relationship between macroeconomic variables and stock return volatility in the NSE

1.4 Research Questions

- i. What is the effect of emerging markets portfolio flows on stock market return volatility in Nairobi Stock Exchange?

- ii. What is the effect of financial account of balance of payment on stock market return volatility in Nairobi Stock Exchange?
- iii. What is the moderating effect of interest rates on the relationship between macroeconomic variables and stock return volatility in the NSE?

1.5 Significance of the study

This study contributed to the limited literature that exists in Kenya in regard to the effect of the macroeconomic variables on stock return volatility. It enabled investors to make informed decisions regarding their investments. Investors were also better placed to manage the economy and further help develop. In doing this therefore, they would in a better position to make concrete objectives and also ensure that right regulatory procedures are introduced.

The findings of the study would be important in understanding inflation, interest rates and exchange rates, changes in financial account of balance of payment and their impact on share prices in Kenya. 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. The use of information on interest rates, inflation, financial account of balance of payment changes, emerging market emerging markets portfolio flows and exchange rate would help market traders and money market analysts manage better their portfolios. Similarly policy makers are also better placed to manage the economy and further help develop stock markets more efficiently by managing these variables that impact on stock markets.

Moreover, the research would be of great value to researchers and academicians. This study would contribute to the limited literature that exists in Kenya in regard to the effect of emerging market emerging markets portfolio flows thus, serve as a source of reference for further research. The recommendations for future research would also help researchers to carry out more studies to extend the understanding of stock markets in Kenya.

1.7 Scope of the study

The main objective of the study was to establish the effect of macroeconomic variables on stock return volatility in the NSE. The variables under study include; financial account of balance of payment of balance of payment and emerging markets emerging markets portfolio flows. The control variables were interest rates, exchange rates, inflation and GDP growth. The study also aimed at developing a multivariable model to predict changes in stock market and identifying the most efficient portfolio to hold during periods of low and high volatility in Nairobi Stock Exchange. This study covered the period 1997 to 2017.

CHAPTER TWO: LITERATURE REVIEW

This chapter reviews and analyses previous studies on the stock return volatility and other related literature. It opens with an attempt to define some aspects of stock return volatility and discusses the major theories that have been applied in the study of the stock return volatility. These theories include Random Walk Theory, Chaos theory and Arbitrage Pricing Theory (APT). Empirical literature review follows after which the variables used are then discussed building into the conceptual framework and thereafter a conclusion of the chapter.

2.1 Theoretical Literature

2.1.1 *Random Walk Theory*

The thought of stock prices taking after a random walk is associated with that of the effective market Hypothesis (EMH). The start is that investors respond immediately to any educational favorable circumstances they have in this way disposing of benefit chances. Dupernex (2007) referred to in Lo and McKinley (1999) that costs completely reflect accessible information and no benefit can be produced using information based trading. Therefore, this prompts to a random walk where the more productive the market, the more arbitrary the arrangement of value changes. On the other hand, it ought to be noticed that the EMH and arbitrary walks do not add up to a similar thing. An arbitrary walk of stock costs does not infer that money market is productive with rational investors. According to Fama (1970), EMH can be classified into three levels in light of the meaning of the accessible information set specifically, Weak form EMH, Semi solid frame EMH and Strong form EMH.

Information on costs, rates of return, exchanging volume, and the market produced are expected to be recorded in the EMH current stock costs where the information is also supposed to be revealed where the customers can access it before they undertake any transactions. The future rate of returns does not have any association with information on other markets and the past returns as suggested by this theory. Market information should therefore be exchanged by the concerned parties to the relevant people as it could

also get to the competitors who will use the idea for their own advantage. The theory thus shows that there is need to keep and share information that is relevant to the market as it will help in the control of prices from how high they range to how low (Dupernex, 2007).

Information that should be delivered to the public require security costs as stated by EMH which is semi-solid; Security costs reflect all the information assumed to belong to the public which is accessed freely. Public information includes; contending firms reports, the economy's condition which is declared and information that involves firm valuation need security costs so as to make it easy to access in the stock value arrangement. The reports that contain public information include; yearly reports, yearly filings, income reports, declarations, and other significant information that can be promptly assembled (McCombie & Thirlwall, 2016).

The solid shape EMH states that stock costs fully reveal all information from public and private sources. This implies no group of shareholders has monopolistic access to information related to the arrangement of costs. Thus, no gathering of shareholders ought to have the capacity to reliably determine expected benefits. The solid frame includes both weak form EMH and semi-solid form. Additionally, the solid form develops the presumption of productive market, in which costs regulates quickly to arrival of new public information, to accept ideal markets, in which all information is cost free and accessible to everybody at once (Labuschagne, Majewska & Olbryś, 2016) There is independence in how price changes vary which defines a random walk. Independence of the returns indicates that the information that has been received today is very important as news given yesterday do not matter today, and the returns received today do not relate to returns of yesterday. Independence of returns involves random variables and random walks (Edgar, 1996). Technically the Random Walk with a drift (δ) as an individual stochastic series X_t that behaves can be defined as:

$$X_t = \alpha + X_{t-1} + \epsilon_{t+1} \quad \epsilon_{t+1} \sim \text{iid}(0, \delta^2)$$

A simple idea is used to explain drifts. It explains how stock prices may vary from a given period to another (Brealey and Meyers, 2005). There are some variances in the model despite the fact that it is very useful. Random walks imply how efficient markets are but efficiency of markets do not really imply random walks. However, there is a very deeply rooted assumption of independence. Most tests of the EMH also test the random walk version. In addition, the EMH in any version says that past information does not affect market activity or return, once the information is generally known (Edgar, 1996). This is relevant to the study as it helps in assessing the effect of emerging markets portfolio flows on stock market return volatility in Nairobi Stock Exchange.

2.1.2 The Present Value Model

According to Attari et al. (2013), the present value models (PVM) using future expected earnings and future expected discount rates has been empirically tested for predicting stock prices. The model explains the dynamic relationship between stock market volatility and economic activities (Semmler, 2006). Sarkar, (2012) opines that the PVM explains the relationship between stock prices and macroeconomic variables Attari et al. (2013) posit that the PVM is useful in establishing a long term relationship among stock prices and macroeconomic variables. In the words of Shiller, (1992), the model states that the price of a share is the present discounted value of the expected future dividends. The description of this model is that the expected future dividend of company shares reflects the levels of macroeconomic activities.

Volatility of share prices and stock market returns would therefore, be influenced by expected future cash flows which are a function of microeconomic variables. The model has been tested and used in a number of studies. Alshogathri (2011), Osisanwo (2012), Sarkar (2012), Attari *et al.* (2013) and Oseni (2011) are among studies which have used this model to explain the effect of macroeconomic variables on stock market volatility. According to the model, the difference between the intrinsic value of a share and its market value represents an overvalued or undervalued stock. The profit opportunities represented by the existence of undervalued and overvalued stocks motivate investors to

trade, and their trading moves share prices toward the intrinsic value (Gorton & Allen, 1993). Consequently, investors search for mispriced stocks and their subsequent trading make the market efficient causing shares to reflect their intrinsic values. According to Banerjee (2015) the intrinsic value of a share is the present value of the cash flows the shareholder is expected to receive.

The advantage of the present value model is that it can be used to focus on the long run relationship between the stock market returns and macroeconomic variables (Osisanwo, 2012). The present value model was important to this study in explaining the relationship between macro-economic variables and stock returns volatility. The theory relates a change in share prices to the discount rate in the market which is influenced by a change in macro-economic factors. Ackert and Smith (1993) argue that volatility in stock prices is due to either a change in the discount rate or new information concerning future cash flows received by shareholders. This theory assists in explaining how financial account of balance of payment affects stock market return volatility in Nairobi Stock Exchange

2.1.3 Arbitrage Pricing Theory (APT)

The Arbitrage Pricing Theory developed by Stephen Ross in 1976 describes how financial assets are priced given the risk associated with them (Alshogeathri, 2011). The theory proposes that share prices are driven by multiple macroeconomic factors (Dincer, 2014). The APT predicts that any anticipated arrival of new information about, exchange rates, interest rates, inflation, GDP, and many other macroeconomic variables will alter share prices through the impact they have on expected return (Chinzara, 2010). This theory explains how changes in macro-economic variables would influence rapid fluctuations in share prices or stock market volatility. The theory has been used in a number of studies to explain the relationship between macro-economic variables and stock market volatility.

Alshogeathri (2011) and Okorafor (2008) are among studies that used the APT to explain the relationship between macroeconomic variables and stock market returns.

Amos (2010) studied the APT and empirical evidence in the Nigeria capital market and found that amongst the five macroeconomic variables examined, none of the variables was significant enough to stimulate the stock returns. Arewa, et al. (2013) conducted a study to test the APT on Nigerian stock market, and made findings that provided overwhelming evidence in support of the APT pricing model as a good description of expected return. According to the theory, the expected return of a financial asset can be modeled as a linear function of various macroeconomic variables or theoretical market indices, where the sensitivity to change in each factor is represented by a factor specific beta coefficient (Gay, 2008). Elton et al. (2011), opines that the APT can be tested over a class of assets such as common stocks or a small set of stocks that form the stock market index. As a single-factor model, uncertainty in asset returns comes from a common macroeconomic factor and a firm-specific cause, where the common factor has zero expected value (McMenamin, 2005).

The one-factor model can be extended into a multifactor model by allowing for other factors that might affect stock returns by affecting its risk (Gibson, et al., 2010). The model may be modified to incorporate interest rates, inflation, gross domestic product and foreign exchange rate as specified in this study. The Arbitrage Pricing theory fails to specify the type or number of macroeconomic variables to be included in studies (Fabozzi, 2015). Consequently, researchers have examined various factors in attempt to explore factors that influences stock market returns to a great extent. Ross, et al. (1987) examined the effect of inflation, gross domestic product, investor confidence, and the shift in the yield curve on stock market returns. Fifield, et al., (2002) endorses GDP, inflation, money supply and short-term interest rates as most suitable macroeconomic variables for research in emerging markets. The theory was key to this study in explaining the effect of macro-economic variables on stock market volatility.

2.2 Empirical Literature

2.2.1 Financial account of Balance of Payment and Stock Market Return Volatility

The systematic recording of economic and financial transactions in a specific period maybe one year, which takes place between both residents and non-residents of a

country in the rest of the globe is defined as the balance of payments. The transactions that take place globally in goods, services and income and changes in claims on and liabilities are involved in providing receipts of the resources globally. Globally, the monetary gold, Special Drawing Rights (SDRs) and claims on and liabilities are responsible for changes in economy holdings in buying of goods, services and income and changes in income involved in transaction of balancing in payment (McCombie & Thirlwall, 2016). This fact is involved in the balancing of various variables to produce equal value of products and services. Credit entries classify a county's non-residents which involve the payments they make during transaction. Debt entries are provided by payments done by non-resident of a country (Labuschagne, Majewska & Olbryś, 2016).

Acikalin et.al (2008) investigated the relationship between the stock markets and macroeconomic variables in Istanbul stock exchange. The variables used in the study were GDP, nominal exchange rate (NER), interest rate (IR), and current account balance (CAB). Employing co integration tests and vector error correction model on a quarterly information set ranging from 1991-2006, the study found a long term stable relationship between the stock return and the macroeconomic variables. Both the current and capital account are used in dividing the balance of payments. Transfers that are either long or short term make up the portfolio and direct investment of capital account. They include merchandise and services (Ndung'u, 2012).

The capital account also refers to charges in financial assets and liabilities, portfolio investment, external loan drawings and amortization and charges in short-term capital movements. However, it should be noted that development in the other sectors – real, monetary and public – has implications for the balance of payments. As a result, current account deficit may not necessarily be an inappropriate policy to pursue especially in a country that is for example, importing to increase domestic investment. However, in a short-term, import bills may remain unpaid or external reserves could be drawn down (Mihaylova, 2015).

A long-term and more viable solution lies in ensuring balance of payments viability. A viable balance of payments position may be defined as a current account position, which can be financed on a sustainable basis by net capital movements on terms that are compatible with reasonable development, growth prospects and debt servicing capacity as well as macro-economic stability (Hwa, Raghavan & Huey, 2017). It can be seen that the balance of payments is linked with the other accounts in a general equilibrium framework. This implies that disequilibrium in one sector; say external sector is transmitted to the other sectors and vice versa. Thus, there is need to achieve both internal and external balance (Chen, 2016).

The balance of payments (BOP) is a bookkeeping system for recording all payments that have a direct bearing on the movement of funds between a nation (private sector and government) and foreign countries Labuschagne, Majewska and Olbryś (2016). All transactions involving payments from foreigners to a country are entered in the "Receipts" column with a plus sign (+) to reflect that they are credits; that is, they result in a flow of funds to a country. Receipts include foreign purchases of local products known as exports, purchases from foreign tourists (services), income earned from local country investment abroad which constitutes investment income, foreign gifts and pensions paid to local citizens commonly called unilateral transfers, and foreign payments for local assets (capital inflows) (Jacoby & Brooman, 2017).

All payments to foreigners are entered in the payments column with a minus sign (-) to reflect that they are debits because they result in flows of funds to other countries. Payments include Kenyan purchases of foreign products such as French wine and Japanese cars (imports), Kenyan travel abroad (services), income earned by foreigners from investments in Kenya (investment income), foreign aid and gifts and pensions paid to foreigners (unilateral transfers), and Kenyan payments for foreign assets (capital outflows) (Mills, 2015). Balance of payments (BOP) accounts are an accounting record of all monetary transactions between a country and the rest of the world.

These transactions include payments for the country's exports and imports of goods, services, financial capital, and financial transfers. The BOP accounts summarize international transactions for a specific period, usually a year, and are prepared in a single currency, typically the domestic currency for the country concerned. Sources of funds for a nation, such as exports or the receipts of loans and investments, are recorded as positive or surplus items. Uses of funds, such as for imports or to invest in foreign countries, are recorded as negative or deficit items (Adams, Klobodu & Lamptey, 2017). When all components of the BOP accounts are included they must sum to zero with no overall surplus or deficit. For example, if a country is importing more than it exports, its trade balance will be in deficit, but the shortfall will have to be counterbalanced in other ways such as by funds earned from its foreign investments, by running down central bank reserves or by receiving loans from other countries (Lawal, Nwanji, Asaleye & Ahmed, 2016). While the overall BOP accounts will always balance when all types of payments are included, imbalances are possible on individual elements of the BOP, such as the current account, the capital account excluding the central bank's reserve account, or the sum of the two (Sunde, 2017).

Imbalances in the latter sum can result in surplus countries accumulating wealth, while deficit nations become increasingly indebted. The term balance of payments often refers to this sum: a country's balance of payments is said to be in surplus (equivalently, the balance of payments is positive) by a certain amount if sources of funds (such as export goods sold and bonds sold) exceed uses of funds (such as paying for imported goods and paying for foreign bonds purchased) by that amount (Hoa & Lin, 2016).

2.2.2 Emerging Markets Portfolio Flows and Stock Market Return Volatility

Kuwornu (2011) examined the relationship between macroeconomic variables and stock returns using monthly information over period January 1992 to December 2008. The variables used in this study are consumer price index, crude oil price, exchange rate and 91 day Treasury bill rate. Full information maximum likelihood estimation procedure was used. The study found significant relationship between stock market returns and three macroeconomic variables; consumer price index, exchange rate and the 91 day

Treasury bill rate. CPI had a positive significant effect. On the other hand exchange rate and Treasury bill rate had a negative significant influence on stock market returns. Crude oil prices did not appear to have any significant effect on stock market returns. The study notes that the macroeconomic variable set employed is not exhaustive and that more variables should be sought and used to determine the relationship with the stock return volatility while employing of vector error correction and the co integration analysis.

Regulatory and policy efforts since the 1998 Asian Financial Crisis (AFC) were major factors that facilitated greater two-way movements in emerging markets portfolio flows. First, there were major efforts to develop Malaysia's domestic bond market as an alternative to bank credit and equities as a source of finance.¹⁶ Second, there was a continuous liberalization of foreign exchange administration rules as Malaysia gradually lifted policies implemented in response to the AFC in 1998. Third, the central bank adopted a managed float regime for Malaysian Ringgit on 21st July 2005. Reflecting these developments, there was a notable shift in composition of emerging markets portfolio flows from predominantly equities in the early-2000s to debt currently. The share of debt and equity securities shifted from 22% and 78% of gross emerging markets portfolio flows in 2001 to 60% and 40% in 2015, respectively (Usman & Arene, 2014).

The experiences of some individual countries are worth commenting on. For example, among the countries which had a fairly regulated investment regime, China, India, Malaysia, Chile and Colombia exhibited quite different patterns of capital flows. China relied overwhelmingly on FDI and registered a net outflow of other investment (mostly bank loans). India which is still relatively closed to foreign investment attracted mostly portfolio equity investment and other investment (including bank loans); during the recent crisis, India was barely affected by externally induced financial turmoil. Malaysia imported mostly FDI, while exporting portfolio investment. Chile and Colombia attracted mostly FDI (Sakyi, Villaverde, & Maza, 2015). There is a high concentration of investment flows. Over the period 1993-97, the sixteen biggest recipients of portfolio investment¹¹ had an amount of emerging markets portfolio flows which is higher than

the total of portfolio investment in all emerging markets. Over the same period, the sixteen countries which received the highest flows of FDI totalled an amount of FDI equivalent to 85% of the total of net FDI flows to all emerging markets. Comparing these two groups of countries, it turned out that twelve countries are at the same time the biggest recipients of FDI and of FPI. As many developing countries and countries in transition have embarked on a process of market liberalization and structural reform, the number of markets to which international investors were able to allocate their savings has grown substantially over the last ten years.

In parallel, the tremendous growth of investible assets managed by institutional investors in OECD countries has flooded international capital markets with liquidity. For example, in 1998, total net assets of OECD pension funds were estimated at around 11 trillion US\$ (14% of which were cross-border investment), while total assets of mutual funds in the world exceeded 8 trillion US\$ (with US funds alone accounting for more than 5 trillion US\$). Accompanied by rapid financial innovation, the combination of these events produced changes in investor strategies as well as a re-allocation of funds towards emerging markets (Liew, Mansor & Puah, 2016). Some governments have used very innovative ways to promote foreign portfolio investment and to facilitate the access of their companies to international finance. For example, as the country moves along the path of liberalization and the opening of capital markets, the government of Mexico started issuing bonds along the entire yield curve to facilitate the placement of Mexican corporate bonds in international markets.

The logic behind this move stems from the fact that corporate bonds across the maturity spectrum are priced in direct relation to sovereign debt. By issuing government bonds of various maturities, the international market was able to price the sovereign debt, and by using the risk premium of each company relative to the sovereign risk, corporate debt could be also be priced easily. The move by the Mexican government was widely welcomed by the international investment community as it increased the transparency of pricing.

For Latin American countries, bond spreads went down for the whole year 1993, and subsequently after the Mexican crisis, during the period from January 1996 to May 1998. For East Asian countries, bond spreads were low from January 1993 up to September 1997 corporate debt. In parallel, this policy paved the way for corporate issuers to access the international capital market and permitted them to calculate the interest rate at which international investors would be ready to lend them funds for various lengths of time (Ridzuan *et al.*, 2015).

2.2.3 Effect of other (Control) Macroeconomic Variables Stock Market Return

Volatility

There exists a lot of empirical literature regarding the impact of macroeconomic variables on stock market return volatility with a view of determining the causality. Acikalin et.al, (2008) investigated the relationship between the stock markets and macroeconomic variables in Istanbul stock exchange. The variables used in the study were GDP, nominal exchange rate (NER), interest rate (IR), and current account balance (CAB). Employing co integration tests and vector error correction model on a quarterly information set ranging from 1991-2006, the study found a long term stable relationship between the stock return and the macroeconomic variables.

Adam and Tweneboa (2008) examined the impact of macroeconomic variables on the stock return in Ghana using quarterly information from 1991 to 2007. The following macroeconomic variables were studied; Treasury bill rate, oil prices, foreign direct investment and the exchange rate. Applying the co integration test and vector error correction model, a long run relationship between the variables and stock return was realized

Abdullah, Sulong and Abdullahi, (2015) investigated the relationship between the stock market return and macroeconomic variables in the Indian stock market using the following variables; money supply, interest rate, industrial production, exports foreign direct investments and exchange rate. In the analysis, Johansen co integration was employed. The study found a long run relationship between stock market return and money supply while no relationship was found with the interest rate.

Sakwaand Muthike(2008) investigated the relationship between the stock market return and macroeconomic variables in Nairobi securities exchange using the following variables; interest rate, money supply, real exchange rate, inflation and GDP using annual time series information from 1976 to 2008 where ordinary least squares was used. The study found out that interest rate, money supply and exchange rate to be positively related with stock returns. However, there exists a negative relationship between inflation and stock returns and GDP with the stock returns.

Kuwornu (2011) examined the relationship between macroeconomic variables and stock returns using monthly information over period January 1992 to December 2008. The variables used in this study are consumer price index, crude oil price, exchange rate and 91 day Treasury bill rate. Full information maximum likelihood estimation procedure was used. The study found significant relationship between stock market returns and three macroeconomic variables; consumer price index, exchange rate and the 91 day Treasury bill rate. CPI had a positive significant effect. On the other hand exchange rate and Treasury bill rate had a negative significant influence on stock market returns. The study notes that the macroeconomic variable set employed is not exhaustive and that more variables should be sought and used to determine the relationship with the stock return volatility while employing of vector error correction and the co integration analysis.

Olweny and Omondi (2011) investigated the effect interest rate, foreign exchange rate and inflation rate fluctuation on stock return volatility in the Nairobi stock exchange Kenya. The study used monthly time series information for a ten years period between January 2001and December 2010. The empirical analysis employed E-Garch and TGarch models. The research findings showed that stock returns are symmetric but leptokurtic and not normally distributed. The results showed evidence that the three macroeconomic variables affect stock return volatility. In addition, the foreign exchange rate impact was found to be relatively low though significant as well as having low volatility persistence. The study also found presence of leverage effect implying that volatility rise more following a large price fall than following a price rise of the same magnitude. The research proposed further studies and identification of other

macroeconomic variables that significantly affect stock returns like money supply, monetary policy, fiscal policy and industrial production.

Zakaria and Shamsuddin (2012), investigated the relationship between stock market returns volatility and macroeconomic variables in Malaysia with five selected macroeconomic variables; GDP, inflation, exchange rate, interest rate and moneysupplybased on monthly information from January 200 to June 2012 where Garch (1,1) was used in estimation. The study found that only interest rate was found to granger cause the stockmarket return volatility and that the volatilities of the macroeconomic variables as a group are also not significantly related to stock market volatility.

Issahaku et al. (2013) examined the causality between the following macroeconomic variables and the stock market return in Ghana stock exchange; money supply, exchange rate, consumer price index, Treasury bill rate and the foreign direct investment. The study employed monthly time series information spanning the period January 1995 to December 2010. The analysis employed ADF, VECM and granger causality. The study revealed a long run relationship existed between the stock return and inflation, money supply and foreign direct investment.

Talla (2013) investigated the impact of changes in macroeconomic variables on stock prices of the Stockholm stock exchange. Interest rate, inflation and money supply were the variables under consideration. Unit root test, multivariate regression model computed using ordinary least squares method and granger causality test were carried out using monthly time series information ranging from 1993 to 2012. Inflation showed a significant negative influence on stock returns while money supply was found to be positively associated with stock returns although not significant.

Nasibu (2013) investigated the impact of the following macroeconomic variables on stock market return in Nairobi securities exchange; interest rate, inflation, government spending and GDP. Monthly time series information spanning from 2006 to 2012 was used and ordinary least squares used in analysis. The study found negative relationship

between interest rate, inflation and stock return. However, GDP and government spending had no significant impact on stock market return volatility.

Gatebi (2013) investigated the effect of macroeconomic factors on the volatility of common stocks returns in Nairobi stock exchange focusing on the following variables; inflation rate, money supply, economic growth and interest rate fluctuations. Monthly time series information for a five year period between January 2007 and December 2011 was used. The study used E-Garch in the analysis. The results indicated that all the macroeconomic factors had a negative correlation against the common stock return volatility. The study recommended that analysis be carried out from time to time on macroeconomic factors affecting volatility of stock returns. However, the current study covers a longer period more than the five year period used by Gatebi (2013) so as to observe the changes on the variables within a longer period of time.

Kirui et al., (2014) sought to evaluate the relationship between GDP, inflation, Treasury bill rate, exchange rate and stock market return in Kenya. The study determined the response of the stock returns to a shock in each of the macroeconomic variables. T – garch model was used to capture leverage effects and volatility persistence at the NSE where time series quarterly information from 2000 to 2012 was used. The study found that only exchange rate had an effect on stock returns which was a negative relationship where other macroeconomic variables were not important in explaining stock returns. The results contradicts what Gatebi (2013) found where inflation and interest rates were found to be significant and negatively correlated with the stock returns.

Ouma and Muriu (2014) investigated the impact of the macroeconomic variables on stock returns in Kenya during the period January 2003 to December 2013 using APT and CAPM framework for monthly information where the following variables were included in the ordinary least square model: money supply, exchange rates and inflation. According to the findings, all the variables affect the stock market returns in Kenya where money supply and inflation are found to be significant determinants of the returns at NSE. Exchange rate was found to have a negative impact on stock returns while

inflation showed a positive one. Interest rate was not important in determining long run returns in the NSE.

Umar (2014) analyzed the impact of macroeconomic variables on stock market return in Pakistan observing the following macroeconomic variables; inflation, GDP per capita, GDP savings, money supply and exchange rate. Annual time series information from 1991 to 2013 was used in correlation and granger causality analysis. The study realized positive insignificant relationship between the macroeconomic variables and stock return.

Ahmad et al., (2015) investigated the causal relationship between stock market returns and the following macroeconomic variables in Nigeria; money supply, exchange rate, interest rate, foreign direct investment and gross domestic saving. Annual time series information ranging from 1984 to 2013 was used where ARDL method was employed in the information analysis. The study found a causal relationship between foreign direct investment, money supply and interest rate while no causal relationship was found between exchange rate and gross domestic saving.

2.3 Macroeconomic Variables

Macroeconomics is the study of the economy altogether. That is, it concentrates on the conduct of a whole economy-the comprehensive view which can be local, national or global. Maghyereh (2002) contends that macroeconomic environment is the general angle and working of national economy, for example, pay, output, and interrelationship in the diverse economic sector. Favorable macroeconomic environment advances the economic development of the nation.

Globally, emerging markets portfolio flows can contribute to economic growth in a country. On the other hand, the volatility of emerging markets portfolio flows has disrupted financial markets and economic activity. Therefore, identifying the drivers of emerging markets portfolio flows into emerging market economies could shed light on potential solutions to help emerging market economies reach higher living standards, while pointing to the sources of volatility that may be outside their control. There is

seasonal adjustment in logarithm that results from natural transformation of variables as the portfolios flow through interest rates and emerging markets. Negative values are contained in the series of level terms due to emerging markets flow of portfolio. The tax compliance issue has been subjected by institutional investors (portfolio investment), companies (FDI) and also for private individuals due to foreign investments allowances that have increased the phase of the allowances (Hwa, Raghavan & Huey, 2017).

Data on non-resident investment in the emerging markets portfolio flows are the main factors that lead to trading in high frequencies: shows that holding periods if nonresidents is held by the stock bonds which are larger substantially due to annual gross purchases and sales. Three measures which are total portfolio, debt and equity), have a negative effect on the US's rate of Treasury bill, the model's total portfolio is weak though. The law encourages many factors that need to be considered before undertaking an equity investment and the investment's total portfolio that results to successful flows in market portfolios. The section below has explored how most organizations have invested in financial integration as a means to improve their market portfolios especially in South Africa. Different forms of capital flows have been witnessed in the balancing of payment as a mechanism insulated in the financial rand (Labuschagne, Majewska & Olbryś, 2016).

Tucker (2007) refers to inflation as a boost in the general value level of services and goods in the economy. Inflation is a growth in the general standard level of costs and not a growth in a particular product. Sloman and Kevin (2007) clarify that inflation might be either demand pull inflation or cost push inflation. Demand pull inflation is created by constant rises in total demand therefore the organizations reacting by raising costs and partly by rising output. Cost push inflation is related by constant increment in the costs experienced by firms. Firms react by raising costs and passing the expenses on to the clients and mostly decreasing production of the products. Hendry (2006) agrees that inflation is the result of numerous surplus requests and supplies in the economy.

A year's percentage of borrowing costs is defined by Forgha, (2012) as an interest rate. Interest rates are vital as their ranges makes a customer to decide whether they will make the purchase or not. There is significance particularly in the expected inflation form adjusted interest from the real interest rates. When one borrows money for a specific period of time, there is a fee they pay for the money which Samuelson and Nordhaus (2010) defines as interest rate; interest rates are of many types and they are determined by the loans' maturity, risk, tax status, and other attributes.

Gross Domestic Product is the entire profitability in a nation for a given year. Gross domestic product consists all locally, manufactured items, all produce and domesticated animals, all advantage valuation increments, and intangible investment development. Unemployment measures the number of residents who are not presently employed but are actively seeking employment. Individual macroeconomic factors, for example, saving money, the Consumer value list, and changes in government policies, affect different areas of economic development (Mishkin and Eakins, 2007).

2.4 Stock Return Volatility

A defined period market index from the broad market prices of fluctuations is defined as stock market volatility. The changes of prices is not stock market volatility but dispersion (Ambrosio, 2007). The market's index and security are used to measure the returns variance through standard deviation to measure volatility (Debesh, 2013). According to Schwert (1990) financial economists find standard deviation to be more appropriate because it summarizes the probability of seeing extreme values of return. In a study to measure the impact of volatility on stock market returns on the NSE by Debesh, (2013), the standard deviation of a computed Nairobi all shares index was used in this study to measure stock market volatility (Debesh, 2013).

Aggregate demand is determined through exports, imports, and the demand for domestic currency to help in anticipating fluctuation of currency. Syria's economy was investigated by Carp (2014) through a research where he investigated how the equilibrium real exchange rate (ERER) and its volatility effect were affected by various

factors. The external balance sheet was improved through the results of the study. Most of the investments done by developing countries do not succeed as the countries do not usually have enough funds to finance them. They mostly rely on foreign currency which they receive either directly or indirectly. International commercial banks are the main providers of loans to these countries. Most of the banks suffered drying up due to having led to many countries and this reduced the rates at which the developing countries borrowed loans and they therefore took up the FDI method to get access to loans internationally without having to undertake risks of debts. Capital inflows were then increased as most of the countries used alternative method to acquire bank loans (Lawal, Kazi, Adeoti, Osuma, Akinmulegun & Ilo, 2017).

There are various studies that have been done on how rise in prices has affected asymmetric volatility in stock price due to the volatility of stock returns over the years as controlled by how high or low the prices vary. However, it has turned out to be difficult to see persistence in the stock prices in many empirical studies; difficult, if not impossible, to predict future asset returns from historical returns leading to conclusions in numerous studies that there is no predictability in the volatility of asset returns (Corsi, 2004). Volatility in the market will have an effect on how investors behave towards a market; higher returns encourage the investors to invest and increase their capital inflows, whereas in volatile environments the returns are unpredictable ultimately affecting investments.

2.5 Summary of the Literature Review

The classical EMH which followed the random walk assumption has been empirically tested in both developed and developing countries' financial markets and the evidence failed to accept EMH. From the rejection of EMH the test for Chaos and non-linearity in returns in the financial market gives the possibility of forecasting asset prices. Further the Martingale process allowed for the financial time series data to be modeled in a successive conditional variance of the asset prices.

The empirical evidence generated from the financial markets suggested stylized behavior of the financial time series data. These stylized facts established excessive skewness and leptokurtosis distribution. Further the volatility of stock market returns had a tendency to cluster, persist and generate a leverage effect. Balance of payments data on portfolio debt investment includes flows associated with the issue and repayment of international bonds. countries will engage in large-scale deficit financing to pay for public sector projects and governmental funding. While such activity stimulates the domestic economy, nations with large public deficits and debts are less attractive to foreign investors. This is because a large debt encourages inflation, and if inflation is high, the debt was serviced and ultimately paid off with cheaper real dollars in the future. While the volume of equity inflows has varied over time, the outcome has been a substantial and long-term accumulation of portfolio equity investment by non-residents (Marashdeh, 2015).

Portfolio investment usually involves financial infrastructure, such as a suitable legal, regulatory, and settlement framework, along with market-making dealers, and a sufficient volume of buyers and sellers. Foreign direct investment is a large and growing source of finance that may help developing countries close the technology gap with high income countries, upgrade managerial skills, and develop their export markets” and this could leads towards a spillover effect in form of improving productive efficiency in the economy (Adams, Klobodu & Lamptey, 2017). In modeling and forecasting stock market volatility the ARCH family models have been used by various studies. Empirical evidence generated from the developed capital markets used both symmetric and asymmetric GARCH extensions, while the existing literature on developing countries volatility modeling and forecasting has not yet implemented those models and lack rigorous empirical evidences.

In conclusion, the developing countries financial markets in general, and African countries in particular have been under researched as far as volatility modeling is concerned. From the available literature, the NSE just like other African equity market has been under-researched which leaves a gap to be filled.

2.6 Research Gaps

Various studies have been conducted in relation to stock market return volatility. For instance, Acikalin et.al (2008) investigated the relationship between the stock markets and macroeconomic variables in Istanbul stock exchange. The variables used in the study were GDP, nominal exchange rate (NER), interest rate (IR), and current account balance (CAB). Employing co integration tests and vector error correction model on a quarterly information set ranging from 1991-2006, the study found a long term stable relationship between the stock return and the macroeconomic variables.

Kuwornu (2011) examined the relationship between macroeconomic variables and stock returns using monthly information over period January 1992 to December 2008 and Adam and Tweneboa (2008) examined the impact of macroeconomic variables on the stock return in Ghana using quarterly information from 1991 to 2007. Abdullah, Sulong and Abdullahi, (2015) investigated the relationship between the stock market return and macroeconomic variables in the Indian stock market using the following variables; money supply, interest rate, industrial production, exports foreign direct investments and exchange rate. In the analysis, Johansen co integration was employed. The study found a long run relationship between stock market return and money supply while no relationship was found with the interest rate.

Sakwaand Muthike(2008) investigated the relationship between the stock market return and macroeconomic variables in Nairobi securities exchange using the following variables; interest rate, money supply, real exchange rate, inflation and GDP using annual time series information from 1976 to 2008 where ordinary least squares was used. The study found out that interest rate, money supply and exchange rate to be positively related with stock returns. However, there exists a negative relationship between inflation and stock returns and GDP with the stock returns. These studies were however carried out a long time ago, given that the factors at play in a stock market at any trading day are so dynamic, there is need to investigate them on a continuous basis. It is therefore imperative there is an understanding of the interplay of factors that cause volatility in the market. The current research addressed these concerns using data from

2007 to 2017. Furthermore there are no studies that have been undertaken to determine the effects of emerging market portfolio flows and the financial account of the balance of payments on stock market return volatility on NSE.

2.7 Conceptual Framework

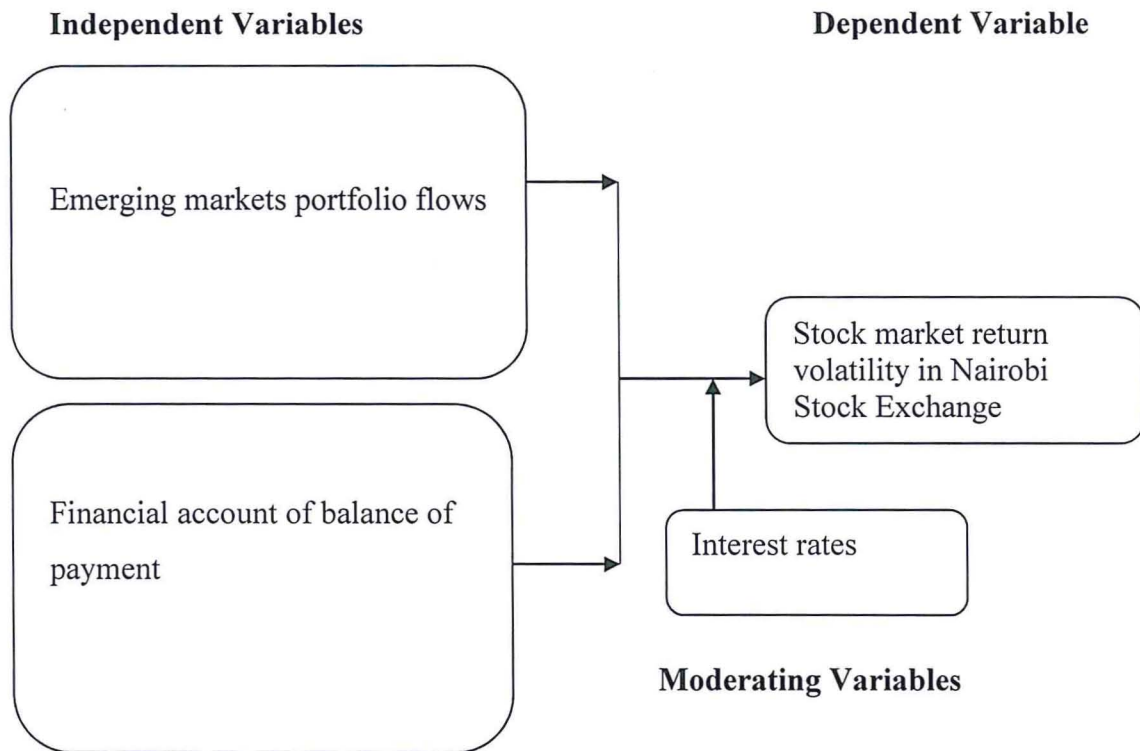


Figure 2.1: Conceptual Framework

Financial account of Balance of Payment (BOP) refers to a record of all business dealings made between one certain country and all other countries during a specified period of time. This is the record of all international financial transactions made by a country's residents. A country's balance of payments tells whether it saves enough to pay for its imports. It also reveals whether the country produces enough economic output to pay for its growth.

Emerging markets portfolio flows includes net inflows from equity securities other than those recorded as direct investment and including shares, stocks, depository receipts (American or global), and direct purchases of shares in local stock markets by foreign investors.

Nominal interest rate is described as the price a borrower pays for the use of money he does not own and has to return to the lender who receives for deferring his consumption, by lending to the borrower.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology to be used for the study. The areas covered in this chapter include the research design, research population, data collection, data analysis and data presentation techniques.

3.2 Research Design

Descriptive survey was adopted for this study. This design was used since the nature of the study exploratory and descriptive (Lewis, 2015). As explained by Creswell and Creswell (2017), it helps in collecting data concerning behaviour, attitude, values and characteristics. Thus, the research design aimed at obtaining the most recent, relevant and in-depth information about the effect of macroeconomic variables on stock return volatility in the Nairobi securities exchange (NSE).

3.3 Population and Sampling

The target population for this study was the NSE 20 share index. The index has the largest 20 securities valued by full market capitalisation after applying all investibility screens was eligible for inclusion in the index. In order for a company to qualify for inclusion in the Index, it is proposed that it meets the following conditions: 1) must have a least 20% of its free float available for trading at the NSE, 2) must have been continuously quoted for a least 1 year. 3) must have a minimum market capitalization of Kshs 50 million. 4) should ideally be a “blue chip” superior profitability and dividend record. 5) shares must have their primary listing on the Nairobi Stock Exchange. 6) market capitalization was the underlying criteria for inclusion in the index if companies fulfil all other inclusion requirements. This is in line with international best practice. Since the population is not large, the study took a census approach.

3.4 Data Collection

The study used secondary data collected from the CBK, KNBS, KIPPRA, Ministry of Finance, public libraries, Institute of International Finance, national budget and other government records as well as World Integrated Trade Solution (WITS). The use of

secondary data is justified on the basis that these sources have information that was very vital to this study and had been vetted and accepted by the general public. The secondary data was collected for all the variables under review. The data was collected for a 12-year period from 2006 to 2017 and included only the NSE 20 share index. Monthly data was used in this study. The data collected in this regard was for balance of payments which is measured by getting the difference between the value of the Exports and the value of the Imports; Portfolio debt (bonds) inflows which is measured by use of country's debt that has been borrowed from foreign lenders including commercial banks, governments or international financial institutions; Portfolio equity inflows measured by shares, stocks, depository receipts (American or global), and direct purchases of shares in local stock markets by foreign investors, Foreign direct investment (FDI) determined by Actual FDI inflow value. Other variables include real interest rate which is determined by difference between nominal Interest Rate and Inflation (Expected or Actual).

3.5 Data Analysis

The study focused on the period January 2006 to December 2017. The data is time series in nature and all the data gathered was used. The data collected for data analysis was in a monthly format. Borrowing from Hui and Yue (2006) the quantitative data collected was analysed using a number of statistical tests and procedures in the following order: the GARCH model was used to forecast volatility. These models include E-GARCH, GJR-GARCH, GARCH-M, T-GARCH, VS-GARCH, and QGARCH.

The secondary data was analyzed by first calculating the monthly averages for each variable in Excel. The averages were then transferred to STATA version 12.1 software for further analysis. Descriptive statistics such as mean score, standard deviation, skewness and kurtosis was estimated for all the variables and information was presented in form of tables and graphs. Descriptive statistics were used because they enable the researcher to meaningfully describe distribution of scores or measurements using few indices (Meyers, Gamst & Guarino, 2016).

According to Yin (2017), regression analysis technique is used to determine the relationship between two variables. The study conducted a regression analysis to establish the extent of the relationship between independent variables and Stock market return volatility in Nairobi Stock Exchange. A controlled regression model was also conducted to determine how moderating variables (Interest rates, Exchange rates, Inflation and GDP growth) on the relationship between the independent and dependent variables.

3.5.1 Analytical Model

The following regression model was used to establish the relationship between the variables;

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

3.5.2 Moderated Regression Model

The hypothesis sought to establish the moderating effect of Interest rates on relationship between the emerging markets portfolio flows and financial account of balance of payment on stock market return volatility in Nairobi Stock Exchange. Moderating effect in a regression model shows the influence of an independent variable on the dependent variable as a function of the third variable. The aim is to examine how the independent variables vary when an intervening variable is introduced in the model.

The model was expressed as:

$$Y = \beta_0 + \beta_1 X_1 * X_3 + \beta_2 X_2 * X_3 + e$$

Where:

Y = Stock market return volatility in Nairobi Stock Exchange

a = Constant

β = Coefficient

X₁ = Emerging markets portfolio flows

X₂ = Financial account of balance of payment

X₃ = Interest rates

e = error term

Stepwise regression technique consisting of two models was used to test moderating influence of interest rates on relationship between the emerging markets portfolio flows and financial account of balance of payment on stock market return volatility in Nairobi Stock Exchange.

Step one: Effect of emerging markets portfolio flows and financial account of balance of payment on stock market return volatility in Nairobi Stock Exchange

In the first model, effect of emerging markets portfolio flows and financial account of balance of payment on stock market return volatility in Nairobi Stock Exchange was tested, with the equation adopted as

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + e$$

Where:

Y = Stock market return volatility in Nairobi Stock Exchange

a = Constant

β = Coefficient

X_1 = Emerging markets portfolio flows

X_2 = Financial account of balance of payment

e = error term

Step Two: Influence of Product of and emerging markets portfolio flows and financial account of balance of payment on Stock market return volatility in Nairobi Stock Exchange

In the second model, computed sum of Interest rates was introduced to the model with the equation adopted as

$$Y = \beta_0 + \beta_1 X_1 * X_3 + \beta_2 X_2 * X_3 + e$$

Where:

Y = Stock market return volatility in Nairobi Stock Exchange

a = Constant

β = Coefficient

X₁ = Emerging markets portfolio flows

X₂ = Financial account of balance of payment

X₃ = Interest rates

e = error term

3.5.3 Test of Significance

The coefficient of determination (R^2) was used to measure the extent to which the variation in Stock market return volatility in Nairobi Stock Exchange is explained by the independent variables and the moderating variables. F-statistic and t-statistics were also computed at 95% confidence level to test whether there is any significant relationship between the independent variables, moderating variables and the dependent variables.

3.6 Pre-Estimation Tests

3.6.1 Stationarity Test/ Unit Root Test

The study conducted a stationarity test to establish the presence of a unit root using Augmented Dickey-Fuller (ADF) tests. The test was done to help avoid the problem of spurious and inconsistent regression results. In general, a p-value of less than 5% implied rejection of the null hypothesis that there is a unit root. The calculated DF_T statistic was also compared with the tabulated critical value. If the DF_T statistic is more negative than the table value, null hypothesis of a unit root was rejected. It is important to note that the more negative the DF test statistic, the stronger the evidence for rejecting the null hypothesis of a unit root.

3.6.2 Cointegration Test

Cointegration prior to the VAR analysis was conducted in order to determine whether the variables exhibited long-run or short run relationship. The study used Johansen test to detect presence of cointegration.

3.6.3 Normality Test

Normality of the data was tested using Jarque-Bera and established that all variables. If p-value obtained is less than 0.05 then the data was deemed to be not normally distributed.

3.6.4 Multicollinearity

This is common in time series data which occurs when two independent variables are linearly related. Its presence leads to inflation of the variance of parameter estimates hence provision of incorrect magnitude of the estimate of the coefficients and signs. This may further lead to incorrect conclusions. The study used VIF values for all the variables to test for multicollinearity. If the VIF values for the respective variable was less than 10, then the variable was said to have no Multicollinearity symptoms.

3.6.5 Autocorrelation

Autocorrelation refers to a situation where the error term is correlated to the preceding error term. Its presence does not affect the un-biasedness of the estimates but leads to poor conclusions due to wrong hypothesis testing. The study conducted Breusch Godfrey LM test to confirm if there is autocorrelation. If the p-values was less 0.05 for the Chi-square statistic then the residuals of the empirical model are not auto correlated.

3.7 Data presentation

Tables and figures were used where necessary in the presentation of data collected and analyzed in the study. A report was written with the recommendations following the research carried out.

CHAPTER FOUR : DATA ANALYSIS, RESULTS AND PRESENTATION

4.1 Introduction

This chapter presents the information processed from the data collected during the study on the effect of macroeconomic variables on stock return volatility in the Nairobi securities exchange (NSE). This chapter comprise of the following sub-section; descriptive statistic, inferential statistics and interpretation of the findings.

4.2 Descriptive Statistics

This section focuses on the general description of the study variables characteristics including the, mean, standard deviation, minimum and maximum values for financial account of Balance of Payments, Emerging markets portfolio flows, nominal interest rate, Real Exchange Rate, Inflation Rate (CPI index) and Real GDP growth rate.

Table 4.1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Kurtosis	Skewness
Financial account of balance of payment	144	5.006102	.1521486	3.968332	-.6909269
EM portfolio flows	144	1.882140	0.671232	1.56211	0.312672
Nominal interest rate	144	1.355208	3.602249	4.984405	-1.184892

From the findings, finance account of balance of payment had a mean of mean of 5.006102 and a standard deviation of 0.1521486, nominal interest rate had a mean of mean of 1.355208 and a standard deviation of standard deviation of 3.602249,. In addition EM portfolio flows had a mean of 1.882140 and a standard deviation of 0.671232.

Analysis of skewness shows that financial account of balance of payment and nominal interest rate were asymmetrical to the left around their mean. The kurtosis for financial

account of Balance of payment and nominal interest rate was greater than zero hence their data exhibits leptokurtic distribution.

4.3 Trend Analysis

The study conducted trend analysis to check the trend of financial account of balance of payments, emerging markets portfolio flows and nominal interest rate.

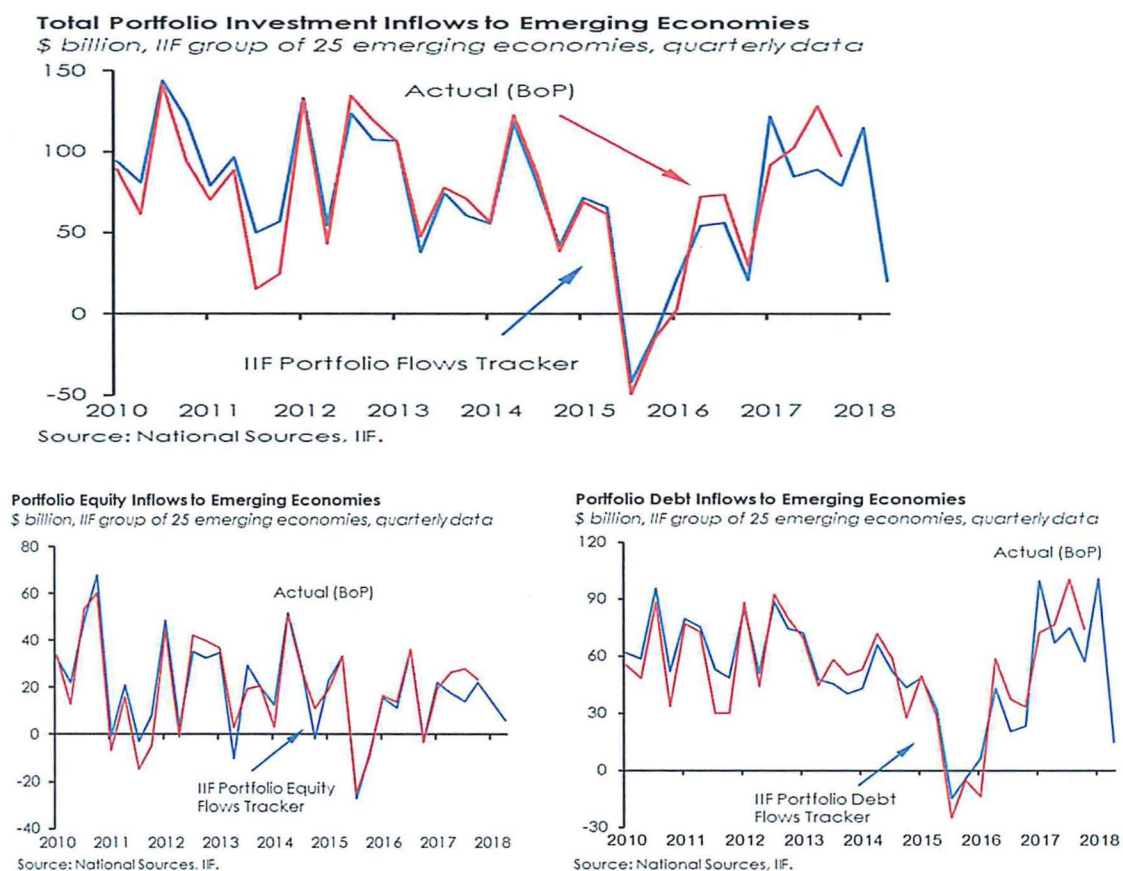


Figure 4.1: Portfolio Flows to the Emerging Markets

From Figure 4.1, the results shows that the portfolio flows into the emerging markets has been fluctuating over the years. This correlates with Kuwornu (2011) who indicates that there is a notable shift in composition of emerging markets portfolio flows from predominantly equities in the early-2000s to debt currently. The Charts suggests that during the peak of the crisis (June 2008 to March 2009) strong outflows from emerging markets were mostly related to an unprecedented increase in risk aversion, whereas the

period from April 2009 to February 2011 reflected a combination of different factors. While modelled fundamentals played a role in driving the inflows from April 2009, it appears that volatile factors (herding and interest rate differentials) also contributed substantially to the inflows. In particular, the interest rate differential between emerging market and advanced economies became the most important explanatory factor among those included in the model.

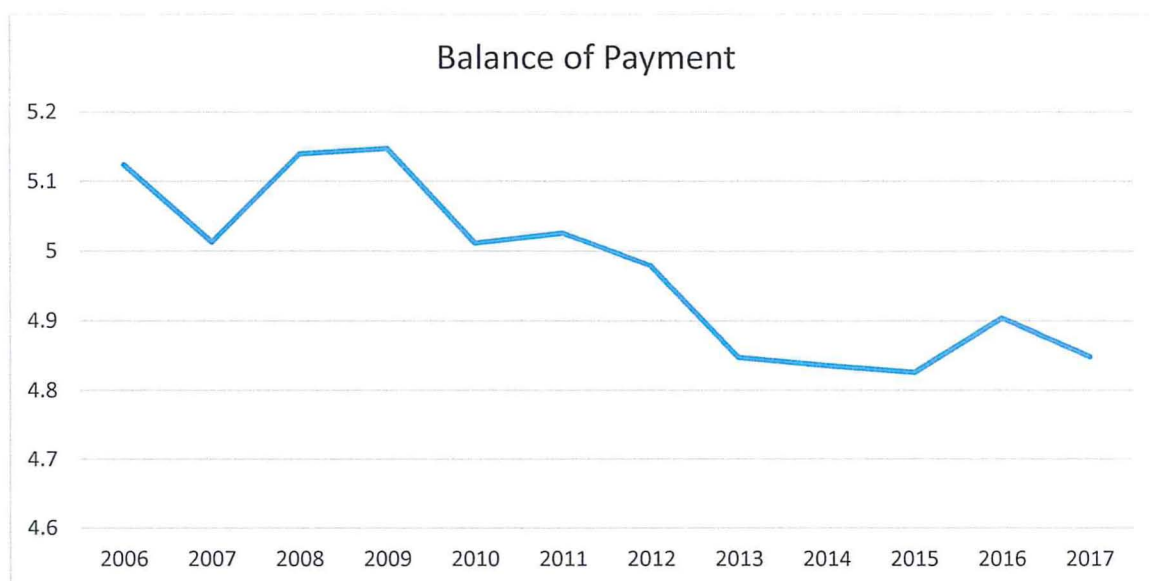


Figure 4.2: Trend of Balance of Payments

The balance of payments have been fluctuating over the years from 2006 with a slight decrease from 2007 to 2016. This is in line with Mills (2015) who noted that balance of payments (BOP) accounts are an accounting record of all monetary transactions between a country and the rest of the world. These transactions have been increasing and include payments for the country's exports and imports of goods, services, financial capital, and financial transfers.

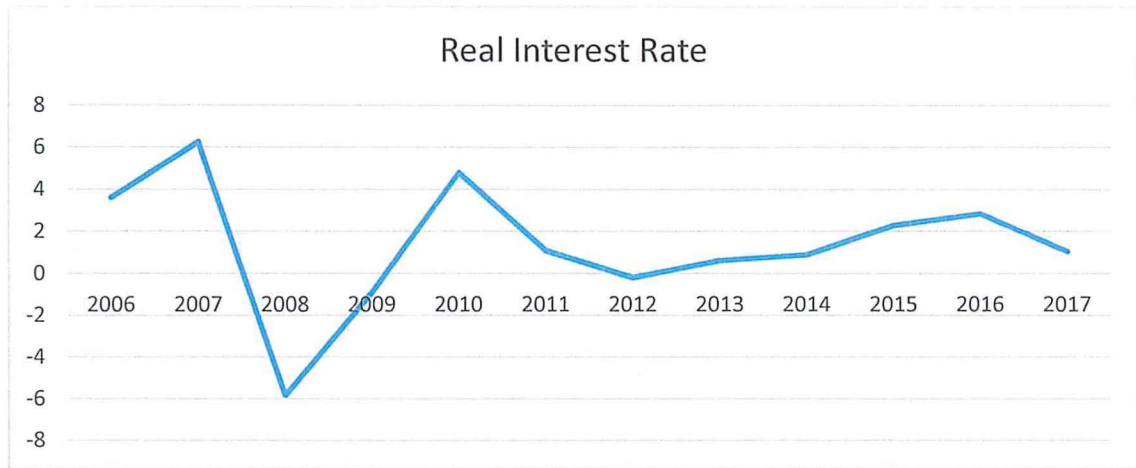


Figure 4.3: Trend of Nominal Interest Rate

From the findings, the results shows that the nominal interest rate has been fluctuating over the years covered in this study. For instance, the nominal interest rate decreased between 2010 and 2012 and increased between 2012 and 2016 before decreasing in 2017. This is in line with Issahaku et al. (2013) who indicated that interest rates have been change over 10 year period between 2003 and 2013 with a decrease between 2006 and 2008.

4.4 Testing for the Exponential Generalized Conditional Heteroscedasticity Model

The study conducted GARCH model to forecast stock return volatility. These models include E-GARCH, GJR-GARCH, GARCH-M, T-GARCH, VS-GARCH, and QGARCH.

4.4.1 Results of the EGARCH model on the effect of Interest Rate on Stock Return Volatility

The results for the EGARCH model on the effect of interest rate on stock return volatility were as shown in Table 4.2.

Table 4.2: Results of the EGARCH model on Stock Return Volatility

	Coefficient	Probability
ω	-7.119	0.0294
β	0.187	0.001
α	-0.186	0.0058
λ	-0.406	0.6720

Interest rate from the results in Table 4.7 show that the magnitude of volatility as measured by β is low at 0.187 and significant since the probability is almost zero. Measure persistence of volatility during the period and is significant since the probability is zero (0). $\lambda < 1$ is significant and proves the presence of leverage effect. The negative sign of -0.406 suggests that there exist leverage effects in the returns series and that bad news has a significant impact on stock return volatility. However, being significant implies that leverage effect is pronounced during the sample periods.

4.4.3 Testing the TGARCH Model

The test was carried out so as to determine the impact of news on stock return volatility in comparison to the results of EGARCH model .The findings of the TGARCH model as shown in Table 4.3.

Table 4.3: Results of the TGARCH model on Stock Return Volatility

	Coefficient	Probability
ω	0.000143	0.000
β	-0.084	0.000
α	0.024	0.172
λ	1.043	0.000

The findings provide evidence that news impact is asymmetric since $\lambda \neq 0$. The results is also consistent with that of EGARCH model as $\lambda > 0$, 1.043. This is an indication that bad news increases volatility in the market suggesting existence of leverage effect and

this is the same results in the study conducted by Kuchta (2012). The probability for the TGARCH test shows that leverage effect is significant. The results contradict that Kuchta (2012) who found leverage effect to be insignificant at the Nairobi Stock Exchange.

4.4.4 Testing the QGARCH Model

The test was carried out so as to determine the impact of news on stock return volatility in comparison to the results of EGARCH model .The findings of the QGARCH model as shown in Table 4.4.

Table 4.4: Results of the QGARCH model Interest rate on Stock Return Volatility

	Coefficient	Probability
ω	0.0167	0.000
β	-0.0173	0.000
α	0.061	0.119
λ	1.012	0.000

The findings provide evidence that news impact is asymmetric since $\lambda \neq 0$. The results is also consistent with that of EGARCH model as $\lambda > 1.012$. This is an indication that bad news increases volatility in the market suggesting existence of leverage effect.

4.5 Pre-Estimation Tests

The study conducted pre estimations tests which included Stationarity Test/ Unit Root Test, Cointegration Test, Normality Test, Multicollinearity and Autocorrelation.

4.5.1 Unit Root Test

The study conducted a stationarity test to establish the presence of a unit root using Augmented Dickey-Fuller (ADF) tests. The test was done to help avoid the problem of spurious and inconsistent regression results. The results for the test were as shown in Table 4.5.

Table 4.5: Stationarity Test/ Unit Root Test

	Test Statistic
Tau (Observed)	-11.31
Tau (Critical)	-0.673
p-value	0.008
Alpha	0.05

From the findings DF_T statistic was -11.31 and tabulated critical value was -0.673. The p-value was 0.008. Since the DF_T statistic was -11.31 was more negative than the critical value and p-value was less than 0.05 then the study rejected the null hypothesis and concluded that there no unit root for the series.

4.5.2 Cointegration Test

Cointegration prior to the VAR analysis was conducted in order to determine whether the variables exhibited long-run or short run relationship. The study used Johansen test to detect presence of cointegration. The results were as shown in Table 4.6.

Table 4.6: Results from Cointegration Test

Null Hypothesis	J_{trace}	J_{max}
r=0	22.05 (0.028)	16.402 (0.042)
r=1	5.642 (0.220)	5.642 (0.220)

Table 4.6 shows the results from the cointegration tests. Both tests reject the null of zero cointegrating vectors. The hypothesis that there is one cointegrating vector cannot be rejected on the other hand; that is, based on the cointegration test, there is no support for both variables in the system being stationary. Based solely on the evidence in Table 2, we would conclude that there exists a long-run or short run cointegrating relationship between the variables.

4.5.3 Normality Test

Normality of the data was tested using Jarque-Bera and established that all variables. If p-value obtained is less than 0.05 then the data was deemed to be not normally distributed. The findings for the test were as shown in Table 4.7.

Table 4.7: Normality Test Results

Obs	Variance	Skewness	Kurtosis	Jarque-Bera test result	Critical value	p-value
144	18.03021	0.1555	2.343	3.71022	5.99	0.006

From the findings the p-value was 0.006 and Jarque-Bera test result was 3.71022. Since the Jarque-Bera test result had a chi square distribution, the chi square distribution critical value was 5.99 which was higher than 3.71022. Also the p-value was less than 0.05. This implies that the variables both independent, dependent and control variables were not normally distributed.

4.5.4 Multicollinearity Test

As shown in Table 4.8 all the VIFs were less than 5 and Tolerance values were less than 1.

Table 4. 8: Variation Inflation Factor

Variable	VIF	1/VIF
Emerging markets portfolio flows	1.35	0.739
Financial account of alance of payment	1.25	0.800
Nominal interest rate	1.10	0.913

Based on the coefficients output, emerging markets portfolio flows had a VIF value of 1.35, financial account of balance of payment had a VIF value of 1.25, nominal interest rate had a VIF value of 1.10. The VIF values for all the variables were less than 10 implying that there was no Multicollinearity symptoms.

4.5.5 Autocorrelation

The study conducted Breusch Godfrey LM test to confirm if there is autocorrelation. The results were as shown in Table 4.9.

Table 4.9: Autocorrelation Test Results

Lags (p)	Chi ²	df	Pro> Chi ²
1	38.243	143	0.000

The chi square statistic was 38.243 and p value was 0.00. The p-values was less 0.05 and hence the study concludes that thus the residuals of the empirical model are not auto correlated.

4.6 Regression Analysis

The study further conducted regression analysis with control variables. This model was to establish moderating effect of interest rates, exchange rates, inflation and GDP growth on the relationship between macroeconomic variables and stock return volatility in the NSE. The results were as shown in Table 4.10.

Table 4.10: Controlled Regression Model

	Coef.	Std. Err.	t	P>t
Emerging markets portfolio flows	0.812	0.293	2.536	0.000
Financial account of balance of payment	0.743	0.144	2.910	0.010
Interest rates	0.419	0.239	3.452	0.003
Cons	0.919	0.855	2.999	0.000

Source	SS	df	MS	Number of obs = 143
Model	711.456	3	237.152	F (3, 140) = 155.384
Residual	213.673	140	1.526	Prob > F = 0.000
Total				R-squared = 0.769
	925.129	143		Adj R-squared = 0.764

The findings found that the adjusted R square was 0.764. This implies that emerging markets portfolio flows, financial account of balance of payment and interest rates explained 76.4% of the changes in stock market return volatility in Nairobi Stock Exchange. The overall p-value was less than 0.05 which implies that the overall model was significant. Further comparing the adjusted R square for controlled and uncontrolled model, the study found that the difference is 0.1. This implies that the interest rates moderates the relationship between macroeconomic variables and stock return volatility in the NSE by 1%. These findings are in line with Acikalin et.al (2008) who investigated the relationship between the stock markets and macroeconomic variables in Istanbul stock exchange and found a long term stable relationship between the stock return and the macroeconomic variables. Basically, the balance of payments is divided into the current and capital account. The capital account is made up of portfolio and direct investment, either long or short term capital and capital transfers. While the current account records all current transactions, which are transactions that include either the export or import of goods and services. A long-term and more viable solution lies in ensuring balance of payments viability.

The results also show that the stock market return volatility in NSE would be 0.919 if other variables were held constant. Further the study revealed that changes in emerging markets portfolio flows would lead to 0.812 increase in stock market return volatility in NSE. The variable was significant since its p-value was less than 0.05. This is in line with Liew, Mansor and Puaah (2016) who noted that some governments have used very innovative ways to promote foreign portfolio investment and to facilitate the access of their companies to international finance.

The study further found that changes in financial account of balance of payment would lead to 0.743 increase in stock market return volatility in NSE. The variable was significant since its p-value was less than 0.05. This is in line with Mills (2015) who noted that balance of payments (BOP) accounts are an accounting record of all monetary transactions between a country and the rest of the world. These transactions have been

increasing and include payments for the country's exports and imports of goods, services, financial capital, and financial transfers.

Moreover the results revealed that interest rates would lead to 0.419 increase in stock market return volatility in NSE. The variable was significant since its p-value was less than 0.05. This is in line with Issahaku et al. (2013) who revealed a long run relationship existed between the stock return and inflation, money supply and foreign direct investment.

4.7 Test for Moderating effect of Interest Rates

Test Results for the Two Models

The results for the regression models were as shown in Table 4.12 and 4.13. Table 4.12 showed the model summary and change in R².

Table 4.11: Regression Results for Moderation

Model	R	R Square	Adjusted R Square	Std. Error	Change Statistics	
					R square Change	F Change
1	0.872	0.760	0.755	1.709		
2	0.921	0.848	0.845	1.617	0.088	0.107

As illustrated Table 4.11, Model 1 fits the data coefficient of determination was 0.760 with a sig F change $p < 0.05$ of 0.153. Based on the model, 76% of stock market return volatility in Nairobi Stock Exchange was accounted for by emerging markets portfolio flows and financial account of balance of payment while the remaining 24% of stock market return volatility in Nairobi Stock Exchange was attributed to other variables outside the study.

The change statistics in the model as shown in Table 11 show an increase in R² by 8.8% from 76% to 84.8%. The increase of 8.8% was accounted by the moderating variable introduced in the second model which is significant since $p < 0.05$. This implies that interest rates moderates the relationship between emerging markets portfolio flows

and financial account of balance of payment and stock market return volatility in Nairobi Stock Exchange.

The coefficient of the moderating effect of Interest rates, Exchange rates, Inflation and GDP growth on relationship between the emerging markets portfolio flows and financial account of balance of payment on stock market return volatility in Nairobi Stock Exchange was shown in Table 4.12.

Table 4.12: Regression Coefficients to Test for Moderation

	Unstandardized		Standardized	t	Sig
	Coefficients		Coefficients		
	B	Std. Error	Beta		
1 (Constant)	0.798	0.187		4.267	.000
Emerging markets portfolio flows	0.645	0.292	0.509	2.209	.030
Financial account of balance of payment	0.743	0.308	0.609	2.412	.018
(Constant)	0.972	0.319		3.047	.003
Emerging markets portfolio flows	0.812	0.214	0.707	3.794	.000
2 * Interest rates					
Financial account of balance of payment * Interest rates	0.767	0.323	0.612	2.375	.020

The findings show that of interest rates, exchange rates, inflation and GDP growth significantly moderates the relationship between emerging markets portfolio flows and financial account of balance of payment and stock market return volatility in Nairobi Stock Exchange ($p=0.00$). This is shown by increase in the value of the regression coefficients after the intervening variable is introduced in the model. Therefore hypothesis that interest rates, exchange rates, inflation and GDP growth significantly moderates the relationship between emerging markets portfolio flows and financial account of balance of payment and stock market return volatility in Nairobi Stock

Exchange was accepted and concluded that Interest rates, Exchange rates, Inflation and GDP growth moderates the relationship between emerging markets portfolio flows and financial account of balance of payment and stock market return volatility in Nairobi Stock Exchange.

CHAPTER FIVE : SUMMARY, DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary, conclusion and recommendations of the main findings on the effect of macroeconomic variables on stock return volatility in the Nairobi securities exchange (NSE). This chapter puts forward the summary of the findings, conclusions of the study, recommendations of the study, limitation of the study and suggestions for further studies.

5.2 Summary

Macroeconomic variables have been emerged as important investment parameters in emerging markets. Investors keep their sharp eye on the global economic parameters before injecting their surplus funds in any investment avenue. Macroeconomic variables put an influential effect on the industrial growth that further effect the stock market performance. This study aimed at establish the effect of macroeconomic variables on stock return volatility in the NSE. The study adopted a quantitative comparative design which is all about quantifying relationships between variables and targeted NSE 20 share index. The study used secondary data collected from the CBK, KNBS, KIPPRA and Ministry of Finance, public libraries, Institute of International Finance, national budget and other government records as well as World Integrated Trade Solution (WITS).

The study found that that emerging markets portfolio flows and financial account of balance of payment have positive and significant effect on Stock market return volatility in Nairobi Stock Exchange as shown by 0.843 and 0.713 respectively. In addition, the study revealed that the emerging markets portfolio flows and financial account of balance of payment explained only 65.6% of the variations in Stock market return volatility in Nairobi Stock Exchange.

Further the study revealed that that changes in emerging markets portfolio flows would lead to 0.812 increase in stock market return volatility in NSE, and that Interest rates would lead to 0.743 increase in stock market return volatility in NSE. Further the study that the interest rates moderates the relationship between macroeconomic variables and stock return volatility in the NSE by 1%.

5.3 Discussion of the Findings

5.3.1 Emerging Markets Portfolio Flows

The study found that that emerging markets portfolio flows have positive and significant effect on Stock market return volatility in Nairobi Stock Exchange . In addition, the study revealed that the emerging markets portfolio flows contributes to variations in Stock market return volatility in Nairobi Stock Exchange. This is in line with Kuwornu (2011) who examined the relationship between macroeconomic variables and stock returns using monthly information over period January 1992 to December 2008 and noted that the macroeconomic variable set employed is not exhaustive and that more variables should be sought and used to determine the relationship with the stock return volatility while employing of vector error correction and the co integration analysis. Raghavan and Huey (2017) concurs with findings by arguing that a viable balance of payments position may be defined as a current account position, which can be financed on a sustainable basis by net capital movements on terms that are compatible with reasonable development, growth prospects and debt servicing capacity as well as macro-economic stability. The findings are also in line with random walk theory which notes that an arbitrary walk of stock costs does not infer that money market is productive with rational investors. According to Fama (1970), EMH can be classified into three levels in light of the meaning of the accessible information set specifically, Weak form EMH, Semi solid frame EMH and Strong form EMH.

5.3.2 Financial Account of Balance of Payment

The study found that that financial account of balance of payment have positive and significant effect on Stock market return volatility in Nairobi Stock Exchange. In addition, the study revealed that the financial account of balance of payment contributes

to variations in Stock market return volatility in Nairobi Stock Exchange. This correlates with Kuwornu (2011) who indicates that there is a notable shift in composition of emerging markets portfolio flows from predominantly equities in the early-2000s to debt currently. The findings are also in line with Mills (2015) who noted that balance of payments (BOP) accounts are an accounting record of all monetary transactions between a country and the rest of the world. These transactions have been increasing and include payments for the country's exports and imports of goods, services, financial capital, and financial transfers. The findings concur with The Present Value Model which uses future expected earnings and future expected discount rates has been empirically tested for predicting stock prices. The model explains the dynamic relationship between stock market volatility and economic activities (Semmler, 2006). Sarkar, (2012) opines that the PVM explains the relationship between stock prices and macroeconomic variables Attari et al. (2013) posit that the PVM is useful in establishing a long term relationship among stock prices and macroeconomic variables.

5.3.3 Moderating Influence of Interest Rates

Further the study that the interest rates moderates the relationship between macroeconomic variables and stock return volatility in the NSE. These findings are in line with Acikalin et.al (2008) who investigated the relationship between the stock markets and macroeconomic variables in Istanbul stock exchange and found a long term stable relationship between the stock return and the macroeconomic variables. The findings are also in line with Arbitrage Pricing Theory (APT) which helps in explaining and understanding the moderating effect of interest rate on stock market volatility.

5.4 Conclusions

The study concluded that emerging markets portfolio flows and financial account of balance of payment have positive and significant effect on Stock market return volatility in Nairobi Stock Exchange and are attributed to 65.6% of the changes in the Stock market return volatility in Nairobi Stock Exchange. Employing co integration tests and vector error correction model on a quarterly information set ranging from 2006 to 2017,

the study found a long term stable relationship between the stock return and the macroeconomic variables.

Further the study concluded that emerging markets portfolio flows, financial account of balance of payment, interest rates positively affects the stock market return volatility in Nairobi Stock Exchange. The study deduced that 1% of the relationship between macroeconomic variables and stock return volatility in the NSE is moderated by interest rates. The study found out that interest rate to be positively related with volatility of stock returns.

5.5 Recommendations

First, exchange rate contains some significant information to forecast stock market performance. Therefore, Central Bank of Kenya (CBK) should try to maintain a healthy exchange rate. The study recommends the government through its policy makers should come up with policies that will help stabilize Foreign exchange rate, Interest rate and Inflation rate fluctuation thus creating investor confidence in the securities market. This will have a significant impact on the performance of the Nairobi Securities Exchange thus foster economic growth.

The regulator should ensure that all the market players comply with the policies and regulations in a bid to ensure efficiency and effectiveness of the bourse. The study recommends survey carried from time to time on macro-economic factors affecting stock return. This can be facilitated by availing data for free to students and other researcher with interest in studying the stock market, factors affecting the market returns and market efficiency. Further studies on persistence of news on stock return will be useful to investors in making rational investment decisions and aid the regulator in policy formulation.

Further the study recommends that the independent regulatory bodies such as Capital Markets Authority and visionary system of government can contribute towards the development of an efficient working and development of the Kenyan Stock Market. The listed firms in the Nairobi Securities Exchange should endeavor to make their stocks attractive to investors who may prefer investment in securities as a hedge for longer

periods of investment. For this regard therefore, the firms should invest in projects that are long term and viable for long term returns to investors. Once it is realized by investors that listed firms have performance coupled with the fact that returns on their shares increases as inflation goes up, the shares may be preferred assets when investors have to hedge against the risk of inflation.

Inflation is found to be a key contributing factor to stock market volatility in Kenya since an increase in inflation leads to a significant increase in stock market volatility. This informs government monetary policy that stock market volatility can be significantly reduced if the rate of inflation in the country is controlled. In light of this finding, the study recommends a strict monetary policy and control of factors contributing to change in inflation rate in order to reduce stock market volatility. A reduced rate of inflation within allowable limits would reduce volatility in the securities market returns, reduce risk to equity investors, boost investor confidence and raise more capital which can be channeled to critical sectors of the economy and in turn promote economic development growth. This would be in line with the objectives envisioned in the vision 2030 where the stock market is seen as a major source of capital required to enable the actualization of the vision 2030.

The study found that interest rates contribute significantly to stock market volatility. In particular, an increase in the interest rates leads to an increase in the stock market volatility. This study recommends that policies on interest rate controls be observed closely to contain increase in interest rate which is found to contribute to stock market volatility. The study findings show that investor herding in the Securities market causes an increase in stock market volatility through exchange rate change.

NSE should put in to place practices/strategies that will enable control of macroeconomic variables in order to moderate the stock price volatility consequently enhancing the stability and the efficiency of the stock market. The regulator should ensure that all the market players comply with the policies and regulations in a bid to ensure efficiency and effectiveness of the bourse. The study recommends survey carried from time to time on macro-economic factors affecting stock return. This can be

facilitated by availing data for free to students and other researcher with interest in studying the stock market, factors affecting the market returns and market efficiency. Further studies on persistence of news on stock return will be useful to investors in making rational investment decisions and aid the regulator in policy formulation.

5.6 Recommendations for Further Research

The results of the study are not consistently stable with the results of the previous studies due to differences between the macroeconomic factors used, the period covered, the research methodology employed and the countries examined. For the future research, it is recommended that there is need to repeat this study taking into account these kinds of differences to make the result of studies more comparable.

Finally, a possible extension of this study should be carried out to consider the impact of other macroeconomic variables such as Money supply which is not included in the analysis because monthly data for these variables are not currently available. In fact, inclusion of these variables would be a significant addition to account for the impact of real activity and the effect of the public sector, given that the Kenyan government plays a major role and has a stake in ownership of the trading firms in the NSE.

This study recommends further studies to be done using other macro-economic variables to understand their contribution to stock market volatility in Kenya. The study also recommends more studies to explore the effect of other behavioral factors on the volatility of the Nairobi Securities Exchange.

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APPENDICES

Appendix I: Secondary Data Collection Sheet

	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9	9	9	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7
Value of the Exports																					
Value of the Imports																					
Portfolio debt (bonds) inflows (country's debt that has been borrowed from foreign lenders including commercial banks, governments or international financial institutions)																					
Portfolio equity inflows																					
Actual FDI inflow																					
Nominal Interest Rate																					
Inflation (CPI index)																					
Real Exchange Rate (The KSH against the USD)																					
Real GDP growth rate																					
NSE 20 share index																					