EFFECT OF TRADING ACTIVITY ON STOCK RETURN VOLATILITY FOR STOCKS LISTED AT THE NAIROBI STOCK EXCHANGE

BY

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DECLARATION

This research project is my original work and has not been presented for assessment or academic award to any other university or institution of higher learning.

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DEDICATION

I dedicate this project to my mother, Esther Mukolwe and my sisters, Laura Mukolwe and Ivy Mukolwe for the financial and moral support they accorded me towards making this project a success.

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ABBREVIATIONS

ARCH	Autoregressive Conditional Heteroscedasticity
BSI	Balance Sheet Item
CR	Cash Ratio
CSI	China Securities Index
DER	Debt to Equity Ratio
DF	Dickey Fuller
DPR	Dividend Payout Ratio
EGARCH	Exponential Generalized Autoregressive Conditional Heteroscedasticity
EMH	Efficient Market Hypothesis
FDI	foreign direct investment
FTSE	Financial Times Stock Exchange
GDP	Gross Domestic Product
HAR	Heterogeneous Autoregressive
HMR	Hierarchical Multiple Regression
IFC	International Finance Corporation
MDH	Mixture of Distribution Hypothesis
MPT	Modern Portfolio Theory
NSE	Nairobi Securities Exchange
OLS	Ordinary Least Squares
ROE	Return on Equity
VAR	Vector Autoregressive

ABSTRACT

The objective of the study was to examine the effect of trading activity on stock return volatility for stocks listed at the Nairobi Stock Exchange. The specific objectives were to determine the effects of trading volume and trade size on stock return volatility from 2013- 2018. The study was based on the Efficient Market Hypothesis, Modern Portfolio Theory and Prospect Theory. A descriptive cross-sectional research was used to conduct this study which targeted 63 stocks listed at the NSE. Non-probability sampling was adopted where convenience sampling was used to select stocks listed at NSE in the period 2013-2018 due to the proximity and accessibility of the 57 companies' data to the researcher. Secondary data was used and was extracted from the NSE website and financial statements of sampled firms and tabulated into a data entry sheet covering the study period. Diagnostic tests which included checking heteroscedasticity, normality, and multicollinearity were conducted. Descriptive and inferential statistics were used to analyze the data which consisted of correlation and multiple regression analysis. The findings revealed that trading activity was a factor that significantly affected stock return volatility. The regression coefficients indicated that trading volume and trade size had a positive and negative significant effects on stock return volatility respectively. The study concluded that an increase in trading volume at the NSE resulted in increased stock return volatility and that an increase in trade size at the NSE resulted in reduction in stock return volatility. The study recommends that the Capital Markets Authority, Nairobi Securities Exchange and policy makers in the financial markets should urge stockbrokers to advise their clients against being overconfident when trading in stocks.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

There have been drastic changes that have been experienced in the global financial markets as a result of order frequencies and fast growth of quantities coming from diverse participants in the market. The huge advancements in computers and high-speed telecommunications are needed to address the considerable increase in the volume orders for financial assets. The current trends in the financial markets indicate that developing and emerging financial markets are more susceptible to volatility as compared to developed nations (Chebbi & Jebnoun, 2016).

In the last few years, investors have shown more interest in understanding the volatility of financial markets and are more than ever anxious about the returns and risks on their investments. The decision making of investors is influenced by the flow of communication which is tightly associated with the stock prices volatility. The unexpected changes in financial markets mean that investors may not be able to make informed decisions on investments (Mamtha & Srinivasan, 2016).

The concern of how predictable the expected returns are has become a significant issue on the ongoing debate amongst researchers and academia owing to its strategic importance for portfolio and personal investors. According to Ahmed (2009), an efficient market assumes that investors cannot be able to use information related to price to predict stock returns. Trading activity and liquidity of financial markets has been an important topic for researchers and much time has been dedicated on finding the actual determinants of liquidity and trading activity in financial markets. Trading activity is shown by trading turnover or trading volume, which are proxies for market liquidity (Garnia & Sudarsono, 2015).

Peiris and Peiris (2011) assert that volatility of stock markets has an impact on economies by its influence on spending of consumers as a drop in market performance results in weakened consumer confidence, which in turn negatively impacts consumer spending. Volatility of stock market also has a direct impact on economic growth and business investments. Higher volatility can be interpreted as higher risk premium for equities investments, resulting in increased asset allocation to less risky assets. This shift from high volatile investments to low volatile investments indicates higher presence of risk-averse investors. Hence, volatility of the stock market attracts investments in a developing economy (Peiris & Peiris, 2011).

The study is based on the Efficient Market Hypothesis (EMH), Prospect Theory and Modern Portfolio Theory (MPT). The EMH assumes that stock markets are efficient which implies that equity prices of companies show all the information about the firm value which means that investors may not be able to make extra returns (Fama, 1965). In such a scenario, an investor may not be able to buy shares at underestimated prices or sell them at exaggerated prices.

Harry Markowitz's (1952) Modern Portfolio Theory which argues that selection and construction of investment portfolios is influenced by the reduced risks of an investment or the expected returns from an investment, is also adopted in this study (Mangram, 2013). The Prospect Theory (Kahneman & Tversky, 1979) asserts that people see losses and gains in different ways. The theory distinguishes investors into risk-averse and risk-seeking investors where the former are more likely to invest in stocks with lower returns and known risks whilst the latter seek to invest in stocks with unknown risks or uncertain outcome (Pasquariello, 2014).

1.1.1 Trading Activity

Trading is the selling and buying of securities such as the buying of equity shares in the New York Stock Exchange (NYSE). The concept of trading activity is seen as the most important factor in explaining cross-sectional changes in stock returns. The concept of trading activity has been measured in several ways by different researchers and studies. For example, Ahmed's (2009) study on cross-sectional changes and trading activities in expected returns of stock used trading volume as a proxy for measuring liquidity. In a study on trading activity and investor education on the stock market, Liivamäg (2016) used the quantity of trades as a parameter for the trading experience and activity of investors.

The trading activity of investors has been conceptualized as the frequency of transactions done by the investor (Feng & Seasholes, 2005; Nicolosi et al., 2009). Nicolosi et al. assert that trade turnover is another measure for trading activity, however, the number of trades is more straightforward in measuring trading intensity and therefore adopted transactions number as a proxy for investors' trading activity. Huang, Cai, and Song (2001) examined the association between varying volatility and trading activity parameters and used trading volume, trade size, and trading frequency as measures of trading activity.

Chordia, Roll, and Subrahmanyam (2000) used price, number of traded stocks, and trading volume as the parameters of trading activity. Garnia and Sudarsono (2015) also agree that trading activity is usually measured by trading volume and turnover. The literature also shows that there are many studies done using stock turnover as a measure of trading activity and have also shown that turnover is priced by the investors.

According to Tseng, Lai, Wen (2018), open interest is also an important variable in the futures market. Open interest is the amount of contracts existing in the fore coming markets that have not yet been closed. Open interest is dissimilar from trading volume, which includes the quantity of traded contracts in a specified period. Open interest can thus be used as a proxy to measure information flowing into and out of the futures contracts (Tseng et al., 2018).

1.1.2 Stock Return Volatility

Stock is a part of company ownership and represents a claim of sorts on a firm's earnings and assets. The percentile share that an investor has is shown by the amount of stock that the investor has from the firm's outstanding stock. This means that the more shares that an investor acquires, the bigger their rights of ownership in that firm (Frimpong, 2010). Returns are the financial rewards that an investor gains after investing in a company. The type of return is based on the form of investment made (Acheampong, Agalega, & Shibu, 2014).

Stock return volatility is an important concept in finance. The concept of stock return volatility can be used to interpret and understand the performance of the market and make projections on the future. A higher volatility indicates the probability of a declining market whilst lower volatility points to the likelihood of a rising market. This information is important for investors to be able to align their investment portfolios with the related expected returns. Stock return volatility is assumed to be a means to measure risk amongst investors. Rational investors and policymakers, on the other hand, use estimates of market volatility to explain how vulnerable the stock market is (Gibet, 2016).

Rajput and Kakkar (2012) interpreted stock return volatility as a parameter for the variance between average past prices of an asset and its current prices. Volatility is standard deviation of returns, which measures the variation of returns from the average. A large fluctuation in the stock prices in a short period means that volatility is high, and low volatility is experienced when the stock prices move slowly.

Daly (2011) conducted an investigation on the different methods that have been utilized to evaluate volatility ranging from time variant and time invariant measures. Standard deviation is one of the easier methods of measuring volatility and is characterized as a time invariant approach. Another measure that has been used to measure return volatility is the realized volatility. This approach was used in Batta (2014) study on the association amongst stock return volatility and trading volume at the NSE.

The standard method to model volatility is done through the Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) class of Autoregressive Conditional Heteroscedasticity (ARCH) models. There is a large number of econometric research on volatility which has been influenced by the accessibility of long series of prices of assets (Pinjaman, & Arala, 2017). Before the advent of the estimation of stock returns volatility by accounting for the varying nature of volatility, stock forecasters simply followed the static standard deviation or variance method in estimating volatility. This poses a problem since variances change over time, which is contrary to a static stock returns volatility assumption of constant variance (Pinjaman & Arala, 2017).

The frequency of extreme-day returns is another measure of volatility used by researchers, which takes into thought the negative and positive returns of stock (Jones, Walker, & Wilson 2004). Using this approach means that volatility is independent of statistical distribution and can be classified as a measure of risk (Jones et al., 2004). The use of extreme-day returns is more stable as compared to standard deviation and its greatest benefit is categorization of negative and positive day return, which is more explicit and explanatory about the risk.

1.1.3 Trading Activity and Stock Return Volatility

According to Tapa and Hussin (2016), trading volume and stock return volatility are simultaneously and altogether determined by similar market occurrences and are also directly associated from a practical and theoretical point of view. Different empirical research studies have been done on the link amid trading activity and stock returns and found positive associations between the variables. Among these studies, there is conflicting indication on links between trading activity and stock returns, some of which are presented in this section.

Tapa and Hussin (2016) study in the Malaysian ACE market aimed to determine the association amongst trading volume and stock yield; it established that a decrease in trading volume was linked with rise in stock return volatility; it also revealed that there existed an asymmetry correlation amid stock yield fluctuations and trading volume. This result supported the assumption that bad news had a greater effect on volatility (negative stock return) in comparison to good news (positive stock return).

Boonvorachote and Lakmas (2016) examined association between price volatility and trading activity from 2006 – 2012 on the Asian future exchanges. The findings revealed that expected

and unexpected volatility had a positive connection with trading volume. Moreover, the findings revealed that speculative activities were more likely to engage the volatility of futures whilst activities of hedging would stabilize the markets. Huang and Masulis (2002) conducted an investigation on stock return volatility in the FTSE 100 index and established that volatility of price was directly associated with frequency of trade and less associated with trade size although this association was positive.

Ayako (2005) sought to analyze the effect of trading activity in regards to whether it affects futures prices and found that trading activity as measured by turnover rate was insignificant to returns. Ting et al. (2010) analyzed the affiliation amid realized volatility and trading volume for the period 1996 – 2010 amongst 50 stock prices in the top 50 firms in Australia. The findings revealed that average trade size, quantity of trades, and trading volume were positively linked to volatility. In the Australian Securities Exchange (ASX), Duong and Kalev (2014) studied the impact of amount of trades and average trade size on stocks transacted and found that amount of trades affected price volatility more than average trade size and also found that there was a positive link amongst stock unpredictability and trading volume. Chordia et al. (2000) found that trading activity has an adverse outcome on the return. On the contrary, Campbell et al. (2003) have shown an opposite result, which is that trading activity has a positive effect on the return. The same conclusion is also supported by Chan and Faff (2013), who found that trading activity positively affects the return.

1.1.4 Stocks Listed at the Nairobi Securities Exchange

The Nairobi Securities Exchange (NSE), founded in 1954, is considered to be among the leading African Stock Markets and maintains sixty years of heritage in listing both equity and

debt securities. The NSE is known to be a global trading facility for investors who seek the opportunity to gain exposure to Kenya's as well as Africa's economic growth. The NSE has 63 listed stocks from 8 different sectors according to latest NSE daily report (Ndunyu, 2017). The International Finance Corporation (IFC) classifies all markets in emerging as developing. As such, the NSE is one of the financial markets in the emerging economies and often suffers from low turnover ratios, low trading volume, inefficient information delivery and few listed companies (Kirui, Wawire, & Onono, 2014).

The NSE financial reports show that trading activity has been on a gradual increase in the past three to five years. In 2016, trading activity in the Fixed Income Securities Market rose by 42% from Kshs. 305 Billion in 2015 to Kshs. 433 Billion in 2016. In 2017, trading activity in the Fixed Income Securities Market rose by 0.82% from Kshs. 432 billion in 2016 to Kshs. 435 billion in 2017. Secondary trading activity in the Fixed Income Securities Market rose by 29% from Kshs. 435 billion in 2017 to Kshs. 562 billion in 2018. A 2018 report showed that 13.6 % and 35.3 % for one year and three years volatility in the FTSE NSE Kenya 15 Index and a 13.7 % and 35.4 % for one year and three-year volatility for the FTSE NSE Kenya 25 Index.

1.2 Research Problem

The influence of trading activity on the volatility of stock yields is often assumed. The assumption is that an increase in trading activity leads to expected changes in the returns of an asset. The knowledge and understanding of trading activity and its influence on stock return volatility would benefit individual investors with the needed information to make improved decision making on making investments at the NSE. There is evidence of vast research on the

link amid trading activity and stock return fluctuations in the Western and Asian financial markets but there is less evidence of this research in developing African nations.

A volatile financial market indicates the performance of the economy where a high volatility indicates a problematic market performance whilst low volatility indicates a promising market. The evidence suggests that trading activity at the NSE has been on a gradual increase while volatility of the market has been high and been experiencing marginal increases (Mwaniki, 2017). Alushula (2018) supported this observation by adding that low number of local investors at the NSE makes it vulnerable to high volatility especially when foreign investors decide to sell.

There is vast literature (Boonvorachote & Lakmas, 2016; Chebbi & Jebnoun, 2016; Duong & Kalev, 2014) that has explored the link between trading activity variables and stock return volatility in the international context with less evidence in local context. However, several studies in Kenya have assessed the connection of trading activity and stock return volatility. Batta's (2014) study on stock return volatility and trading volume at the NSE; Achieng's (2013) study on association amongst stock prices and trading volume of firms at the NSE; and Gworo's (2012) study on link amongst price instability and trading volume of shares at the NSE. These studies used a single parameter of trading activity on stock return volatility while this study intended to answer the question to what extent trading activity variables have an effect on stock return volatility at the NSE.

1.3 Research Objectives

The objective of the research was to determine the effect of trading activity on stock return volatility for listed stocks at the Nairobi Stock Exchange.

1.4 Value of the Study

The study is of importance to theoretical postulations on the association amid trading activity and stock yield volatility. There are different theories that have been proposed to clarify the association between trading activity and stock return instability and the findings of this study confirmed these theories. The study could be of significance to policy and decision makers in the regulation of the financial markets; by shedding light on the association between trading activity and stock return volatility, and this information may assist policy makers in designing and developing regulations aimed at increasing trading activity and thus reduce volatility in financial markets and thus the economy. The study may enable individual and corporate investors at the NSE make insightful investment decisions and thus reduce the underlying risks in their portfolios.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature review of the study. The chapter consists of the theoretical review, the factors that influence stock return volatility and empirical review of studies from both local and international studies. A summary of the empirical review is presented and the conceptual framework of the research study is included in this chapter.

2.2 Theoretical Review

A theoretical framework comprises of concepts which when taken together present their reference and definitions to existing scholar literature. A theoretical framework demonstrates the comprehension of theories and concepts that are related to the topic at hand and that are also associated to the bigger areas of knowledge that are under consideration (Adom, Hussein, & Agyem, 2018).

2.2.1 Efficient Market Hypothesis

The efficient market hypothesis (EMH) is a significant component of modern finance and is credited to Eugene Fama's (1970) research. However, the empirical evidence of the concept is inconclusive but the idea has been cemented as sound. The EMH can be adopted to financial and capital markets (Degutis & Novickytė, 2014). Today's financial market efficiency is founded with cost efficiency while other markets are examined on the foundation of allocation efficiency (Blume & Durlauf, 2008). Stock market efficiency is the notion that equity prices of companies that are listed show all the information about the firm value, which means that investors may not be able to make extra returns (Fama, 1965).

Stock prices in most cases are traded at reasonable values (Fama, 1965) and this makes it difficult for an investor to buy stocks that are underestimated or to trade stocks at exaggerated prices. A market is efficient if the prices are able to be adjusted fast and in most cases free from bias to new information. Therefore, there is no motive to think that prices are excessively low or high which means that an efficient market provides the opportunity for a personal investor to rival the market. In the EMH, an investor is only concerned in choosing a set of risk-return trade-off. Goedhart, Koller, and Wessels (2010) assert that the variations in uneven transaction costs and awareness of the investor are a barrier to major changes in value to be immediately and completely seen in market prices.

Nevertheless, the efficiency of markets, variations in prices of assets may not be shown in algorithms whilst extra return is achieved as a success more than a result of a right prediction. An efficient market is one in which an investor can earn higher returns than returns from the market (Allen, Brealey and Myers (2011). The worth of a firm can be reflected by the value of shares and is in balance with the future cash flows reduced by other expenses of capital. The EMH has been considered in the professional and academic fields in many decades and most of research on the theory has been influenced by several motivations.

In inefficient markets, a risk-weighted yield is expected and thus research in efficiency of stock market is significant for institutional and personal investors. Complete comprehension of market efficiency is critical for top executives whose actions and decisions influence the firm's perceived value. The EMH is adopted to comprehend the development of stock markets being significant for supervisors and operators of stock markets (Degutis & Novickytė, 2014).

There are schools of thought that have challenged the arguments of the EMH. These include the behavioral finance theory which proposes that investors aren't guided by efficiency and rationality but are rather influenced by psychology. Momentum investing has also countered the arguments of EMH proposing that there exists a combination of fundamental and technical analysis that exist in certain price patterns (Malkiel, 2003). The fundamental analysis approach also counters the arguments of EMH proposing that specific valuation ratios predict underperformance and outperformance in the future. Despite these criticisms, the EMH has been adopted in several studies (Ang, Goetzmann, & Schaefer, 2010; Al Samman & Al-Jafari, 2015) that have explored the association amongst trading activity and stock yield volatility.

The EMH theory is relevant to this study as it espouses that there needs to be an equilibrium in the stock price and stock yield and investors in the financial markets look towards gaining a balance between making a profit or making a loss. Thus, the assumption is that a market is efficient if it does not experience any significant volatility and have an impact on the investment portfolio of an individual or corporate investor into the financial market. The theory is useful to this study as it assumes that the information on the stock market is available to the public and the volatility information is useful to investors in making informed decisions on their investment portfolio.

2.2.2 Modern Portfolio Theory

Harry Markowitz's (1952) Modern Portfolio Theory is an investment theory for selection and construction of investment portfolios founded on the growth of expected returns of selection and immediate reduction of risks in investments (Fabozzi, Gupta, & Markowitz 2002). MPT makes several assumptions that an investor is rational (they aim to minimize risk while

maximizing results); that investors are ready to accept a higher amount of risk if they are rewarded by higher expected returns; that an investor receives all critical information related to their decisions of investments on time; that an investor can lend or borrow an infinite size of capital at a risk free rate of interest; that markets are perfectly efficient and markets do not have transaction taxes or costs and it is likely to choose securities whose single performance is free from other portfolio investments (Mangram, 2013). The MPT argues that volatility generates risks that are linked to the degree of spreading of returns around the average. This means that a lower than expected return translates to a greater risk of the investment. Volatility often occurs when there is a rise in a stock market and when there is a fall in the stock market.

In the MPT, standard deviation is the most popular dorm of measuring volatility of a security (Fabozzi et al., 2002). Markowitz (1952) assumes that investors make their decisions on investments based on the risk spread and the returns. Most investors' risks that is undertaken when buying a security is that they will get returns that are less than what they intended to earn. This is a deviation from the average (expected) return. This means that every security has its own standard deviation from the average and a higher standard deviation means there is a required higher chance return and greater risk (McClure, 2010).

This theory is pertinent to this research as it assumes that most investors are risk averse and aim to maximize or optimize expected returns from an investment which is pegged on a particular market risk level. This market risk is measured by stock return volatility which can be calculated by the standard deviation of a security in the investment portfolio of an investor. The modern portfolio then becomes important for this research as the risk of investing at the NSE can be measured using stock return volatility.

2.2.3 Prospect Theory

Kahneman and Tversky (1979) are credited with coming up with Prospect Theory whose major assertion is that people see losses and gains in different ways. According to the theory, an investor submitting to the prospect theory is more risk-averse if they experienced gains and is risk-seeking if they experienced losses. The major characteristics of prospect theory are based on the definition of variations in financial wealth, loss aversion, risk seeking and risk aversion.

Prospect theory argues that investors assess outcomes associated to a point of reference and are risk averse in gain arena and risk-seeking in the loss arena. In the setting of financial performance, the point of reference is the price of purchase and a fall or rise in asset value since buying investors to their risk averse (risk-seeking) arena so as to have a better tendency to increase and reduce their positions. Basically, prospect theory assumes that a person will make a decision which is influenced by the gains and losses and not the final result, and that people determine their gains and losses by using certain methods (Willman, O'Creevy, Nicholson, & Soane, 2001).

The propositions of prospect theory are utilized to explain momentum and the character effect, asset pricing riddles as the greatness of the equity best value, value premium, and predictability of stock return and its effects on portfolio choice. Loss aversion (risk seeking in losses) persuades risk-takers to trade less (additional), and less carefully (more aggressively), with their reserved data – but also makes them less (additional) motivated to buying private information when it is expensive – in order to lessen (increase) their supposed risk of a trading loss (Pasquariello, 2014).

The prospect theory has been used by other studies (Liu et al., 2014; Metwally& Darwish, 2015) to explore behaviour of financial traders. Liu et al. found support for the prospect theory establishing that traders watched and followed the trading activities of others, by forecasting possible victors based on their past trading behaviour. Metwally and Darwish (2015) found evidence of the impact of overconfidence as a behavioral bias stemmed from the second building block of behavioral finance on cognitive psychology and affected traders' beliefs and thereby their trading behavior in form of excessive trading in the Egyptian Stock Market.

The prospect theory is thus useful for this study as it proposes that decisions of investment in a financial market are made rationally among investors. The theory is relevant as the decisions by investors have an effect on trading activity and are also based on the return volatility of the market and their decision making on whether or not to invest in particular stocks is founded on stock's performance in the financial market. The theory is relevant as it explains the role that investors' experience in the financial market plays in influencing their decision to invest.

2.3 Determinants of Stock Return Volatility

This section presents some of the determinants identified in the literature which have been identified to have an influence on stock return volatility. The causes of return volatility can be distinguished into macroeconomic factors and microeconomic factors. These macro-economic determinants are from the external environment of the firm whilst microeconomic factors are in the internal environment of the firm.

2.3.1 Economic Determinants of Stock Return Volatility

Stock return volatility is influenced by determinants of patterns of trading or determinants of future dividends' uncertainty (Zhang, 2010). Daly (2011) described determinants of market

volatility into short and long-term factors. Amid the long-term effects on volatility is that of company influence such as equity or debt ratios. The determinants that effect volatility in the short term consist of contrarian trade, trading volume, and introduction of options and futures. Daly noted that one of the most mentioned factors is the link amid volatility and trading volume.

Angko (2013) researched on the determinants of stock market volatilities in Ghana and found that lagged GDP, exchange rate, and Foreign Direct Investment (FDI) were the major factors that influenced stock return volatilities. Waweru (2013) examined the factors of stock price volatility at NSE and confirmed that the determinants of stock price volatility include inflation rate, interest rate and exchange rate. Khositkulporn (2013) found that S&P 500 had a large impact on Thailand's stock market followed by oil prices and British Standards Institution (BSI) and found that the variations of political uncertainties and large and international stock markets have significant impact on volatility of stock market.

The evidence also suggests that economic policies of a country can have an impact on market volatility. Chulia, Martens, and van Dijk (2010) found that there was an uneven association among stock return volatility and monetary policies, and further established that volatility levels can be explained by changes in monetary policies whether negative or positive. Corbet, McHugh, and Meegan (2017) also found enough proof of cryptocurrency return volatility effects driven by United Kingdom, European Union, Japanese, and United States easing announcements.

2.3.2 Firm-Specific Determinants of Stock Return Volatility

Misbah et al. (2013) found that changes in stock returns are related to microeconomic aspects like corporate bond yields, corporate earnings, interest rates changes, trading activity, and dividend yields, in the stock market, bond prices leverage, and other macro-economic factors. In their examination of the instability of stock yields in selected Asian developing markets in regard of the volatility of external and domestic factors in emerging Asian markets, Chaudhuri and Koo (2001) found that both global variables and local macroeconomic variables had descriptive control for stock return fluctuations.

Handayani et al. (2013) studied the elements of the stock price fluctuations in the Indonesian manufacturing sector and found that company's stock price volatility was explained by Cash Ratio (CR), Dividend Payout Ratio (DPR), Debt to Equity Ratio (DER), Return on Equity (ROE), firm size and sales growth.

Jankensgårda and Vilhelmsson (2016) investigated ownership causes of stock yield fluctuations and concluded that ownership structure is critical for understanding cross-sectional variations in stock yield volatility in Sweden. The outcomes revealed that proxies for under-diversified owners – a largest owner that is a family or has an affiliation with a business sphere – are associated with lower volatility. The findings showed that when the largest owner is an institutional investor with a high degree of portfolio concentration, volatility was lower.

2.4 Empirical Review

Song, Tan, and You (2005) conducted a study on the influence of size of trades, number of traded stocks, trade size, and share volume had an effect on explaining the link between fluctuations and trading volume, extracting data from the Shanghai Stock Exchange. The

findings confirmed that the link between volume and volatility was determined by the number of trades at the Chinese Stock Market. Size of trade did not explain the association between volatility and volume unlike number of trades. The second largest trade sizes affected volatility more than other trades at the Chinese market. This study relied on data from high frequency trading which is often used by corporate investors and thus may not be suitable to explain the relationship amid trading volume and return fluctuations for individual investors. The information from the study cannot be generalized to individual investors.

Gworo (2012) researched on the impact of trade volume changes on stock price volatility in Kenya. The study utilized a correlational research design and the sample for the study was 14 listed companies at the NSE's 20 share index in 2011. Average monthly traded volumes were used to compute volume of shares and stock price volatility was measured using standard deviation. Regression and Pearson correlation models were adopted to measure the association between the variables. The study used the coefficient of determination (R^2) and T-Tests and found that there was a weak correlation between volatility of share prices and traded volume of the companies at the NSE. This study was limited to NSE 20 share index and was also limited to one fiscal year. There is need to conduct analysis of trade volume and stock volatility using data from a data series.

Belhaj, Abaoub, and Mahjoubi (2015) examined the size of trade, number of transactions, and volatility-volume relationship in the Tunisian stock market. The findings confirmed a positive and strong association concurrent association between unconditional price volatility and trading volume along with the Mixture of Distribution Hypothesis (MDH). The findings also showed that number of transactions was much more important than trade size in explaining

volatility and appear to be the major factor that influenced a positive volume-volatility association. The empirical tests of this study focused on intraday and daily data among 43 of the most dynamic and active stocks. The outcome of the study was thus affected by exclusion of stocks that were not active in the market.

In Kenya, Batta (2014) examined connection amid trading volume and stock return fluctuations using evidence from NSE. The study adopted a correlational study among companies of the NSE 20-share index. Daily closing stock prices of all the companies comprising the NSE 20-share index and daily trade volume as a substitute for information onset were used in the analysis for the period January 2008 to December 2013. Daily realized volatility was computed using standard deviation and realized volatility at different time horizons – weekly and monthly in this study, were calculated using simple averages. Ordinary least squares regression (OLS) and auto regression were used to analyze the data. Trading volume was not statistically significant indicating a weak association amongst volatility of stock yields and trading volume. The data for this study was limited to the NSE 20 share index which means the data excluded other NSE listed companies and this may have had an effect on the results of the study since the firms in this sample are high performing firms.

Giot, Laurent and Petitjean (2010) examined the influence of trade size, order imbalance, and number of transactions of the volume-volatility association by disintegrating achieved volatility in two fundamental categories: discontinuous jump component and continuously varying component. The study covered from 1996 – 2003 of 100 listed shares at the NYSE. The findings indicated that trade size, number of transactions and order imbalance had a positive association with persistent and continuous part of volatility and that number of

transactions had the largest effect on volume-volatility relationship. The period under study covered the financial crisis period which was characterized by high uncertainty which could have affected the outcome of the study.

In Thailand, Boonvorachote and Lakmas (2016) conducted an empirical investigation into the effect of trading activity which comprised of open interest and trading volume on volatility of price in Asian futures exchanges. This study adopted three meanings of volatility: trading volatility measured by open-to-close returns, daily volatility measured by close-to-close returns, and non-trading volatility measured by close-to-open returns. The sample consisted of Japanese, Thai, Chinese, and Singaporean future exchanges from 2006 – 2012 using data from their close and open prices, open interest, and trading volume. The unexpected and expected trading volumes had a positive effect with volatility, whilst unexpected and expected open interests had a negative association with volatility. The sample of the study consisted of Chinese, Japanese, Singaporean, and Thai futures exchanges. The study did not control for the differences in the economic factors of either of the countries which can affect outcome of the study since volatility is influenced by economic factors.

Karaa, Slim, and Hmaied (2017) assessed volume-volatility and trading intensity association in Tunis Stock Exchange from 2008 – 2010. Data was retrieved from a transaction file obtained from TSE on transaction quantity and price, security code, transaction time, transaction date of shares traded. An Autoregressive Conditional Duration (ACD) model which did not depend on any sampling frequency assumption was adopted. The results found a positive and significant association between volatility and trading intensity. The study concluded that presence of informed traders resulted in an increase in volatility of highly traded stocks. The

sample period avoided the large drop in market activity mainly attributed to political and economic instability after the Tunisian revolution in January 2011. This exclusion could affect the outcome of the findings since political and economic factors have been shown to influence volatility in financial markets.

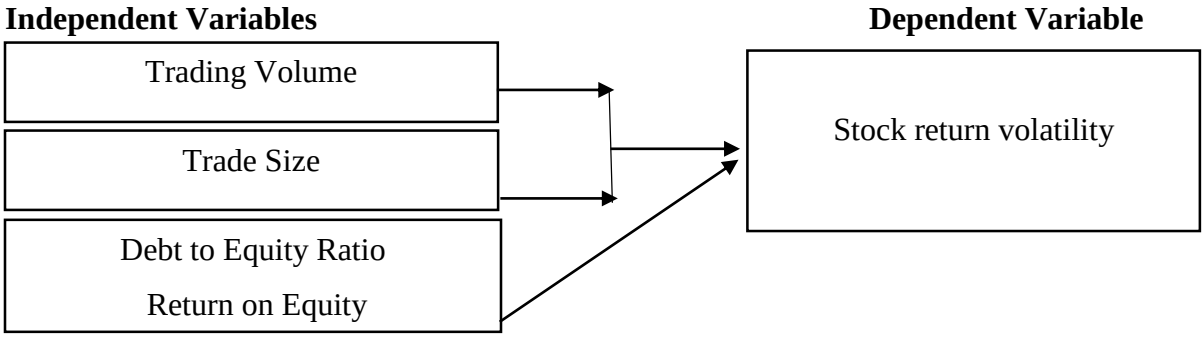
Al Samman and Al-Jafari (2015) measured the association between stock return volatility and trading volume for industrial companies in the Muscat Securities Market in Oman. The selected sample was on stock returns and monthly traded volume for 17 firms from 2009 – 2013. The study adopted VAR, Brailsford model, and pairwise Granger causality tests. The empirical findings revealed that there was a positive impact on return volatility from trading volume. The VAR model provided evidence of positive and significant impacts of trading volume on stock returns. Moreover, pairwise Granger causality test revealed that trading volume caused stock return. This study was limited to the variables of trading volume and stock return volatility on a sample of firms that operated in a single sector and thus could not account for sector differences in the results.

Chebbi and Jebnoun (2016) estimated return volatility using daily number of trades and aimed to notice the most appropriate proxy for trading activity that explained volatility of stock prices in a sample of 48 organizations in the Tunisian Exchange in the 2015 financial year. Trading activity was measured using share volume, traded capitals, and number of transactions. The study conducted three sets of regression for each stock and found a negative association between volatility of price and trading activity. The findings indicated that small trade sizes increase with price volatility and that for medium and large trade sizes, price volatility decreases as trade size increases. The study used data for five months (02/01/2015 to

29/05/2015) which may not be as efficient in exploring the influence of trading activity and price volatility.

2.5 Conceptual Framework

Figure 2.1 represents the conceptual framework of the study showing the independent variable of the study is trading activity and stock return volatility is the dependent variable. The control variables of the study are Debt to equity ratio (DER) and return on equity (ROE) of the firm.



Source: Researcher (2019)
Figure 2.1: Conceptual Framework

2.6 Summary of Empirical Review

The evidence suggests that trading activity has been measured using different parameters which include trading turnover, trading volume, trade size, open interest, number of shares traded daily, weekly or monthly. However, there is less evidence of studies that have used a combination of trading activity variables as a model for predicating or explaining stock return volatility in Kenya. Studies that have been conducted on trading activity and stock return volatility have used a single variable such as influence of trading volume on stock return volatility. This is the research gap that the study intended to fill by measuring the effects of

trading volume and trade size on stock return volatility at the NSE as parameters for trading activity.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter consists of the selection, justification and the presentation methods and techniques that were followed to achieve the objectives of the study. The chapter presents the research design, population, sampling design, data collection methods, validity and reliability, and data analysis approach that were adopted.

3.2 Research Design

A study's research design can be described as the holistic plan for conceptualizing a research topic to the relevant empirical research (Rahi, 2017). In other words, the research design details what information is needed and what techniques are going to be adopted to analyse and collect data and how these are related to the study research questions. Research design can be categorized into descriptive, exploratory, and/or explanatory research (Rahi, 2017). The study adopted the descriptive research design which can be distinguished between longitudinal studies and cross-sectional studies. In longitudinal studies, the data is collected over a stretched period of time whilst cross-sectional research contains collection of information at one point in time (Cohen, Manion, & Morrison, 2013). Descriptive cross-sectional research was used to conduct this study.

3.3 Population

Target population refers to components for which results of a study aims to generalize or all people, organisations or elements that one wishes to understand (Moffat, 2015). In this study, the target population was 63 firms listed at the NSE (Appendix I).

3.4 Sample Design

The best practice in research is to target the biggest sample likely, a larger sample provides a large representation of the outcome, but smaller size samples provide less specific findings as they are not representative of the population (Moffat, 2015). In this case, convenience sampling was used to select stocks listed at NSE in the period 2013-2018 due to the proximity and accessibility of the data to the researcher (Farrokhi & Mahmoudi-Hamidabad, 2012).

3.5 Data Collection

Data collection is defined as the procedure of measuring and gathering data on variables of a study in a systematic way that allows one to answer questions, test hypothesis, and evaluate outcomes (Rahi, 2017). The study utilized secondary data which refers to data gathered by others, not precisely for the research questions at present (Cowton, 1998). This data was acquired from the NSE website and financial statements of NSE listed organizations and tabulated into a data entry sheet covering the period from 2013 – 2018. A data entry sheet (Appendix II) was used to collect the average scores for each of the variables for the 5 year period under study.

3.6 Diagnostic Tests

There are several diagnostic tests that the study conducted to confirm the reliability and validity of the data. These are autocorrelations, heteroscedasticity, normality, multicollinearity, and stationarity. ANOVA and linear regression statistics assume that the errors of the models used in the analysis are independent of one another and that there is no autocorrelation. The Durbin-Watson (DW) statistic is the most adopted measure for autocorrelation of a first order in regression analysis.

In order to check for heteroscedasticity, the study conducted the Breusch-Pagan (BP) for heteroscedasticity test where a significance level of over 0.05 is considered as evidence of no heteroscedasticity problem in the data from the results of the ANOVA. The rule of thumb in interpreting heteroscedasticity is that when a clear pattern exists, there is a heteroscedasticity problem and when there is no pattern, it means that there is no heteroscedasticity problem in the data. The study also conducted graphical tests using scatterplot to check for heteroscedasticity.

Normality can be assessed using two common approaches, these are graphical and numerical (statistical) tests. The study used statistical methods of normality and the most popular statistical tests are Shapiro–Wilk and the Kolmogorov–Smirnov tests. In this study, the Kolmogorov–Smirnov test was used as it is more suitable for samples > 50 and continuous data. In this study, Tolerance and Variance Inflation Factor (VIF) were used to determine whether there were multicollinearity issues in the data.

The tolerance point is the $1\text{-}R^2$ value when each explanatory variables is regressed on other explanatory variables whose low tolerance levels display excessive points of multicollinearity. The VIF is utilized as an indicator of multicollinearity and is described as the mutuality of tolerance. The rule of thumb is to have low points of VIF, as high points of VIF are recognized to adversely influence the result linked with a multiple regression analyses. VIF values of over 5.0 and tolerance levels below 0.40 start to show relatively high points of multicollinearity (Belsley, Kuh, & Welsch, 2004).

3.7 Data Analysis

Data analysis refers to a closely related process that involves summarizing the gathered information and consolidating it in such an approach that yields answers to the questions (Ibrahim, 2015). The data was collected using a data entry sheet after which this was used to tabulate data for each variable before being entered into a statistical software for analysis. Data analysis was done using the Statistical Package for the Social Sciences (SPSS) Version 22.

The first step of analysis was conducting descriptive statistical analysis aiming to summarize the data to make it easy to observe any trends occurring in the data. These descriptive statistics were mean, standard deviations, skewness, and kurtosis. The next phase of the analysis involved checking the data for any issues, as mentioned earlier, some diagnostic tests were conducted to determine validity of the data before conducting inferential analysis. The Pearson (*r*) correlation was done to determine associations between trading activity and stock return volatility. Multiple regression analysis was conducted to estimate the effect of trading activity indicators on stock return volatility while Hierarchical Multiple Regression (HMR) was done to include control variables in the analysis. Multiple regression analysis was done to determine the influence of the explanatory variables on the response variable at 95 % confidence level. The proposed regression model is thus.

$$\mathbf{Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + X_p + X_i + \varepsilon}$$

Where:

Y = Stock return volatility

α = Constant

β_1, β_2, β_3 = Coefficients

$\mathbf{X_1}$ = Trading Volume

$\mathbf{X_2}$ = Trade Size

$\mathbf{X_p}$ = Debt to equity ratio

$\mathbf{X_i}$ = Return on Equity

$\boldsymbol{\varepsilon}$ = Error term

Table 3.1: Variable Measurement

Variable	Measurement
Stock return volatility	Stock return volatility was measured using annual stock return's standard deviation
Trading Volume	Calculated by the log of number of shares bought and sold in the course of trading hours
Trade Size	The number of shares bought or sold multiplied by the closing price at market close that was standardized by calculating the logarithm.
DER	Calculated by dividing the company's gross loans (including bank overdrafts) by its shareholder's equity.
ROE	Net profit divided by the net asset value (Total assets less total liabilities)

CHAPTER FOUR: DATA ANALYSIS, RESULTS, AND DISCUSSION

4.1 Introduction

This chapter presents the findings of the study where findings are presented, interpreted, and discussed. The chapter is outlined in sections that consist of the study's response rate, diagnostic tests undertaken, descriptive statistics for each of the study variables, correlation analysis, regression analysis, and discussion of the findings.

4.2 Diagnostic Tests

There were several diagnostic tests that were undertaken to ensure that the data met the criteria for conducting multiple regression analysis. These included normality tests, Heteroscedasticity test, and multicollinearity test.

4.2.1 Normality Tests

The rule of thumb in interpreting normality tests is that a p-value that is greater than 0.05 suggests that there is normal distribution while a p-value less than 0.05 indicates non-normal distribution of data. Table 4.1 indicates that there existed normal distribution in the data as shown by *p* values for the normality tests were both greater than 0.05.

Table 4.1: Tests of Normality

	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	df	Sig.	Statistic	df	Sig.
Stock Return Volatility	.140	57	.057	.754	57	.061

a. Lilliefors Significance Correction

4.2.2 Heteroscedasticity Test

Table 4.2 displays the results of the Breusch-Pagan and Koenker Tests which were conducted to determine whether there were any homoscedasticity issues in the data. The results indicate that significance for the Breusch-Pagan was > 0.05 which means that there were no homoscedasticity problems in the data.

Table 4.2: Breusch-Pagan / Cook-Weisberg test for heteroscedasticity

chi2(1)	=	1.59
Prob > chi2	=	0.2078

Null hypothesis: heteroscedasticity not present (homoscedasticity).
If sig-value less than 0.05, reject the null hypothesis

The study also conducted a graphical test to determine the presence of homoscedasticity in the data where Figure 4.1 which confirms that there were no homoscedasticity problems as there was no observable pattern on the scatterplot which is the rule of thumb in interpreting heteroscedasticity.

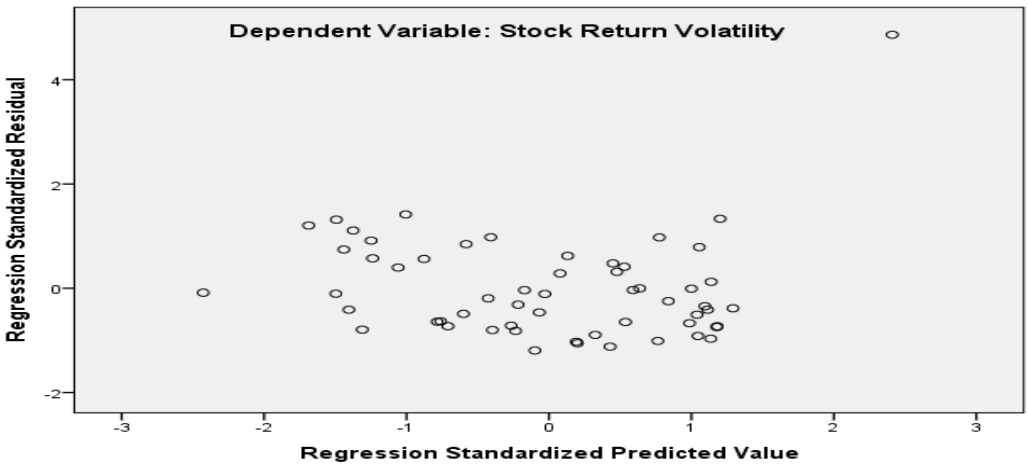


Figure 4.1: Heteroscedasticity Test Scatterplot

4.2.3 Multicollinearity Test

A multicollinearity test was performed on the data and the results are summarized in Table 4.4 and Table 4.3. The tolerance values for trading volume and trade size are 0.975 and the VIF values are 1.026. The rule of thumb is that tolerance values of less than 0.2 and VIF values greater than 10 indicate that multicollinearity is problematic. This means that there are no multicollinearity issues in the data since the tolerance and VIF values meet this threshold.

Table 4.3: Tolerance and VIF Statistics

Variable	Tolerance	VIF
Trade size	0.975	1.026
Trading volume	0.975	1.026

a Dependent Variable: Stock Return Volatility

Table 4.4 shows the collinearity diagnostics results where we interpret the condition index values which are less than 15 to indicate any collinearity in the data as Kennedy (2003) suggested that any index greater than 30 indicates strong collinearity and values greater than 15 may indicate a problem that warrants a closer look.

Table 4.4: Collinearity Diagnostics [a]

Dimension	Eigenvalue	Condition Index	Variance Proportions		
			(Constant)	Trading Volume	Trade Size
1	2.116	1.000	.01	.04	.01
2	.872	1.557	.00	.94	.00
3	.012	13.255	.99	.02	.99

a. Dependent Variable: Stock Return Volatility

4.3 Descriptive Statistics

Table 4.5 shows the summary statistics of the variables where the number of observations, mean, standard deviation, and the minimum and maximum values are presented. These statistics indicated that trading volume had an average of 0.7512 and standard deviation of 2.8532. The average trading size was 199.169 with a standard deviation of 31.7877. Stock return volatility during the period under investigation averaged 0.1722. The company size variable of Debt to Equity ratio had a mean average of 1.5527 and firm performance measured by Return on Equity averaged 0.1298 for the period under study.

Table 4.5: Summary Statistics

Variable	N	Minimum	Maximum	Mean	Std. Dev.
Trading Volume	285	-6.65	6.87	0.7512	2.8532
Trade Size	285	134.97	257.64	199.169	31.7877
Stock Return Volatility	285	-1.26	6.57	0.1722	1.16507
Debt to Equity Ratio	285	0.05	14.18	1.5527	2.48101
Return on Equity	285	-1.11	0.51	0.1298	0.20202

4.4 Regression Analysis

A linear multiple regression was done to determine the effects of trading activity on stock return volatility. Table 4.6 presents the results of the model summary which indicates the coefficient of determination values and the adjusted R^2 values and the change statistics when the control variables are introduced which are used to explain the level of variation explained by the independent variables even after introduction of the control variables.

Table 4.6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.053[a]	0.003	-0.034	1.18476	0.003	0.077	2	282	0.926
2	.373[b]	0.139	0.073	1.12171	0.136	4.12	2	284	0.022

a Predictors: (Constant), Return on Equity , Debt to Equity Ratio
b Predictors: (Constant), Return on Equity , Debt to Equity Ratio, Trading Volume , Trade Size
c Dependent Variable: Stock Return Volatility

Table 4.7 indicates the coefficient of determination (R^2) is 0.003 which means that trade size and trading volume explains only 0.3 % variation in stock return volatility. Model 2, the R^2 increases to 0.139 which explains 13.9 % of variation in stock return volatility. The finding means that DER and ROE accounted for an extra 13.6 % of variation in stock return volatility.

Table 4.7 shows the ANOVA results which indicate the F-statistics and P-values which suggest the significance of a model.

Table 4.7: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10.138	2	5.069	4.155	.021[b]
	Residual	65.876	282	1.22		
	Total	76.014	284			

a Dependent Variable: Stock Return Volatility
b Predictors: (Constant), Trade Size , Trading Volume

The ANOVA results indicate a positive F statistic of 4.155 and a significance level of 0.021 which is less than 0.05 which means that the model is statistically significant in explaining the effects of trading volume and trade size on stock return volatility.

Table 4.8: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.181	0.943		2.314	0.025
	Trading Volume	0.113	0.052	0.276	2.154	0.036
	Trade Size	-0.011	0.005	-0.287	-2.235	0.030

a Dependent Variable: Stock Return Volatility

The regression coefficient results indicate that a unit increase in trading volume resulted in a 0.113 increase in stock return volatility and this was statistically significant ($p = 0.036$). A unit increase in trade size resulted in a – 0.011 decrease in stock return volatility and this was statistically significant ($p = 0.030$) and the regression equation thus becomes.

$$Y = 2.181 + 0.113 + - 0.011 + \varepsilon$$

4.5 Discussion of Research Findings

The multiple regression analysis indicated that trading activity explained 10.1 % of variation in stock return volatility and the model was statistically significant with a positive F statistic ($F(2,284) = 4.155$, $p = < 0.05$). This finding corroborates Gworo's (2012) study on the effect

of trade volume changes on stock prices volatility in Kenya among 14 companies listed at the NSE 20 share index in 2011 which found a weak coefficient of determination (R^2) statistic between volatility of share prices and traded volume of the companies at the NSE suggesting that trading volume had a small impact on stock return volatility at the NSE.

An examination of the regression coefficients revealed that a unit increase in trading volume resulted in a 0.113 increase in stock return volatility and this was significant ($p = < 0.05$). This finding agrees with other studies that confirmed positive effects of trading volume on stock return volatility. Belhaj et al (2015) study confirmed a positive and strong association concurrent association between unconditional price volatility and trading volume.

The findings also agree with Al Samman and Al-Jafari (2015) study which revealed a positive impact on return volatility from trading volume. In contrast, this findings disagree with past studies such as Batta's (2014) study on the relationship between trading volume and stock return volatility among the NSE 20-share index companies of the which established that trading volume was not statistically significant indicating a weak association between volatility of stock returns and trading volume.

The findings indicate that there was increased trading volume at the NSE under the study period which resulted in increased stock return volatility and this can be attributed to overconfidence of investors. This finding goes against the modern portfolio theory assumptions that an investor is rational (they aim to minimize risk while maximizing results); that investors are ready to accept a higher amount of risk if they are rewarded by higher expected returns; that an investor receives all critical information related to their decisions of investments on time; that an investor can lend or borrow an infinite size of capital at a risk free

rate of interest; that markets are perfectly efficient and markets do not have transaction taxes or costs and an investor is likely to choose securities whose single performance is free from other portfolio investments (Mangram, 2013).

In reference to trade size, the regression coefficients indicate that a unit increase in trade size resulted in a 0.011 decrease in stock return volatility and thus was statistically significant (p = < 0.05). This finding agrees with Chebbi and Jebnoun's (2016) estimation of return volatility using daily number of trades and volatility of stock prices in a sample of 48 companies in the Tunisian Stock Exchange (BVMT) in the 2015 financial year which found that price volatility decreased as trade size increases. However, the finding goes against other study findings which concluded that trade size did not have any effect on stock return volatility. Song et al. (2005) did not find any associations between volatility and trading activity.

The results of effects of trade size on stock return volatility suggest that investors made average trade sizes that were neither too big nor too small when trading day stocks. A bigger trade size exhibits greater concern for stock return volatility. This finding supports the prospect theory which assumes that decisions of investment in a financial market are made rationally among investors. The theory is relevant as the decisions by investors have an effect on trading activity and are also based on the return volatility of the market and their decision making on whether or not to invest in particular stocks is based on the performance of the stock in the financial market.

This finding supports the assumption of the Efficient Market Hypothesis that a market is efficient if it does not experience any significant volatility and this has an impact on the investment portfolio of an individual or corporate investor into the financial market. The theory

is useful to this study as it assumes that the information on the stock market is available to the public and the volatility information is useful to investors in making informed decisions on their investment portfolio.

The study also aimed at establishing the effect of control variables on the relationship between trading activity and stock return volatility at the NSE during the period 2013 – 2018. The results revealed that DER and ROE accounted for an extra 13.6 % of variation in stock return volatility but this effect was by chance and does not suggest that Debt to Equity Ratio and Return on Equity did not enhance the ability to predict stock return volatility. The findings go against previous studies which indicated that DER and ROE affected stock return volatility. For example, Handayani et al. (2013) studied the determinants of the stock price volatility in the Indonesian manufacturing sector and found that company's stock price volatility was explained by ROE and DER. This finding suggests that financial performance of the firm and size of the company did not have a statistically significant effect on stock return volatility in the 2013 – 2018 period.

CHAPTER FIVE: SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusion and recommendations of the study, which are presented in line with the research objectives of the study. The chapter also contains the limitations of the study and makes suggestions for future research.

5.2 Summary of Findings

The study aimed to determine the influence of trading activity on stock returns volatility at the NSE from 2013 – 2018. The trading activity variable was measured by trading volume and trade size. The correlation results indicated that there was a positive but insignificant association between trading volume and stock return volatility. A negative but significant association was observed between trade size and stock return volatility. The regression analysis revealed that trading activity had a statistically significant effect on stock return volatility which was statistically significant. The multiple regression coefficients indicated that an increase in trading volume contributed to a 0.113 increase in stock return volatility and this was positive. However, an increase in trade size resulted in a - 0.011 decrease in stock return volatility. An increasing stock return volatility exhibits a declining market whilst a decreasing stock return volatility manifests a growing market.

5.3 Conclusion

The first objective of the study was to determine the effect of trading volume on stock return volatility. The findings indicated that an increase in trading volume resulted in an increase in stock return volatility. The study therefore concludes that an increase in trading volume at the

NSE results in increased stock return volatility. The second finding revealed that an increase in trade size resulted in a decrease in stock return volatility and the study thus concludes that increase in trade size at the NSE results in reduced stock return volatility. The study concludes that debt to equity ratio and return on equity have an effect on the relationship between trading activity and stock return volatility.

5.4 Recommendations

The study makes the following recommendations based on the study findings. First, the study recommends that the CMA, NSE and policy makers in the financial markets should urge stock brokers at the NSE to advice their clients against being overconfident when trading in stocks. Secondly, it is this study's recommendation that the CMA the NSE should create more knowledge and awareness on trade size among individual and institutional investors to encourage them make large trade sizes in the financial markets which will reduce the amount of volatility experienced at the NSE which in turn reduces the risk of investing at the NSE.

5.5 Limitations of the Study

There were several limitations that were experienced in the course of the study. One of the limitations was the five-year period under investigation which meant that fewer observations were included in the study and some significant periods in the economy were not covered in the study. Second, there were also firms that were suspended during the study period and this reduced the number of firms under investigation.

5.6 Suggestions for Further Research

The study examined effects of trading activity on stock return volatility for stocks listed at the NSE from 2013 – 2018. The study recommends for future research to include a larger time period for investigation. The study also recommends for future research to examine the relationship between trading activity and stock return volatility for industry specific data.

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APPENDICES

APPENDIX I: STOCKS LISTED AT THE NSE

S/No.	Company	Sector
1	B O C Kenya	Basic Materials
2	Carbacid Investments	Basic Materials
3	Crown Paints Kenya	Basic Materials
4	Flame Tree Group Holdings	Basic Materials
5	BAT Kenya	Consumer Goods
6	Eaagads	Consumer Goods
7	East African Breweries	Consumer Goods
8	Eveready East Africa	Consumer Goods
9	Kakuzi	Consumer Goods
10	Kapchorua Tea Kenya	Consumer Goods
11	Kenya Orchards	Consumer Goods
12	Limuru Tea	Consumer Goods
13	Mumias Sugar Co	Consumer Goods
14	Sameer Africa	Consumer Goods
15	Sasini	Consumer Goods
16	Unga Group	Consumer Goods
17	Williamson Tea Kenya	Consumer Goods
18	Car & General (K)	Consumer Services
19	Deacons (East Africa)	Consumer Services
20	Express Kenya	Consumer Services
21	Kenya Airways	Consumer Services
22	Longhorn Publishers	Consumer Services
23	Nairobi Business Ventures	Consumer Services
24	Nation Media Group	Consumer Services
25	Standard Group	Consumer Services
26	TPS Eastern Africa	Consumer Services
27	Uchumi Supermarkets	Consumer Services
28	WPP Scangroup	Consumer Services
29	Barclays Bank of Kenya	Financials
30	BK Group	Financials
31	Britam (Kenya)	Financials
32	Centum Investment	Financials
33	CIC Insurance Group	Financials
34	Co-operative Bank of Kenya	Financials
35	Diamond Trust Bank Kenya	Financials
36	Equity Group Holdings	Financials
37	HF Group	Financials

38	Home Afrika	Financials
39	I&M Holdings	Financials
40	Jubilee Holdings	Financials
41	KCB Group	Financials
42	Kenya Re-Insurance Corporation	Financials
43	Kurwitu Ventures	Financials
44	Liberty Kenya Holdings	Financials
45	Nairobi Securities Exchange	Financials
46	National Bank of Kenya	Financials
47	NIC Group	Financials
48	Sanlam Kenya	Financials
49	Stanbic Holdings	Financials
50	Standard Chartered Bank Kenya	Financials
51	Stanlib Fahari I-REIT	Financials
52	ARM Cement	Industrials
53	Bamburi Cement	Industrials
54	East African Cables	Industrials
55	East African Portland Cement	Industrials
56	Olympia Capital Holdings	Industrials
57	TransCentury	Industrials
58	KenolKobil	Oil & Gas
59	Total Kenya	Oil & Gas
60	Safaricom	Telecommunications
61	KenGen Company	Utilities
62	Kenya Power & Lighting	Utilities
63	Umeme	Utilities

APPENDIX II: DATA ENTRY SHEET

S/No.	Company	Trading Volume	Trade Size	DER	ROE	Stock Return Volatility
1	B O C Kenya					
2	Carbacid Investments					
3	Crown Paints Kenya					
4	Flame Tree Group Holdings					
5	BAT Kenya					
6	Eaagads					
7	East African Breweries					
8	Eveready East Africa					
9	Kakuzi					
10	Kapchorua Tea Kenya					
11	Kenya Orchards					
12	Limuru Tea					
13	Mumias Sugar Co					
14	Sameer Africa					
15	Sasini					
16	Unga Group					
17	Williamson Tea Kenya					
18	Car & General (K)					
19	Deacons (East Africa)					
20	Express Kenya					
21	Kenya Airways					
22	Longhorn Publishers					
23	Nairobi Business Ventures					
24	Nation Media Group					
25	Standard Group					
26	TPS Eastern Africa					

27	Uchumi Supermarkets					
28	WPP Scangroup					
29	Barclays Bank of Kenya					
30	BK Group					
31	Britam (Kenya)					
32	Centum Investment					
33	CIC Insurance Group					
34	Co-operative Bank of Kenya					
35	Diamond Trust Bank Kenya					
36	Equity Group Holdings					
37	HF Group					
38	Home Afrika					
39	I&M Holdings					
40	Jubilee Holdings					
41	KCB Group					
42	Kenya Re-Insurance Corporation					
43	Kurwitu Ventures					
44	Liberty Kenya Holdings					
45	Nairobi Securities Exchange					
46	National Bank of Kenya					
47	NIC Group					
48	Sanlam Kenya					
49	Stanbic Holdings					
50	Standard Chartered Bank Kenya					
51	Stanlib Fahari I-REIT					
52	ARM Cement					
53	Bamburi Cement					
54	East African Cables					
55	East African Portland Cement					

56	Olympia Capital Holdings					
57	TransCentury					
58	KenolKobil					
59	Total Kenya					
60	Safaricom					
61	KenGen Company					
62	Kenya Power & Lighting					
63	Umeme					