THE RELATIONSHIP BETWEEN TRADING VOLUME AND STOCK PRICES OF FIRMS QUOTED AT THE NAIROBI SECURITIES EXCHANGE

BY

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DECLARATION

I declare that this project is my own original work and has not been submitted for an award of degree in any University.

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This research project has been submitted for examination with my approval as the University supervisor.

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DEDICATION

To my dad and mum who instilled in me the importance of education and hard work.

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God bless you all.

ABSTRACT

This study intended to examine the dynamic relationship between stock prices and trading volume of firms listed at the NSE. In addition, the study reveals the nature and direction of this relationship. Trading volume is measure of the quantity of securities that change owners' hands in any given trading day at the Securities Exchange. Stock price represents the most recent price at which the stock last traded. The higher the volume the higher is the level of interest in the security at its prevailing price.

The research design used was a correlation study and the population comprised of all the 58 firms listed at the NSE by December 31, 2012. The study covered the period 1st January, 2008 to 31st December, 2012. Secondary data for the period was collected from Mystocks, a company that does Real-time data streaming for NSE. The data for the population was first analyzed at the segmental level and thereafter for the combined 58 firms. Trading volume was measured by the weekly averages of the traded volumes and the stock returns by the weekly average percentage change in price. A regression model proposed by Lee and Rui (2002) was used to carry out the analysis in order to establish if a contemporaneous relationship exist between trading volume and stock prices.

The overall coefficients of R^2 and adjusted R^2 were below 0.5 indicating that major variations of stock prices and trading volume were explained by other factors as opposed to the relationship between the two variables. It was concluded that a weak correlation exists between trading volume and stock prices of firms listed at the NSE as the overall coefficient of Correlation R was also below 0.5.

The study recommended that it will be wise for financial managers, investment advisors and other policy makers to ensure that they pay very close attention to other factors especially fundamental, technical as well as prevailing market sentiments before making investment decisions. This would help to minimize poor investment decisions occasioned by mere observation of the movements in stock prices and trading volume of firms listed at the NSE.

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LIST OF ABBREVIATIONS

CMA	Capital Markets Authority
DJIA	Dow Jones Industrial Average
DJTI	Dow Jones Transportation Indexes
EABL	East Africa Breweries Ltd
EMH	Efficient Market Hypothesis
KBA	Kenya Bankers Association
MDH	Mixture of Distribution Hypothesis
NASI	NSE All Share Index
NSE	Nairobi Securities Exchange
NYSE	New York Stock Exchange
USA	United States of America
UK	United Kingdom
RBA	Retirement Benefits Authority
SIAH	Sequential Information Arrival Hypothesis
S&P	Standard & Poor
SPSS	Statistical Package of Social Sciences

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Today information efficient financial markets play a very crucial role in any country's economic modernization because these markets have far reaching implication on macro-economic stability and financial performance. Therefore, it is in the interest of the economy to achieve efficiency in the dynamics of the stock markets (Stefano et al., 2006). Two of the important dynamics in the stock market is the trading volume and price and the entire stock market revolves around them. A change in price is normally interpreted as an evaluation of new information, while trading volume is used to indicate the level with which investors agree or disagree with the new information (Mestal et al., 2003). Furthermore, it is important to note that stock prices are usually noisy and cannot convey all the available information to the market dynamics of stock prices and trading volume. Therefore, to have a proper understanding of the microstructure of the stock market it is essential to undertake a joint study of the dynamics of stock prices and trading volume.

In an ideal stock market, the arrival of new information causes investors to adapt expectations and this is seen as the main source for price and return fluctuation. However, since investors are heterogeneous in their interpretations of new information, stock returns may remain the same even though new information is revealed to the market. This will be a special case when some investors interpret it as good news while others perceive it to be bad news. Changes in prices therefore reflect the average reaction of investors to news. In many instances stock returns only change if there is a positive trading volume (Camille & Silvo, 2005).

Saatccioglu and Starks (1998) observed that just as it is with the return, trading volume and volume changes mainly reflect the available set of relevant information on the market. Unlike what is observed with stock price and return, any revision in investors' expectations will always lead to a change in trading volume which therefore helps to sum

up investors' reaction to news. Numerous studies have reported a significant relationship between trading volume and stock prices because trading volume is a source of risk occasioned by the flow of information.

Many studies have been conducted worldwide on different stock markets, especially in the USA, to investigate the relationship between stock prices and trading volume. Karpoff (1987) summarizes the significance of understanding this relationship as follows. First, it assists in predicting the volume-price/return relation that rely on the level of information and the extent to which price-volume convey the information. Secondly, price-volume relation is important for event studies that use a combination of price and volume data to make inferences. Third, price-volume relationship is of fundamental importance in the debate over the empirical distribution of speculative returns. And finally, price-volume relationship has significant implications for research into futures markets.

Lee and Rui (2002) also acknowledge that there are many reasons why traders pay close attention to the trading volume. They observed that a lower volume implies that the market is illiquid; which also results in high price fluctuation. On the other hand, a higher volume indicates that the market is highly liquid, resulting in low price variability. The implication of this is that with an increase in volume, a market broker's revenue will increase and therefore, market makers will have a greater opportunity of profiting out of the increased turnover.

Numerous tests have been performed by different researchers to establish if indeed a relationship exists between trading volume and stock prices. Osborne (1959) modeled stock price changes using diffusion process also known as the Brownian motion and established that prices had a variance dependent on the quantity of transactions made in the market over that security in that particular day. Many other studies acknowledge the existence of a positive relationship between trading volume and return as measured by the prevailing price levels. The existence of this relationship is observed in stock and

bond markets only, not in futures markets as observed by Karpoff (1987), Kogail (1999) and Chen, Firth and Yu (2004).

Trading volume is a very useful tool in determining the level of discrepancy that exists with the arrival of new information which is reflected in the changes of the stock price. Anything that causes investors to act can be regarded as information, whether truly or not has any fundamental influence on the underlying valuation of a firm. For instance, a study undertaken by the University of Michigan established that in the absence of clear financial information, investors' decisions are swayed by the aesthetics of financial report (Chordia & Ravi, 2001). Indeed, it is doubtful whether any significant correlation exists between the aesthetics of a firm's report and its future earnings yet the study concluded that some investors attribute value to an organization which produces a colourful report.

In as much as a price might be efficient at the time of transacting a trade, future inference of that price to future trading behaviour should be interpreted with caution (Camilleri & Silvo, 2005). For instance, trading effects have to be considered when analyzing stock market data not only because they induce specific characteristics in price series, but also because they might lead to false inferences regarding market efficiency and related issues such as the ability of a few key investors to manipulate trading volumes and the stock prices. Furthermore, emerging stock markets trade for a short time and there is a time lag in factoring in new information that may occur between trading sessions. For instance, trading at the NSE takes place between 10.30am to 3pm.Whereas new information may be disseminated after the close of a trading session; traders are not able to act on this information instantaneously (The standard, 2012).

1.1.1 Trading Volume

Karpoff (1987) defines trading volume as the quantity of shares that change owners for a given security. It measures the number of trades that take place for a given security at its prevailing price in securities exchange market. Trading volume is a very useful tool when carrying out technical analysis in which volume is used to establish the strength of a market indicator. The amount of daily trading volume of a security can fluctuate on any

given day depending on the amount of new information available about a given company (Bloomberg, 2012). This information can be a press release, a regular earnings announcement provided by the company or a third party communication such as an awaited court ruling or an information release by a regulatory agency such as Capital Markets Authority (CMA) about the company. For example, on June 14, 2012 when Kenya Airways announced a drop in its annual profits from Kshs. 3.54billion to kshs.1.66billion its stock price immediately fell by 0.4% while in the subsequent 5 days trading period its trading volume shrank by 7.3% (Bloomberg, 2012).

Baker and Stein (2004) assert that high trading volume reflects the participation of overconfident investors which is caused by high investor sentiment. Subsequently, high investor sentiment can also give rise to different opinions between investors with rational expectations on asset prices and investors with distorted asset valuations. For instance, if high investor sentiment leads to higher level of speculative demand, as suggested by Llorente et al. (2002), the model would then suggest a positive relationship between investor sentiment and trading volume.

1.1.2 Stock Prices

The most keenly watched statistic of a stock market is the stock price. The stock price as contemplated in this study represents the market price of a stock. This represents the most recent price at which the stock last traded. According to Ying (1966) stock prices are set by a combination of factors which in general reflect the long-term earnings potential of companies. Wurgler (2000) observes that investors are attracted to stocks of companies they expect to earn substantial profits in the future because there is general expectation of a price increase in such stocks. On the other hand, companies that portray a bleak future such as a possibility of profit decline will have investors shying away from investment hence a subsequent decline in stock price.

When choosing whether to sell or purchase stocks, investors consider the general business climate, the financial condition and future prospects of individual firms in which they are considering to invest, and whether stock prices relative to earnings are already

below or above their expectations. Interest rates are also known to affect stock prices; partly because they foreshadow a general slowdown in economic activity. Corporate profits also do lure investors out of the stock market for new issues of interest bearing investments (Baker & Stein, 2004). In addition, momentum can also distort stock prices. Rising prices naturally woo more buyers into the market and the increased demand, in turn pushes these prices even higher. More upward pressure is often added by speculators who buy prevailing securities in the expectation of selling to other buyers at higher prices. A market scenario where there is continuous rise in stock prices is referred to as a "bull'' market. On the other hand, when speculative fever can no longer be sustained, prices decline and investors become worried about falling prices thereby rushing to sell their shares is referred to as the "bear" market (Berk, Demarzo & Harford, 2011).

1.1.3 Effect of Trading Volume on Stock Prices

The conventional wisdom on Wall Street according to Stickel and Verrecchia (1994) is that "volume is the fuel for stock prices" But the extent to which trading volume influences subsequent price changes is still unclear to researchers. However, there is a general consensus that price changes are more likely to reverse following a weak volume support than a strong volume support. This is because price changes reflect the prevailing demand level for a stock and a higher volume indicates a greater likelihood that demand originates from informed rather uninformed trade (Stickel & Verrecchia, 1994). When volume increases, the probability that a price change is information driven is usually very high. In the market place, there is strong evidence that indicates that large price changes occur on days with weak volume support and reverse at least partially in the following day. The volume effect is reinforced by (though independent) the bid-ask bounce effect.

Karpoff (1987) in his studies of price-volume effects observes that returns do not reverse following days of strong volume support. Whenever we have a strong volume support, a large increase in price is usually followed by another price increase in the following day. Technical analysts are the most concerned persons on the effect that trading volume has on stock prices. They use trading volume as a barometer of the market sentiment. They believe that when a large number of shares are traded then that stock's price is somehow

accurate because it represents a consensus between buyers and sellers (Llorente et al., 2002). Volume is also used in their prediction of trends. The general guidelines that are used to infer the relationship between trading volume and price as observed by Smirlock and Starks (1985) are: One, when prices are rising and volume is also increasing, prices will continue to rise. Two, when prices are increasing while volume decreasing, prices will either increase at a slower rate or start to drop. Three, when prices are falling and volume is increasing, prices will fall further. Four, when prices are dropping and volume is also on decline; then prices will slow down or start to increase. And finally, when volume is flat (neither rising nor falling, it will have no impact on price.

1.1.4 Nairobi Securities Exchange

The dealing in securities in Kenya can be traced back in 1920s when the country was still a British colony. NSE was initially set up as an overseas stock exchange in 1953 based in London. The idea of setting up NSE was muted by Francis Drummond who by then established the first professional stock broking firm. In 1954 NSE was constituted as a voluntary association of stock brokers registered under the societies Act. At that time only the European community was allowed to trade securities. No Africans and Asians were allowed to transact till independence in 1963. From then the NSE operated as an association of stockbrokers with no trading floor until October 1991. The introduction of trading floor led to a substantial increase in trading volumes and an upward movement in various indexes. In February 1994 NSE recorded the highest NSE-share index record and during the same period it was rated by the International Finance Corporation (IFC) as the best performing market in the world with an average return of 179% in dollar terms (NSE, 2012).

The year 1996 saw the largest privatization issue of NSE by Kenya Airways and the adoption of live trading on the automated trading systems. In 2006 a demutualization committee was set to spearhead the process of demutualization of NSE. A review of the companies constituting NSE share index was done in July 2007 with an aim of ensuring that the NSE 20 share index remained a true barometer of the market. In April 2008, the NSE All Share Index (NASI) was introduced as an alternative index. The index was to

become the overall indicator of performance of the market. This index includes all traded shares of the day. Other notable changes at NSE include: automated trading of government bonds (July 2009), reduction of equity settlement cycle from the previous T+4 to T+3 settlement cycle (July 2011), conversion from a company limited by guarantee to a company limited by shares (October 2011) and March 2012 NSE became a member of the financial information Division (NSE, 2012).

In a recent survey by Standard & Poor (S&P), African stock markets, including Kenya's, were among the 10 best performing stock markets in the world in 2012 and the NSE 20 share index gained over 1,700 points in the year since March 2012 (Business Daily, 2013). History shows that the price of shares and other assets are an important part of the dynamics of economic activity and can even indicate the prevailing social mood. For example, rising prices are associated with increased investment and vice versa. The wealth of households and their consumption is affected by share prices (Barry, 2006). To have economic growth money has to shift from less to more productive activities. This means that any idle money and savings should be invested in productive activities of the economy for it to realize growth. The NSE makes this possible by bringing together investors and those who want to tap into available investment opportunities categorized as short term, medium term or long term.

The NSE helps to mobilize domestic savings, thereby reallocating financial resources from dormant to active agents. The stock market is one of the most important platforms from which firms raise funds for either expansion or related strategic initiatives (Anderson, 1996). The liquidity that the exchange provides affords investors the ability to quickly and easily sell their securities. This is what makes it attractive to invest in shares, compared to other relatively less liquid investments such as the real estate.

According to Baker and Wurgler (2000), the stock market enables idle money and savings to become productive by bringing the borrowers and lenders together at a low cost. They lend and invest and expect a profit or a financial reward for their investment. The NSE provides real-time trading information for listed companies that assists in

facilitating price discovery. The stock exchange facilitates the exchange of securities between buyers and sellers thus providing a market place that is virtual or real. Consequently, the establishment of an efficient stock market is therefore indispensable for any economy that is keen on using scarce capital resources to achieve economic growth.

1.2 Research Problem

Considerable attention has been given in finance to understand the relationship between trading volume and stock prices. Price-volume relationship is important because this empirical relationship helps in the understanding of the competing theories of information dissemination in the financial market. Technical analysts strongly believe that "It takes volume to make price move" (Kapoff, 1987). Early studies on price-volume relation suggest that there is a positive relation between the absolute value of a daily price changes and trading volume for both market indices as well as individual stocks (Ying, 1966). Worth noting also is that these early studies merely examined contemporaneous relationships between trading volume and absolute price changes; hence, they may have little relevance on the predictability of future stock prices. In an attempt to understand the power of trading volume in predicting the directions of future price movements; Gervais and Mingelgrin (2001) investigated the role of trading activities in terms of information it contains about future prices. They established that individual stocks whose trading volume usually large (small) over a period of a day or a week, normally tend to experience large (small) returns over the subsequent trading period.

Over the recent period there has been a general rise in trend of the NSE's market capitalization, NSE 20 Share Index and NSE's All Share Index. This reflects the fact that stock prices have been on a rising trend and also the Exchange experiences increased trading activity. However, a close examination of the NSE's trading segments one realizes that increased trading activity is not replicated in all the segments and within these segments only a few stocks are actively traded. In addition, highly priced stocks within the segments attract a lot of trading activity as witnessed with stocks of Nation Media Group Ltd, EABL, Limuru Tea, Standard Chartered Bank and BAT Kenya when

they rose above Kshs.300 mark. Furthermore, companies with brighter future prospects and a general upward trend in stock price level such as Safaricom have had a consistent high trading activity.

A review of literature reveals that studies on price volume relationships have mostly been done in developed markets. For instance, Ying (1966) applied a series of statistical tests to a six-year daily price volume data at the New York Stock Exchange and established a positive correlation between trading volume and price level. Ciner (2000) carried out a similar study at the Tokyo Commodities Futures Markets and established that lagged trading volume has a predictive power for the current price volatility.

Locally, Gacheru (2007) and Karungari (2009) examined trading volume behaviour and its effect on price movements using NSE 20 Share listed firms. Their findings were that there is no significant association between trading volume and security prices. Odhiambo (2012) extended the same research by examining the relationship between trading volume and price volatility of 14 of the NSE 20 Share listed firms. His findings were also consistent with Odhiambo and Karungari that a weak correlation existed between trading volume and price volatility of NSE listed firms. Why is it then that studies conducted in developed market report a positive association while developing markets report no association? Furthermore, it can be generalized that price-volume association does not exist in the listed firms but not across the listed segments because each and every trading segment has distinctive sector characteristics that such price-volume relation would be different. Therefore, this research explores the question is there a relationship between trading volume and stock price of firms listed at the NSE?

1.3 Objective of the Study

To determine the relationship between trading volume and stock prices of firms listed at the NSE.

1.4 Value of the Study

The results of the study would be useful to;

Investment advisors who need insightful information to advice their clients on the economic importance of price -volume correlations and offer solutions to decision makers and regulators on the measures required to enhance efficiency of the NSE.

Financial managers: The behaviour of trading volume and share price movements has obvious implications to managers who prefer equity to debt financing. The rationale is that they need to catch up when the market is high.

Retail and Institutional investors: The study brings out key highlights as far as price volume relationship is concerned and this will be useful to both retail and institutional investors in making investment decisions and choices. In addition, the issue of market efficiency in the operations of the stock market is highly emphasized and it plays a vital role in retail investments, financing and economic development of a country.

Regulators: The study will be of importance to both the government and regulatory bodies such as Capital Markets Authority (CMA), Central Bank of Kenya (CBK), Kenya Bankers Association (KBA) and Retirement Benefit Authority (RBA) among others. The findings of the study will provide useful information for developing optimal decisions. For example the study may be used to formulate policies and regulations that may encourage and protect local and international investors from stock price manipulations.

Academicians and students: The study will provide more information to academicians, students and other interested parties in carrying out further research in the area of price volume relationship and offer substantive solutions to decision makers and regulators on the measures required to improve further the efficiency of the NSE. Furthermore, the study will contribute more knowledge in field of financial economics. The findings will provide an overview of volume -price share movements that may suggest directions for future research.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter discussed the various theories and models that provide explanations regarding the concept of trading volume and stock prices relevant to this study. The chapter is organized in such a way that it began with theoretical framework covering the relevant theories, followed by an empirical review of literature and a summary of literature.

2.2 Theoretical Framework

This section of the chapter covered theories that revolve around the investor's reaction to new information and the sentiments they use to predict the direction of stock price based on the movement of the trading volume.

2.2.1 The Random Walk Hypothesis

The random walk hypothesis posits that there is no difference between the distributions of returns conditional on any information structure thus stock prices changes are independent of one another just as gains and losses in a coin tossing event (Kendall, 1953). When Kendal examined the 22 UK stocks and commodity price series, he concluded that "in series of prices which are observed at fairly close intervals the random changes from one term to the next are so large as to swamp any systematic effect which may be present. The data behave almost like wandering series." In essence, the reason why the security prices follow a random walk is because of the random nature of the news. In that in some days the news is good, while some days the news is bad. You cannot predict specifics of the new information with much accuracy. When the news relevant to a particular stock is good, investors adjust their estimates of future returns upward or they reduce the discount rate they attach to these returns. Therefore, either way the stock price goes up or down depending on the nature of the news. The corresponding reaction to the news is also replicated in traded volumes of the day. When the expected

news is good the volume of trade increases proportionately. Conversely, when bad news is expected, the volume of trade decreases in the same manner as investors become cautious taking positions in the market that would help them to avoid losses (Fama, 1991).

2.2.2 Investor Visibility Hypothesis

Gervars, Kaniel and Mingelgrin (2001) developed investor visibility hypothesis based on the earlier view point of Merton (1987). This hypothesis holds that a high volume return premium caused by short-term volume shocks is as result of increased visibility of a stock. When visibility increases the demand for stock rises and this leads to a rise in price of that stock. In other words, this hypothesis relies on the particular characteristics of an information environment in which due to different information structures, the awareness of a firm's securities may be limited to a subset of the potential investing population. When investors have diverse opinions about the value of a stock, the traders who buy the stock are optimistic about its value and those who take short positions are pessimistic about its value.

In general, the stock's limited visibility among investors means that if the stock gains increased visibility thereby increasing the investor base, there should be a reduction in the cost of capital and a concomitant increase in the firm's market value. This also means the factors that affect a stock's investor base and information environment should be expected to affect the changes in value from increased visibility. What investor visibility means for a stock is that when visibility increases the demand for the stock also increases. The high demand pushes the price of a stock upwards. As the demand increases the level of trading volume for the stock also increases proportionately. Any rise and fall in investor visibility is reflected in the fluctuation of both the trading volume and stock price observed at the Securities Exchange (Gervais & Mingelgrin, 2001).

2.2.3 The Dow Theory

The Dow Theory was developed by Charles Dow (1851-1902), refined by William Hamilton and articulated by Robert Rhea. The theory addresses not only technical

analysis and price action but also the market concept philosophy. Many of the axioms that the Wall Street uses today have their foundation in the Dow Theory. The theory postulates that a stock market is not significant until both Dow Jones Industrial Average (DJIA) and Dow Jones Transportation Indexes (DJTI) reach their new highs or lows together. This means that a major reversal from a bull to a bear market or from a bear to bull market cannot be signaled unless both indexes are in agreement. For instance, if one index is confirming a new primary uptrend but another index remains in a primary downward trend, it is difficult to assume that a new trend has begun. The reason for this is that the movement of the primary trend either up or down indicates the overall direction of the stock market which according to the theory should be a reflection of the business conditions prevailing in the economy. When you see the stock market doing well, it is because the business conditions are good and when the stock market is doing poorly the business conditions are also poor (Stephen, William & Kumar, 1998).

Consequently, the Dow Theory postulates that the main signals for buying and selling will be based on the price movements of both indexes. Volume is also used as a secondary indicator to help confirm what the price movement is portraying. Volume should increase when the price moves in the direction of the trend and a decrease when the price moves in the opposite direction of the trend. For example, in an uptrend, volume should increase when the price rises and fall when price falls. The reason behind this is that an uptrend indicates the strength when volume increases because traders will be more willing to buy an asset in the belief that the upward momentum will continue. Low volume during the corrective periods signals that most traders are not willing to close their positions because the momentum of the primary trend will continue. In summary, the Dow Theory says that once a trend has been confirmed by volume, the majority of money in the market should be moving with the trend and not against it (Stephen, William & Kumar, 1998).

2.3 Empirical Evidence

The relationship between the stock price and the trading volume heavily relies on the concept of financial market efficiency. Financial market efficiency refers to the degree to which prices reflect fundamental values and the speed with which they adjust instantaneously to news. Early empirical examination of the volume-price relationship was performed by Granger and Morgensten (1963) where they established that there was no correlation between absolute price changes and volumes for daily or weekly transaction data for the stock market price index data for the individual stocks.

Ying (1966) carried out a study which applied a series of statistical tests to a six-year daily series of price and volume from 1957-1962 at the New York Stock Exchange (NYSE). He normalized the trading volume by the number of shares outstanding to avoid any biases from issues with larger number of outstanding shares. He also adjusted prices to reflect quarterly dividends. In his findings, he established that a small volume is usually accompanied by a fall in price, a large volume is usually accompanied by a rise in price and that when volume decreases (increases) in five straight days the price will tend to fall (rise) over the next four trading days.

The Mixture of Distributions Hypothesis (MDH) models of Clark (1973) and Epps and Epps (1976) view information as an important variable that impacts on trading volume. They suggest that price change and trading volume bear a positive relationship due to their joint dependence on a common event. The models they came up with involve different explanations for positive relation between current stock return and trading volume. In Clark's model, interpretation of volume as proxy for the speed of information which is regarded as a latent factor, explains the observed positive correlation between the variance of price and trading volume. In this model there is no causal relationship of volume to returns. However, Epps used volume to measure disagreement among traders because traders do revise their reservation prices when the new information arrives.

Copeland (1976), Morse (1980), Jennings, et al., (1981), and Smirlock and Stocks (1985) advanced another popular hypothesis to explain the volume-volatility/absolute return

relationship; Sequential Information Arrival Hypothesis (SIAH). This model suggests a gradual dissemination of information that means a series of intermediate equilibria exists before arrival of the final equilibria. In other words, new information is disseminated sequentially to traders, and traders who are not yet informed can't perfectly infer the presence of informed trading. The sequential arrival of new information to the market generates both trading volume and price movements, with both increasing during the periods characterized by numerous information shocks (Diagler & Wiley, 2006). Thus, whereas the MDH implies only contemporaneous relationship, the SIAH model further suggest a dynamic relationship whereby lagged values of volatility may have the ability to predict current trading volume and vice-versa (Darrat et al., 2003).

A positive relationship between price and volume is widely acknowledged in the financial literature. For instance, Jennings, Starks and Fellingham (1981), also known as JSF's model, extended Copeland's (1976) sequential information arrival model by incorporating real world margin constraints and short selling. The study revealed that short positions are possible but are more costly than long positions. Their argument was that when a previously uninformed investor interprets new information pessimistically, the trading volume that results is less than when the trader is an optimist. This means that volume is relatively higher when price increases than when it decreases. JSF's model has been used to shed light on institutional rules that raise the cost of selling short for explaining the positive correlation between return and volume.

In contrast to Jennings et al, (1981) findings above, Karpoff (1988), Kocagail and Shachmurove (1999), Mcmillen (2002) and Chen, Firth and Yu (2004) carried out studies that covered the futures market and found no significant contemporaneous relationship between return and volume, and thus confirming the symmetry of trading in futures markets. Blume et al. (1994) also carried out a research in this area and established that a contemporaneous relationship between volume and volatility did shed light on information arrival pattern and quality and dispersion of such information.
Karpoff (1987) curiously attempted to find out answers for the two old Wall Street adages that 'it takes volume to make prices move; volume movement causes price

changes and that 'volume is relatively heavy in bull markets and light in bear markets'; price changes cause volume movements. He came up with a simple model of price-volume relationship known as Asymmetric Volume Price Change Hypothesis. The hypothesis showed that price-volume relationship is fundamentally different for positive and negative prices.

Wang (1994) analyzed dynamic relations between volume and returns that were based on a model with information asymmetry. Wang's model showed that volume might provide information about expected returns. A year later he developed a rational expectations model of stock trading in which investors have different concerns pertaining to the underlying value of the stock. The study examined the way in which trading volume relates to private information. They found out that trading volume bears a lot of significance in the lead-lag patterns observed in the stock returns. As an extension of the same study, Chordia and Swaminathan (2000) examined the way trading volume relates to private information flow in the market, and how investor's trading reveals their private information. They also came up with the same findings that trading volume is a significant determinant of the lead-lag patterns observed in the stock returns. This is explained by the non-synchronous trading or low volume portfolio autocorrelations.

In a study to determine how trading volume is linked to the information flow entering the market, Herbert (1995) and Ciner (2002) found that lagged trading volume contains predictive power for the current price volatility. The empirical results provide evidence against a mixture of distributions hypothesis and instead support the sequential information arrival hypothesis. On the other hand, Mestal et al., (2003) and Mishra (2004) all found evidence of unidirectional granger causality from return volatility to volume.

In a study to determine a predictive model for stock price movement at NSE Mwangi (1997) concluded that it was not always possible to develop models that were an accurate prediction of share prices at the NSE. This was mainly attributed to parameters of forecasting models varying over time to reflect changes in the underlying earnings

generation process. However, Kiweu (1997) argues that with proper control over the quality of the data and the use of a large number of data observations, the random walk model can be a good description of successive price returns in the exchange.

The study by Gervais and Mingelgrin (2001) investigated whether trading volume of common stock can be used to predict stock prices. Based on the visibility hypothesis by Miller (1977) they argue that in future the stocks with higher (lower) than normal trading volume will have better (worse) returns than other stocks. The visibility hypothesis laid emphasis not on the trading volume itself but on the visibility observed in the trading volume. In other words, Miller (1977) states 'in theory, high volume does not indicate that stock will rise and merely observing heavy trading volume should not cause anyone to buy. However, if the stock does attract attention and cause more people to look at that stock, some are likely to persuade themselves that the stock should be bought.' This indicates that visibility increases, especially for small firms as their stock price increases. The results of empirical studies done by Gervais et al., (2001) support the visibility theory.

Ciner (2002) studies the information content of trading volume on the Toronto Stock Exchange before and after the move towards electronic trading. His empirical analysis supports more accurate price discovery under electronic trading as opposed to the traditional manual system. The results from both the structural and vector auto-regression models indicate a predictive power of volume for price variability which disappears after full automation. Assogbavi, Schell and Fagnisse (2007) analyze the stock price- volume relationship of individual equities in the Russian Stock Exchange. They employed a Vector Auto-Regression analysis on weekly individual equity data on the Russian Stock Exchange. Their findings show a strong evidence of the bi-directional causality, indicating that stock price changes adjust to the lagged price changes over the same time period.

Gacheru (2007) carried out a study on trading volume behaviour and its effects on price movements at the NSE. His sample included companies that constituted the NSE 20 share index. He used Value weighted average prices (VWAP) to construct the weekly volumes data. The sensitivity of stock prices to trading volumes was derived by computing the percentage change in trading volumes. A correlation coefficient was used to determine the association between trading volume and security prices. The study revealed that there is no significant association between trading volume and prices of firms listed at the NSE.

Similarly, Sabri (2008) investigates the impact of trading volume on stock price volatility in eight Arab stock markets, including the Amman Stock exchange. His sample included four oil Arab states and four non-oil Arab states. Sabri's findings indicate that volume volatility represents the most predicted variable of increasing price volatility and that both volume and prices are integrated with each other. He also later examined the relationship between the abnormal change in trading volume of both the individual stocks and portfolios and short-term price auto-regressive behaviour in the Saudi Stock Market. In this study he was evaluating whether the abnormal change in the lagged, contemporaneous and lead turnovers affect serial correlation in the returns. His findings show a reversal in weekly stock returns when conditioned on the change in the lagged volume.

Karungari (2009) sought to establish the empirical relationship between trading volumes and returns volatility at the NSE. She used the 20 companies comprising of the NSE 20 share index and carried out a regression and correlation analysis of a five year data (1998-2002). Her findings showed that there was no relationship between trading volumes and returns volatility of firms quoted at the NSE. Similarly, Odhiambo (2012) examined the relationship between trading volume and price volatility of shares at the NSE. His sample comprised of 14 companies of the NSE 20-share index that traded continuously between the periods January, 2007 to December, 2011. Karl Pearson's correlation coefficient model was used to determine if there is any association between

the two variables. His findings were that there is weak correlation between traded volume and share price volatility of firms quoted at the NSE.

2.4 Summary of Literature Review

The studies reviewed above reveal that information plays a key role in determining the behavior of price-volume relationships. A majority of studies conducted in the developed markets report the existence of a positive correlation between stock prices and trading volume. Mixed reactions are however reported for the emerging markets as far the price-volume relation is concerned. Studies reviewed in developing markets show either a weak or no correlation between stock prices and trading volume. In Kenya, with specific reference to NSE upon which this study is based there is no significant attention that has been laid on segmental behavior of price-volume relationship. This study therefore, seeks to fill this gap by establishing the segmental price-volume relationship that will not only help to give insights for firms trading within those segments but also make overall generalization of NSE price-volume trading behavior.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter highlighted the research methodology used in the study. The research methodology detailed the research design used to achieve the objective stated out earlier in the study. It also discussed the population, data collection method and data analysis used in the study.

3.2 Research Design

The research design used was a correlational study. Mugenda and Mugenda (2003) explain that a correlational research is used to explore the relationship between variables and this was consistent with this study that sought to establish the relationship between trading volume and stock prices.

3.3 Population

The target population comprised of the 10 trading segments with a combined total of 58 firms listed at the NSE as at December 2012 (Appendix 1). The period of study was 5 years spanning from January 2008 to December 2012. This period was considered adequate for establishing if there is any relationship between stock price and trading volume.

3.4 Data Collection

The research was based on secondary data. Therefore, data on trading volume and stock prices was obtained from the Mystocks, a company that does Real-time data streaming for NSE. The study used weekly averages of the traded volumes for the listed firms as categorized in their respective segments. The measure of return was taken as the percentage change in price fluctuation where a weekly average was also obtained for each of the firms listed in their segments. The data obtained for analysis covered the period January, 2008 to December, 2012.

3.5 Data Analysis

Stock prices do react to changes in trading volume so is the trading volume to changes in the stock prices. This technically implies that a causal relationship does exist in either way whereby a change in stock prices might be seen to be dependent on the trading volume and a change in trading volume to be dependent on the stock price.

In order to test this contemporaneous relationship between stock prices and trading volume, the study applied a regression model proposed by Lee and Rui (2002). The model was defined by the use of two equations shown below.

$$R_t = \alpha_0 + \alpha_1 V_t + \alpha_2 V_{t-1} + \alpha_3 R_{t-1} + u_t \quad (1)$$

$$V_t = \beta_0 + \beta_1 R_t + \beta_2 R_{t-1} + \beta_3 V_{t-1} + e_t \quad (2)$$

Where: R_t = Current week's average Stock return (measured by the percentage change in price) at time t.

R_{t-1} =Previous week's average stock return (measured by the percentage change in price) at time t.

V_t= Current week's average traded volume at time t

V_{t-1}= Previous week's average traded volume at time t

α_i and β_i (i=0,...3) are the model parameters

u_t and e_t denote the white noise variables that define other factors that might have influence on price volume relationship.

A test of statistical significance for coefficients of correlation and determination was then carried out using the t-test. The analysis was done using Statistical Package for Social Sciences (SPSS).

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND INTERPRETATIONS

4.1 Introduction

This chapter presented the results of the study. Data used was secondary and it was collected from Mystocks, a company that does Real-time data streaming for NSE. The study covered all firms that actively traded at the NSE throughout the period of the study.

4.2 Findings

Weekly average trading volume and the weekly average percentage change in share prices were used in the analysis. Both the descriptive and inferential analysis of the data is discussed to give a better understanding of the contemporaneous relationship between the two variables being investigated in this research paper. The regression parameters for the equations established in the analysis have been interpreted. The corresponding coefficients of determination and correlation also have been determined on sector basis and the overall findings for all the 58 firms listed at the NSE. A t-test was used to test the significance of the relationship at 5% level of significance.

The analysis obtained from the research findings was as follows:

4.2.1 Agricultural Sector

Table 4.2.1.1: Descriptive statistics for Stock Returns and Trading Volume

	Return	Volume
Mean	0.1884	8923
Median	0	1230
Maximum	8.06	212380
Minimum	-5.01	0
Std. Dev.	3.722	21587
Skewness	0.890835	5.093897
Kurtosis	13.79777	33.71304
Observations	1820	1820

Source: Research Findings

Table 4.2.1.1 displays descriptive statistics to include the mean, median, maximum, minimum, standard deviation, skewness and kurtosis. It is clear that the return mean is positive with relatively high volatility around the mean. The return series was skewed to the right and the kurtosis was higher than 3 reflecting a leptokurtic profile. On the other hand, trading volume has much less volatility around the mean. Moreover, trading volume is also right skewed with a kurtosis much higher than 3 reflecting leptokurtic profile.

Table 4.2.1.2: Regression Results for Model (1)

$$R_t = \alpha_0 + \alpha_1 V_t + \alpha_2 V_{t-1} + \alpha_3 R_{t-1} + u_t$$

	Constant	Vt	Vt-1	Rt-1	R-Square	Adj. R-Square	R
Coefficient	0.126	0.000881	0.0001334	0.013*			
Std. Error	0.222	0.000	0.000	0.194			
t-Statistic	0.569	0.899	-0.146	1.469	0.222	0.216	0.471
P-Value	0.570	0.369	0.884	0.005			

Source: Research Findings

Dependent variable: return. Independent variables: trading volume and one lagged period (trading volume and return).

*Significant at the 0.05 level (two tailed)

Table 4.2.1.2 displays regression results for equation in model 1. It can be observed that all the regression coefficients are positive but not significant except for the lagged return (Rt-1) that is significant at 5% level. Since the parameter for α_1 is not significant confirms that in the regression analysis conducted there is no contemporaneous relationship between the stock returns and the trading volume. There is also no evidence of lagged relationship between returns and trading volume as shown by the parameter α_2 that is not significant. However, the positive and significant α_3 reflects a lagged relationship between the current returns and lagged returns.

In the findings given R squared (0.222) indicates that 22.2% of the variation in the stock returns is accounted for by trading volume and the lagged stock returns. The other 77.8% is explained for by the presence of other factors. The lower adjusted R squared (0.216) confirms the less dependency of stock return in variation in trading volume. On overall the correlation coefficient R (0.471) shows a weak correlation exists between trading volume and stock returns when stock returns are held as dependent variable in the sector.

Table 4.2.1.3: Regression Results for Model (2)

$$V_t = \beta_0 + \beta_1 R_t + \beta_2 R_{t-1} + \beta_3 V_{t-1} + e_t$$

	Constant	Rt	Rt-1	Vt-1	R-Square	Adj. R-Square	R
Coefficient	6921*	267	1249	0.217*			
Std. Error	1199.516	297.350	1094.921	0.050			
t-Statistic	5.770	0.899	-0.141	4.304	0.054	0.046	0.233[a]
P-Value	0.000	0.369	0.255	0.005			

Source: Research Findings

Dependent variable: trading volume. Independent variables: return and one lagged period (return and trading volume).

*Significant at the 0.05 level (two tailed)

Table 4.2.1.3 displays regression results for equation in model 2. The findings confirm no evidence of a contemporaneous relationship between trading volume and stock returns. This is because the parameter β_1 in equation 2 is not significant at 5% level and positive. Parameter β_2 is positive and not significant indicating that no lagged relationship exists between trading volume and stock returns. On the other hand, parameter β_3 is positive and significant at 5% indicating a lagged relationship between the current trading volume and lagged trading volume.

In the findings given R squared (0.054) indicate that 5.4% of the variation in the trading volume is accounted for by stock returns and the lagged trading volume. The remaining 94.6 % is explained for by other factors. The lower adjusted R squared (0.046) confirms

the less dependency of trading volume in variation of stock returns. The overall correlation coefficient R (0.233) shows that a weak correlation exists between trading volume and stock returns when trading volume is held as dependent variable in the sector.

4.2.2 Automobile and Accessories Sector

Table 4.2.2.1: Descriptive statistics for Stock Returns and Trading Volume

	Return	Volume
Mean	0.0212	12932
Median	0	380
Maximum	2.52	400520
Minimum	-2.65	0
Std. Dev.	0.65015	38427
Skewness	0.465706	6.88947529
Kurtosis	3.625102	58.6587606
Observations	1040	1040

Source: Research Findings

Table 4.2.2.1 displays descriptive statistics to include the mean, median, maximum, minimum, standard deviation, skewness and kurtosis. It is clear that the return mean is positive with relatively high volatility around the mean. The return series was skewed to the right and the kurtosis was higher than 3 reflecting a leptokurtic profile. On the other hand, trading volume has much less volatility around the mean. Moreover, trading volume is also right skewed with a kurtosis much higher than 3 reflecting leptokurtic profile.

Table 4.2.2.2: Regression Results for Model (1)

$$R_t = \alpha_0 + \alpha_1 V_t + \alpha_2 V_{t-1} + \alpha_3 R_{t-1} + u_t$$

	Constant	Vt	Vt-1	Rt-1	R-Square	Adj. R-Square	R
Coefficient	0.020	0.00005646	-0.0002645	0.070*			
Std. Error	0.049	0.000	0.000	0.194			
t-Statistic	0.402	0.468	-0.220	1.601	0.131	0.121	0.336
P-Value	0.688	0.640	0.826	0.011			

Source: Research Findings

Dependent variable: return. Independent variables: trading volume and one lagged period (trading volume and return).

*Significant at the 0.05 level (two tailed)

Table 4.2.2.2 displays regression results for equation in model 1. It can be observed that all the regression coefficients are positive except for the lagged trading volume (Vt-1) whose coefficient is negative. Since the parameter for α_1 is not significant at 5% level confirms that in the regression analysis conducted there is no contemporaneous relationship between the stock returns and the trading volume. There is also no evidence of lagged relationship between returns and lagged trading volume as shown by the insignificant parameter α_2 though there co-movement is in opposite direction. However, the positive significant α_3 reflects a lagged relationship between the current stock returns and lagged stock returns.

In the findings given R squared (0.131) indicates that 13.1% of the variation in the stock returns is accounted for by trading volume and the lagged stock returns. The other 86.9% within the automobile and accessories sector is explained for by other factors. The lower adjusted R squared (0.216) confirms the less dependency of stock return in variation in trading volume series. On overall the correlation coefficient R (0.336) shows a weak

correlation exists between trading volume and stock returns when stock returns are held as dependent variable in the sector.

Table 4.2.2.3: Regression Results for Model (2)

$$V_t = \beta_0 + \beta_1 R_t + \beta_2 R_{t-1} + \beta_3 V_{t-1} + e_t$$

	Constant	Rt	Rt-1	Vt-1	R-Square	Adj. R-Square	R
Coefficient	10126*	1905	4536	0.204*			
Std. Error	2751	4052	4063	0.068			
t-Statistic	3.680	0.470	1.117	2.984	0.048	0.034	0.220[a]
P-Value	0.000	0.639	0.265	0.003			

Source: Research Findings

Dependent variable: trading volume. Independent variables: return and one lagged period (return and trading volume).

*Significant at the 0.05 level (two tailed)

Table 4.2.2.3 displays regression results for equation in model 2. The findings confirm no evidence of a contemporaneous relationship between trading volume and stock returns. This is because the parameter β_1 in equation 2 is not significant at 5% level and positive. Parameter β_2 is positive and not significant indicating that no lagged relationship exists between trading volume and stock returns. On the other hand, parameter β_3 is positive and significant at 5% indicating a lagged relationship between the current trading volume and lagged trading volume.

In the findings given R squared (0.048) indicates that 4.8% of the variation in the trading volume is accounted for by stock returns and the lagged trading volume. The remaining 95.2 % within this sector is explained for by other factors. The lower adjusted R squared (0.034) confirms the less dependency of trading volume in variation of stock returns. The overall correlation coefficient R (0.220) shows that a weak correlation exists between

trading volume and stock returns when trading volume is held as dependent variable in the sector.

4.2.3 Banking Sector

Table 4.2.3.1: Descriptive statistics for Stock Returns and Trading Volume

	Return	Volume
Mean	0.0035	613211
Median	0.11	89930
Maximum	3.26	13400000
Minimum	-4.22	800
Std. Dev.	0.63543	1160977
Skewness	-0.57667	4.408274169
Kurtosis	3.619649	32.8660796
Observations	2600	2600

Source: Research Findings

Table 4.2.3.1 displays descriptive statistics to include the mean, median, maximum, minimum, standard deviation, skewness and kurtosis. It is clear that the return mean is positive with relatively low volatility around the mean. The return series was skewed to the left and the kurtosis was higher than 3 reflecting a leptokurtic profile. On the other hand, trading volume has much lesser low volatility around the mean. Moreover, trading volume is right skewed with a kurtosis much higher than 3 reflecting leptokurtic profile.

Table 4.2.3.2: Regression Results for Model (1)

$$R_t = \alpha_0 + \alpha_1 V_t + \alpha_2 V_{t-1} + \alpha_3 R_{t-1} + u_t$$

	Constant	Vt	Vt-1	Rt-1	R-Square	Adj. R-Square	R
Coefficient	0.008	-0.000003903	-0.00003619	0.021*			
Std. Error	0.033	0.000	0.000	0.036			
t-Statistic	0.245	-0.133	-0.108	1.933	0.035	0.026	0.187
P-Value	0.806	0.894	0.914	0.003			

Source: Research Findings

Dependent variable: return. Independent variables: trading volume and one lagged period (trading volume and return).

*Significant at the 0.05 level (two tailed)

Table 4.2.3.2 displays regression results for equation in model 1. It can be observed that two out of four regression coefficients are negative. Since the parameter for α_1 is not significant at 5% level confirms that in the regression analysis conducted there is no contemporaneous relationship between the stock returns and the trading volume although they are observed to move in opposite direction. There is also no evidence of lagged relationship between returns and lagged trading volume as shown by the insignificant parameter α_2 though there co-movement is in opposite direction. However, the positive significant α_3 reflects a lagged relationship between the current stock returns and lagged stock returns.

In the findings given R squared (0.035) indicates that 3.5% of the variation in the stock returns is accounted for by trading volume and the lagged stock returns. The other 96.5% within the banking sector is explained for by other factors. The lower adjusted R squared (0.026) confirms the less dependency of stock return in variation in trading volume series. On overall the correlation coefficient R (0.187) shows a weak correlation exists between trading volume and stock returns when stock returns are held as dependent variable in the sector.

Table 4.2.3.3: Regression Results for Model (2)

$$V_t = \beta_0 + \beta_1 R_t + \beta_2 R_{t-1} + \beta_3 V_{t-1} + e_t$$

	Constant	Rt	Rt-1	Vt-1	R-Square	Adj. R-Square	R
Coefficient	229503*	-8843	15525	0.647*			
Std. Error	48792.273	66260.241	54793.346	0.042			
t-Statistic	4.704	-0.133	0.283	15.592	0.321	0.317	0.567[a]
P-Value	0.000	0.894	0.777	0.000			

Source: Research Findings

Dependent variable: trading volume. Independent variables: return and one lagged period (return and trading volume).

*Significant at the 0.05 level (two tailed)

Table 4.2.3.3 displays regression results for equation in model 2. The findings confirm no evidence of a contemporaneous relationship between trading volume and stock returns. This is because the parameter β_1 in equation 2 is not significant at 5% level and negative showing that the movement is in opposite direction. Parameter β_2 is positive and not significant indicating that no lagged relationship exists between trading volume and stock returns. On the other hand, parameter β_3 is positive and significant at 5% indicating a lagged relationship between the current trading volume and lagged trading volume.

In the findings given R squared (0.321) indicates that 32.1% of the variation in the trading volume is accounted for by stock returns and the lagged trading volume. The remaining 64.9 % within this sector is explained for by other factors. The lower adjusted R squared (0.317) confirms the relatively less dependency of trading volume in variation of stock returns. However, the overall correlation coefficient R (0.567) shows a slightly strong correlation between trading volume and stock returns when trading volume is held as dependent variable in the sector.

4.2.4 Commercial and Services Sector

Table 4.2.4.1: Descriptive statistics for Stock Returns and Trading Volume

	Return	Volume
Mean	-0.16	110818.34
Median	0	10680
Maximum	8.86	3995920
Minimum	-11.11	0
Std. Dev.	2.303375	293661.496
Skewness	-0.998420107	7.11514764
Kurtosis	6.721701748	77.84769
Observations	2600	2600

Source: Research Findings

Table 4.2.4.1 displays descriptive statistics to include the mean, median, maximum, minimum, standard deviation, skewness and kurtosis. It is clear that the return mean is negative with relatively low volatility around the mean. The return series was skewed to the left and the kurtosis was higher than 3 reflecting a leptokurtic profile. On the other hand, trading volume has much lesser low volatility around the mean. Moreover, trading volume is right skewed with a kurtosis also much higher than 3 reflecting leptokurtic profile.

Table 4.2.4.2: Regression Results for Model (1)

$$R_t = \alpha_0 + \alpha_1 V_t + \alpha_2 V_{t-1} + \alpha_3 R_{t-1} + u_t$$

	Constant	Vt	Vt-1	Rt-1	R-Square	Adj. R-Square	R
Coefficient	-0.127	0.0001146	0.007601	0.051*			
Std. Error	0.130	0.000	0.000	0.113			
t-Statistic	-0.980	2.572	1.714	1.341	0.024	0.016	0.154
P-Value	0.327	0.10	0.17	0.181			

Source: Research Findings

Dependent variable: return. Independent variables: trading volume and one lagged period (trading volume and return).

*Significant at the 0.05 level (two tailed)

Table 4.2.4.2 displays regression results for equation in model 1. It can be observed that all the regression coefficients are positive except for one that is negative. Since the parameter for α_1 is not significant at 5% level confirms that in the regression analysis conducted there is no contemporaneous relationship between the stock returns and the trading volume. There is also no evidence of lagged relationship between returns and lagged trading volume as shown by the parameter α_2 that is not significant. In addition, parameter α_3 that is positive and not significant gives evidence of no lagged relationship between the current stock returns and lagged stock returns.

In the findings given R squared (0.024) indicates that 2.4% of the variation in the stock returns is accounted for by trading volume and the lagged stock returns. The other 97.6% within the commercial and allied sector is explained for by other factors. The lower

adjusted R squared (0.016) confirms the less dependency of stock return in variation in trading volume series. On overall the correlation coefficient R (0.154) shows a weak correlation exists between trading volume and stock returns when stock returns are held as dependent variable in the sector.

Table 4.2.4.3: Regression Results for Model (2)

$$V_t = \beta_0 + \beta_1 R_t + \beta_2 R_{t-1} + \beta_3 V_{t-1} + e_t$$

	Constant	Rt	Rt-1	Vt-1	R-Square	Adj. R-Square	R
Coefficient	61252*	-14516*	26293*	0.455*			
Std. Error	14273	5643	12643	0.044			
t-Statistic	4.291	-2.572	2.080	10.235	0.236	0.230	0.486[a]
P-Value	0.000	0.010	0.038	0.000			

Source: Research Findings

Dependent variable: trading volume. Independent variables: return and one lagged period (return and trading volume).

*Significant at the 0.05 level (two tailed)

Table 4.2.4.3 displays regression results for equation in model 2. The findings confirm evidence of a contemporaneous relationship between trading volume and stock returns. This is because the parameter β_1 in equation 2 is significant at 5% level and negative showing that the movement is in opposite direction. Parameter β_2 is positive and significant indicating that a lagged relationship exists between trading volume and stock returns. On the other hand, parameter β_3 is positive and significant at 5% also indicating existence of a lagged relationship between the current trading volume and lagged trading volume.

In the findings given R squared (0.236) indicates that 23.6% of the variation in the trading volume is accounted for by stock returns and the lagged trading volume. The remaining 76.4 % within this sector is explained for by other factors. The lower adjusted R squared (0.230) confirms that trading volume depends less on the variation of stock

returns. The overall correlation coefficient R (0.486) shows that a weak correlation exists between trading volume and stock returns when trading volume is held as dependent variable in the sector.

4.2.5 Construction and Allied Sector

Table 4.2.5.1: Descriptive statistics for stock Returns and Trading Volume

	Return	Volume
Mean	0.0767	31302
Median	0	10500
Maximum	8.98	624660
Minimum	-12.27	0
Std. Dev.	1.240	64440
Skewness	-2.05335	5.411284
Kurtosis	48.02029	39.2353944
Observations	1300	1300

Source: Research Findings

Table 4.2.5.1 displays descriptive statistics to include the mean, median, maximum, minimum, standard deviation, skewness and kurtosis. It is clear that the return mean is positive with relatively low volatility around the mean. The return series was skewed to the left and the kurtosis was higher than 3 reflecting a leptokurtic profile. On the other hand, trading volume has much lesser low volatility around the mean. Moreover, trading volume is right skewed with a kurtosis also much higher than 3 reflecting leptokurtic profile.

Table 4.2.5.2: Regression Results for Model (1)

$$R_t = \alpha_0 + \alpha_1 V_t + \alpha_2 V_{t-1} + \alpha_3 R_{t-1} + u_t$$

	Constant	Vt	Vt-1	Rt-1	R-Square	Adj. R-Square	R
Coefficient	0.018	0.0009251	0.0001411	-0.163*			
Std. Error	0.090	0.000	0.000	0.062			
t-Statistic	0.196	0.768	1.165	-2.640	0.034	0.023	0.185
P-Value	0.844	0.443	0.245	0.009			

Source: Research Findings

Dependent variable: return. Independent variables: trading volume and one lagged period (trading volume and return).

*Significant at the 0.05 level (two tailed)

Table 4.2.5.2 displays regression results for equation in model 1. It can be observed that all the regression coefficients are positive except for α_3 in Rt-1 that is negative. Since the parameter for α_1 is not significant at 5% level confirms that in the regression analysis conducted there is no contemporaneous relationship between the stock returns and the trading volume. There is also no evidence of lagged relationship between returns and lagged trading volume as shown by the insignificant parameter α_2. However, the negative significant α_3 reflects a lagged relationship between the current stock returns and lagged stock returns whose movement is in opposite direction.

In the findings given R squared (0.034) indicates that 3.4% of the variation in the stock returns is accounted for by trading volume and the lagged stock returns. The other 96.6% within the construction and allied sector is explained for by other factors. The lower adjusted R squared (0.023) confirms the less dependency of stock return in variation in trading volume series. On overall the correlation coefficient R (0.185) shows a weak correlation exists between trading volume and stock returns when stock returns are held as dependent variable in the sector.

Table 4.2.5.3: Regression Results for Model (2)

$$V_t = \beta_0 + \beta_1 R_t + \beta_2 R_{t-1} + \beta_3 V_{t-1} + e_t$$

	Constant	Rt	Rt-1	Vt-1	R-Square	Adj. R-Square	R
Coefficient	25388*	2483	-1599	0.186*			
Std. Error	4396	3234	3249	0.062			
t-Statistic	5.775	0.768	-0.492	3.012	0.039	0.027	0.197[a]
P-Value	0.000	0.443	0.623	0.003			

Source: Research Findings

Dependent variable: trading volume. Independent variables: return and one lagged period (return and trading volume).

*Significant at the 0.05 level (two tailed)

Table 4.2.5.3 displays regression results for equation in model 2. The findings confirm no evidence of a contemporaneous relationship between trading volume and stock returns. This is because the parameter β_1 in equation 2 is not significant at 5% level and positive. Parameter β_2 is negative and not significant indicating that no lagged relationship exists between trading volume and stock returns though the existing variation is in opposite direction. On the other hand, parameter β_3 is positive and significant at 5% indicating a lagged relationship between the current trading volume and lagged trading volume.

In the findings given R squared (0.039) indicates that 3.9% of the variation in the trading volume is accounted for by stock returns and the lagged trading volume. The remaining 96.1 % within this sector is explained for by other factors. The lower adjusted R squared (0.027) confirms the relatively less dependency of trading volume in variation of stock returns. The overall correlation coefficient R (0.197) shows that a weak correlation exists between trading volume and stock returns when trading volume is held as dependent variable in the sector.

4.2.6 Energy and Petroleum Sector

Table 4.2.6.1: Descriptive statistics for stock Returns and Trading Volume

	Return	Volume
Mean	0.0778	334656
Median	0	205160
Maximum	12.69	3420000
Minimum	-4.37	0
Std. Dev.	1.202	435719
Skewness	5.188786	2.95993957
Kurtosis	59.20329	13.77465962
Observations	1045	1045

Source: Research Findings

Table 4.2.6.1 displays descriptive statistics to include the mean, median, maximum, minimum, standard deviation, skewness and kurtosis. It is clear that the return mean is positive with relatively low volatility around the mean. The return series was skewed to the right and the kurtosis was higher than 3 reflecting a leptokurtic profile. On the other hand, trading volume has much lesser low volatility around the mean. Moreover, trading volume is right skewed with a kurtosis also much higher than 3 reflecting leptokurtic profile.

Table 4.2.6.2: Regression Results for Model (1)

$$R_t = \alpha_0 + \alpha_1 V_t + \alpha_2 V_{t-1} + \alpha_3 R_{t-1} + u_t$$

	Constant	Vt	Vt-1	Rt-1	R-Square	Adj. R-Square	R
Coefficient	0.084	0.0001741	-.0001697	-0.119*			
Std. Error	0.112	0.000	0.000	0.070			
t-Statistic	0.748	0.822	-0.802	-1.706	0.018	0.004	0.135
P-Value	0.456	0.412	0.423	0.009			

Source: Research Findings

Dependent variable: return. Independent variables: trading volume and one lagged period (trading volume and return).

*Significant at the 0.05 level (two tailed)

Table 4.2.6.2 displays regression results for equation in model 1. It can be observed that two of the four regression coefficients are negative. Since the parameter for α_1 is not significant at 5% level confirms that in the regression analysis conducted there is no contemporaneous relationship between the stock returns and the trading volume. There is also no evidence of lagged relationship between returns and lagged trading volume as shown by the insignificant parameter α_2 though the existing variation is in opposite direction. In addition, the negative significant α_3 reflects a lagged relationship between the current stock returns and lagged stock returns whose movement is in opposite direction.

In the findings given R squared (0.018) indicates that 1.8% of the variation in the stock returns is accounted for by trading volume and the lagged stock returns. The other 98.2% within the energy and petroleum sector is explained for by other factors. The lowest adjusted R squared (0.004) confirms the very much less dependency of stock return in variation in trading volume series. On overall the correlation coefficient R (0.135) shows a weak correlation exists between trading volume and stock returns when stock returns are held as dependent variable in the sector.

Table 4.2.6.3: Regression Results for Model (2)

$$V_t = \beta_0 + \beta_1 R_t + \beta_2 R_{t-1} + \beta_3 V_{t-1} + e_t$$

	Constant	Rt	Rt-1	Vt-1	R-Square	Adj. R-Square	R
Coefficient	188107*	18858	8443	0.434*			
Std. Error	34535	22947	23045	0.063			
t-Statistic	5.447	0.822	0.366	6.910	0.190	0.178	0.436[a]
P-Value	0.000	0.412	0.714	0.000			

Source: Research Findings

Dependent variable: trading volume. Independent variables: return and one lagged period (return and trading volume).

*Significant at the 0.05 level (two tailed)

Table 4.2.6.3 displays regression results for equation in model 2. The findings confirm no evidence of a contemporaneous relationship between trading volume and stock returns. This is because the parameter β_1 in equation 2 is not significant at 5% level and positive. Parameter β_2 is positive and not significant indicating that no lagged relationship exists between trading volume and stock returns. On the other hand, parameter β_3 is positive and significant at 5% indicating a lagged relationship between the current trading volume and lagged trading volume.

In the findings given R squared (0.190) indicates that 19% of the variation in the trading volume is accounted for by stock returns and the lagged trading volume. The remaining 81 % within this sector is explained for by other factors. The lower adjusted R squared (0.178) confirms the less dependency of trading volume in variation of stock returns. The overall correlation coefficient R (0.436) shows that a weak correlation exists between trading volume and stock returns when trading volume is held as dependent variable in the sector.

4.2.7 Insurance Sector

Table 4.2.7.1: Descriptive statistics for stock Returns and Trading Volume

	Return	Volume
Mean	0.0626	294371
Median	0	28860
Maximum	5.34	12132260
Minimum	-4.54	0
Std. Dev.	0.99283	849911
Skewness	0.314905	9.47089966
Kurtosis	6.257082	122.878511
Observations	1560	1560

Source: Research Findings

Table 4.2.7.1 displays descriptive statistics to include the mean, median, maximum, minimum, standard deviation, skewness and kurtosis. It is clear that the return mean is positive with relatively low volatility around the mean. The return series was skewed to the right and the kurtosis was higher than 3 reflecting a leptokurtic profile. On the other

hand, trading volume has much lesser low volatility around the mean. Moreover, trading volume is right skewed with a kurtosis also much higher than 3 reflecting leptokurtic profile.

Table4.2.7.2: Regression Results for Model (1)

$$R_t = \alpha_0 + \alpha_1 V_t + \alpha_2 V_{t-1} + \alpha_3 R_{t-1} + u_t$$

	Constant	Vt	Vt-1	Rt-1	R-Square	Adj. R-Square	R
Coefficient	0.100*	-.001091	-0.001510	-0.001			
Std. Error	0.061	0.000	0.000	0.005			
t-Statistic	1.630	-1.551	-0.215	-0.189	0.010	0.000	0.099
P-Value	0.004	0.122	0.830	0.851			

Source: Research Findings

Dependent variable: return. Independent variables: trading volume and one lagged period (trading volume and return).

*Significant at the 0.05 level (two tailed)

Table 4.2.7.2 displays regression results for equation in model 1. It can be observed that only one of the regression coefficients is positive. Since the parameter for α_1 is not significant at 5% level confirms that in the regression analysis conducted there is no contemporaneous relationship between the stock returns and the trading volume. There is also no evidence of lagged relationship between returns and lagged trading volume as shown by the insignificant parameter α_2 though the existing variation is in opposite direction. In addition, the negative insignificant α_3 reflects the absence of a lagged relationship between the current stock returns and lagged stock returns whose movement is also in opposite direction.

In the findings given R squared (0.010) indicates that 1.0% of the variation in the stock returns is accounted for by trading volume and the lagged stock returns. The other 99.0% within the Insurance sector is explained for by other factors. The absence of adjusted R squared (0.000) confirms that there is no dependency of stock return in the variation of

trading volume series. On overall the correlation coefficient R (0.135) shows a very weak correlation exists between trading volume and stock returns when stock returns are held as dependent variable in the sector.

Table 4.2.7.3: Regression Results for Model (2)

$$V_t = \beta_0 + \beta_1 R_t + \beta_2 R_{t-1} + \beta_3 V_{t-1} + e_t$$

	Constant	Rt	Rt-1	Vt-1	R-Square	Adj. R-Square	R
Coefficient	200703*	-71013	-1055	0.332*			
Std. Error	48301	45797	3892	0.053			
t-Statistic	4.155	-1.551	-0.271	6.211	0.120	0.112	0.347
P-Value	0.000	0.122	0.786	0.000			

Source: Research Findings

Dependent variable: trading volume. Independent variables: return and one lagged period (return and trading volume).
*Significant at the 0.05 level (two tailed)

Table 4.2.7.3 displays regression results for equation in model 2. The findings confirm no evidence of a contemporaneous relationship between trading volume and stock returns. This is because the parameter β_1 in equation 2 is not significant at 5% level and negative. Parameter β_2 is also negative and not significant indicating that no lagged relationship exists between trading volume and stock returns though the existing variation is in opposite direction. On the other hand, parameter β_3 is positive and significant at 5% indicating a lagged relationship between the current trading volume and lagged trading volume.

In the findings given R squared (0.120) indicates that 12% of the variation in the trading volume is accounted for by stock returns and the lagged trading volume. The remaining 88 % within this sector is explained for by other factors. The lower adjusted R squared (0.112) confirms the less dependency of trading volume in variation of stock returns. The overall correlation coefficient R (0.347) shows that a weak correlation exists between

trading volume and stock returns when trading volume is held as dependent variable in the sector.

4.2.8 Investment Sector

Table 4.2.8.1: Descriptive statistics for stock Returns and Trading Volume

	Return	Volume
Mean	0.0710	77662
Median	0	5510
Maximum	16.79	1324700
Minimum	-5.08	0
Std. Dev.	1.548	174847
Skewness	5.985347	4.1462307
Kurtosis	66.02895	20.875087
Observations	1040	1040

Source: Research Findings

Table 4.2.8.1 displays descriptive statistics to include the mean, median, maximum, minimum, standard deviation, skewness and kurtosis. It is clear that the return mean is positive with relatively low volatility around the mean. The return series was skewed to the right and the kurtosis was higher than 3 reflecting a leptokurtic profile. On the other hand, trading volume has much lesser low volatility around the mean. Moreover, trading volume is right skewed with a kurtosis also much higher than 3 reflecting leptokurtic volume is right skewed with a kurtosis also much higher than 3 reflecting leptokurtic profile.

Table 4.2.8.2: Regression Results for Model (1)

$$R_t = \alpha_0 + \alpha_1 V_t + \alpha_2 V_{t-1} + \alpha_3 R_{t-1} + u_t$$

	Constant	Vt	Vt-1	Rt-1	R-Square	Adj. R-Square	R
Coefficient	0.075	-.001569	.0001663	-0.040			
Std. Error	0.122	0.000	0.000	0.070			
t-Statistic	0.611	0.224	-0.238	-0.577	0.002	0.001	0.044
P-Value	0.542	0.823	0.812	0.565			

Source: Research Findings

Dependent variable: return. Independent variables: trading volume and one lagged period (trading volume and return).

*Significant at the 0.05 level (two tailed)

Table 4.2.8.2 displays regression results for equation in model 1. It can be observed that only one of the regression coefficients is positive. Since the parameter for α_1 is not significant at 5% level confirms that in the regression analysis conducted there is no contemporaneous relationship between the stock returns and the trading volume. There is also no evidence of lagged relationship between returns and lagged trading volume as shown by the insignificant parameter α_2 though the existing variation is in opposite direction. In addition, the negative insignificant α_3 reflects the absence of a lagged relationship between the current stock returns and lagged stock returns whose movement is also in opposite direction.

In the findings given R squared (0.002) indicates that 0.2% of the variation in the stock returns is accounted for by trading volume and the lagged stock returns. The other 99.8% within the Investment sector is explained for by other factors. The near absence of adjusted R squared (0.001) confirms that there is no dependency of stock return in the variation of trading volume series. On overall the correlation coefficient R (0.044) shows a very weak correlation exists between trading volume and stock returns when stock returns are held as dependent variable in the sector.

Table 4.2.8.3: Regression Results for Model (2)

$$V_t = \beta_0 + \beta_1 R_t + \beta_2 R_{t-1} + \beta_3 V_{t-1} + e_t$$

	Constant	Rt	Rt-1	Vt-1	R-Square	Adj. R-Square	R
Coefficient	41081*	1569	1038	0.466*			
Std. Error	11858	7000	6994	0.062			
t-Statistic	3.464	0.224	-0.149	7.529	0.218	0.206	0.466[a]
P-Value	0.001	0.823	0.882	0.000			

Source: Research Findings

Dependent variable: trading volume. Independent variables: return and one lagged period (return and trading volume).

*Significant at the 0.05 level (two tailed)

Table 4.2.8.3 displays regression results for equation in model 2. The findings confirm no evidence of a contemporaneous relationship between trading volume and stock returns. This is because the parameter β_1 in equation 2 is not significant at 5% level and positive. Parameter β_2 is also positive and not significant indicating that no lagged relationship exists between trading volume and stock returns. On the other hand, parameter β_3 is positive and significant at 5% indicating a lagged relationship between the current trading volume and lagged trading volume.

In the findings given R squared (0.218) indicates that 21.8% of the variation in the trading volume is accounted for by stock returns and the lagged trading volume. The remaining 78.2 % within this sector is explained for by other factors. The lower adjusted R squared (0.206) confirms the less dependency of trading volume in variation of stock returns. The overall correlation coefficient R (0.466) shows that a weak correlation exists between trading volume and stock returns when trading volume is held as dependent variable in the sector.

4.2.9 Manufacturing and Allied Sector

Table 4.2.9.1: Descriptive statistics for stock Returns and Trading Volume

	Return	Volume
Mean	0.1060	197839
Median	0	10530
Maximum	5.74	3840000
Minimum	-4.25	0
Std. Dev.	0.93577	469687
Skewness	0.833374	3.6171831
Kurtosis	7.379892	15.767879
Observations	2080	2080

Source: Research Findings

Table 4.2.9.1 displays descriptive statistics to include the mean, median, maximum, minimum, standard deviation, skewness and kurtosis. It is clear that the return mean is positive with relatively low volatility around the mean. The return series was skewed to the right and the kurtosis was higher than 3 reflecting a leptokurtic profile. On the other hand, trading volume has much lesser low volatility around the mean. Moreover, trading volume is right skewed with a kurtosis also much higher than 3 reflecting leptokurtic profile.

Table 4.2.9.2: Regression Results for Model (1)

$$R_t = \alpha_0 + \alpha_1 V_t + \alpha_2 V_{t-1} + \alpha_3 R_{t-1} + u_t$$

	Constant	Vt	Vt-1	Rt-1	R-Square	Adj. R-Square	R
Coefficient	0.103*	.004159*	.004152*	0.005*			
Std. Error	0.050	0.000	0.000	0.004			
t-Statistic	2.065	2.819	2.814	1.025	0.024	0.017	0.154
P-Value	0.040	0.005	0.005	0.006			

Source: Research Findings

Dependent variable: return. Independent variables: trading volume and one lagged period (trading volume and return).

*Significant at the 0.05 level (two tailed)

Table 4.2.9.2 displays regression results for equation in model 1. It can be observed that all the regression coefficients are positive. Since the parameter for α_1 is significant at 5% level confirms that in the regression analysis conducted there is contemporaneous relationship between the stock returns and the trading volume. There is also evidence of lagged relationship between returns and lagged trading volume as shown by the significant parameter α_2. In addition, the positive significant α_3 reflects also the existence of a lagged relationship between the current stock returns and lagged stock returns.

In the findings given R squared (0.024) indicates that 2.4% of the variation in the stock returns is accounted for by trading volume and the lagged stock returns. The other 97.6%

within the manufacturing and allied sector is explained for by other factors. The near absence of adjusted R squared (0.017) confirms that there is no dependency of stock return in the variation of trading volume series. On overall the correlation coefficient R (0.154) shows a very weak correlation exists between trading volume and stock returns when stock returns are held as dependent variable in the sector.

Table 4.2.9.3: Regression Results for Model (2)

$$V_t = \beta_0 + \beta_1 R_t + \beta_2 R_{t-1} + \beta_3 V_{t-1} + e_t$$

	Constant	Rt	Rt-1	Vt-1	R-Square	Adj. R-Square	R
Coefficient	43418*	45489*	658	0.758*			
Std. Error	16478	16139	1476	0.032			
t-Statistic	2.635	2.819	0.446	23.601	0.576	0.573	0.759[a]
P-Value	0.009	0.005	0.656	0.000			

Source: Research Findings

Dependent variable: trading volume. Independent variables: return and one lagged period (return and trading volume).

*Significant at the 0.05 level (two tailed)

Table 4.2.9.3 displays regression results for equation in model 2. The findings confirm evidence of a contemporaneous relationship between trading volume and stock returns. This is because the parameter β_1 in equation 2 is significant at 5% level and positive. Parameter β_2 is also positive and not significant indicating that no lagged relationship exists between trading volume and stock returns. On the other hand, parameter β_3 is positive and significant at 5% indicating a lagged relationship between the current trading volume and lagged trading volume.

In the findings given R squared (0.576) indicates that 57.6% of the variation in the trading volume is accounted for by stock returns and the lagged trading volume. The remaining 42.4 % within this sector is explained for by other factors. The relatively higher adjusted R squared (0.573) confirms that trading volume does depend to a large extent in the variation of stock returns. The overall correlation coefficient R (0.759)

shows that a strong correlation exists between trading volume and stock returns when trading volume is held as dependent variable in the sector.

4.2.10 Telecommunication Sector

Table 4.2.10.1: Descriptive statistics for stock Return and Trading Volume

	Return	Volume
Mean	0.0998	5057827
Median	-0.01	1683988
Maximum	3.41	33288000
Minimum	-2.64	8400
Std. Dev.	0.90886	7043317
Skewness	0.46355	1.7949957
Kurtosis	1.767003	3.158826
Observations	520	520

Source: Research Findings

Table 4.2.10.1 displays descriptive statistics to include the mean, median, maximum, minimum, standard deviation, skewness and kurtosis. It is clear that the return mean is positive with relatively low volatility around the mean. The return series was skewed to the right and the kurtosis was higher than 3 reflecting a leptokurtic profile. On the other hand, trading volume has much lesser low volatility around the mean. Moreover, trading volume is right skewed with a kurtosis also much higher than 3 reflecting leptokurtic profile.

Table 4.2.10.2: Regression Results for Model (1)

$$R_t = \alpha_0 + \alpha_1 V_t + \alpha_2 V_{t-1} + \alpha_3 R_{t-1} + u_t$$

	Constant	Vt	Vt-1	Rt-1	R-Square	Adj. R-Square	R
Coefficient	0.082	2.530*	2.109*	0.061*			
Std. Error	0.116	0.214	0.201	0.002			
t-Statistic	0.709	2.142	2.118	1.631	0.065	0.054	0.073
P-Value	0.480	0.007	0.006	0.030			

Source: Research Findings

Dependent variable: return. Independent variables: trading volume and one lagged period (trading volume and return).

*Significant at the 0.05 level (two tailed)

Table 4.2.10.2 displays regression results for equation in model 1. It can be observed that all the regression coefficients are positive. Since the parameter for α_1 is significant at 5% level confirms that in the regression analysis conducted there is contemporaneous relationship between the stock returns and the trading volume. There is also evidence of lagged relationship between returns and lagged trading volume as shown by the significant parameter α_2. In addition, the positive significant α_3 reflects also the existence of a lagged relationship between the current stock returns and lagged stock returns.

In the findings given R squared (0.065) indicates that 6.5% of the variation in the stock returns is accounted for by trading volume and the lagged stock returns. The other 97.6% within the Telecommunication sector is explained for by other factors. The less of adjusted R squared (0.054) confirms that there is less dependency of stock return in the variation of trading volume series. On overall the correlation coefficient R (0.073) shows a very weak correlation exists between trading volume and stock returns when stock returns are held as dependent variable in the sector.

Table 4.2.10.3: Regression Results for Model (2)

$$V_t = \beta_0 + \beta_1 R_t + \beta_2 R_{t-1} + \beta_3 V_{t-1} + e_t$$

	Constant	Rt	Rt-1	Vt-1	R-Square	Adj. R-Square	R
Coefficient	1559490*	80004	-0.3634	0.689*			
Std. Error	633439	562276	12801	0.073			
t-Statistic	2.462	0.142	-0.284	9.482	0.476	0.461	0.690[a]
P-Value	0.016	0.887	0.777	0.000			

Source: Research Findings

Dependent variable: trading volume. Independent variables: return and one lagged period (return and trading volume).

*Significant at the 0.05 level (two tailed)

Table 4.2.10.3 displays regression results for equation in model 2. The findings confirm no evidence of a contemporaneous relationship between trading volume and stock returns. This is because the parameter β_1 in equation 2 is not significant at 5% level and positive. Parameter β_2 is negative and not significant indicating that no lagged relationship exists between trading volume and stock returns. On the other hand, parameter β_3 is positive and significant at 5% indicating a lagged relationship between the current trading volume and lagged trading volume.

In the findings given R squared (0.476) indicates that 47.6% of the variation in the trading volume is accounted for by stock returns and the lagged trading volume. The remaining 52.4 % within this sector is explained for by other factors. The adjusted R squared (0.461) confirms that trading volume does to an extent depend on the variation of stock returns. The overall correlation coefficient R (0.690) shows that a strong correlation exists between trading volume and stock returns when trading volume is held as dependent variable in the sector.

4.2.11 Consolidated Ten Sectors of NSE

Table 4.2.11.1: Descriptive statistics for stock Returns and Trading Volume

	Return	Volume
Mean	0.0804	419718
Median	0	16800
Maximum	16.79	33288000
Minimum	-5.08	0
Std. Dev.	1.643	1771711
Skewness	2.489768	5.41128457
Kurtosis	40.85429	123.701583
Observations	13785	13785

Source: Research Findings

Table 4.2.11.1 displays descriptive statistics to include the mean, median, maximum, minimum, standard deviation, skewness and kurtosis for all the combined sectors listed at the NSE for the period during the study. It is clear that the overall return mean is positive with relatively low volatility around the mean. The overall return series was skewed to the right and the kurtosis was higher than 3 reflecting a leptokurtic profile. On the other hand, trading volume has much lesser low volatility around the mean. Moreover, the overall trading volume is right skewed with a kurtosis also much higher than 3 reflecting leptokurtic profile.

Table 4.2.11.2: Regression Results for Model (1)

$$R_t = \alpha_0 + \alpha_1 V_t + \alpha_2 V_{t-1} + \alpha_3 R_{t-1} + u_t$$

	Constant	Vt	Vt-1	Rt-1	R-Square	Adj. R-Square	R
Coefficient	0.079*	8.313	-3.432	-0.001			
Std. Error	0.032	0.000	0.000	0.003			
t-Statistic	2.430	0.306	-0.125	-0.178	0.035	0.031	0.187
P-Value	0.015	0.759	0.900	0.858			

Source: Research Findings

Dependent variable: return. Independent variables: trading volume and one lagged period (trading volume and return).

*Significant at the 0.05 level (two tailed)

Table 4.2.11.2 displays the overall regression results for equation in model 1 for all sectors listed at the NSE during the period of study. It can be observed that two of the regression coefficients are negative. Since the parameter for α_1 is not significant at 5% level confirms that in the regression analysis conducted there is contemporaneous relationship between the stock returns and the trading volume. There is also no evidence of lagged relationship between returns and lagged trading volume as shown by the parameter α_2 that is not significant. In addition, the negative parameter α_3 that is negative indicates also the lack of a lagged relationship between the current stock returns and lagged stock returns.

In the findings given R squared (0.035) indicates that on overall for the firms listed at the NSE 3.5% of the variation in the stock returns is accounted for by trading volume and the lagged stock returns. The other 96.5% within NSE's listed firms is explained for by other factors. The small adjusted R squared (0.031) confirms that there is low dependency of stock return in the variation of trading volume series. On overall the correlation coefficient R (0.187) shows a very weak correlation exists between trading volume and stock returns when stock returns are held as dependent variable for firms listed at the NSE.

Table 4.2.11.3: Regression Results for Model (2)

$$V_t = \beta_0 + \beta_1 R_t + \beta_2 R_{t-1} + \beta_3 V_{t-1} + e_t$$

	Constant	Rt	Rt-1	Vt-1	R-Square	Adj. R-Square	R
Coefficient	100349*	41103	-237.4	0.765*			
Std. Error	22652.940	13389.640	2292.187	0.013			
t-Statistic	4.430	0.306	-0.104	61.064	0.210	0.192	0.458[a]
P-Value	0.000	0.759	0.917	0.000			

Source: Research Findings

Dependent variable: trading volume. Independent variables: return and one lagged period (return and trading volume).

*Significant at the 0.05 level (two tailed)

Table 4.2.11.3 displays the overall regression results for equation in model 2 for all the sectors listed at the NSE during the period of study. The findings confirm no evidence of a contemporaneous relationship between trading volume and stock returns. This is because the parameter β_1 in equation 2 is not significant at 5% level and positive. Parameter β_2 is negative and not significant indicating that no lagged relationship exists between trading volume and stock returns. On the other hand, parameter β_3 is positive and significant at 5% indicating a lagged relationship between the current trading volume and lagged trading volume.

In the findings given R squared (0.2096) indicates that 20.96% of the variation in all the listed firms at the NSE's trading volume is accounted for by stock returns and the lagged trading volume. The remaining 79.04 % within NSE's listed firms is explained for by other factors. The adjusted R squared (0.1915) confirms that trading volume depend less on the variation of stock returns. The overall correlation coefficient R (0.458) shows that a weak correlation exists between trading volume and stock returns when trading volume is held as dependent variable for firms listed at the NSE.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presented summary, conclusions, recommendations for policy and also discussed limitations that may be in this study and areas that require further research.

5.2 Summary

This study intended to determine the relationship between trading volume and stock prices of firms listed at the Nairobi Securities Exchange. The study was to achieve this objective by first establishing if a simultaneous or contemporaneous relationship exists between the two variables. Thereafter, both the coefficient of determination and correlation coefficient had to be determined to ascertain the strength of the simultaneous relationship. A regression model proposed by Lee and Rui (2002) was used in the analysis. Data on weekly averages for both the percentage change in stock prices and absolute trading volume were ascertained as per each trading sector and used in the analysis.

The study established that on overall no simultaneous or contemporaneous relationship exist in either way between trading volume and stock prices of all the firms within individual sectors listed at the NSE. The summarized strength of the contemporaneous relationship for both the stock prices and trading volume is as shown below:

Sector	Stock prices	Comment	Trading volume	Comment
Agricultural	47.1%	weak	23.3%	weak
Automobiles	33.6%	weak	22%	weak
Banking	18.7%	very weak	56.7%	strong
Commercial	15.4%	very weak	48.6%	weak
Energy& Petroleum	13.5%	very weak	43.6%	weak
Insurance	9.9%	very weak	34.7%	weak
Investment	4.4%	very weak	46.6%	weak
Manufacturing	15.4%	very weak	75.9%	strong
Telecommunication	7.3%	very week	69.0%	strong
NSE	18.7%	very weak	45.8%	weak

The results show that a very weak correlation is observed for stock prices if they were held as a dependent variable with respect to trading volume. The implication is that any changes in stock prices are far much less dependent on the changes observed in trading volume. Other factors account for a very big percentage in stock price changes for firms listed at the NSE. On the other hand from the results shown trading volume seem to some extent dependent on changes in stock prices. It can be seen that the banking, manufacturing and Telecommunication sectors are registering a strong correlation of 56.7%, 75.9% and 69% respectively. However on the overall scale a weak correlation does exist between trading volume and stock prices when trading volume is held as a dependent variable on stock prices in the analysis.

5.3 Conclusions

This study sought to investigate whether there is a relationship between trading volume and stock prices of firms listed at the Nairobi Securities Exchange. The study concludes that there exists no simultaneous or contemporaneous relationship between trading volume and stock prices of firms listed at the NSE. This implies that neither change in stock prices are dependent on trading volume nor the trading volume levels dependent on the changes in the stock prices. It can also be concluded that changes in stock prices have a weak correlation to the number of shares traded. Moreover, traded volumes have also a weak correlation to the changes in stock prices. Therefore, major variations in share prices or the traded volumes are explained by other variables that play a major role in their behavior.

This result raises a number of issues that could be looked into in future research regarding the specific variables that affect the relationship between trading volume and stock prices. This conclusion regarding to the NSE is inconsistent with the studies carried out in developed markets specifically the USA, European Countries and Australian markets which established the existence of a contemporaneous relationship between trading volumes and stock prices and presence of a high correlation between trading

volume and stock prices. The study is however consistent with other studies conducted in developing markets especially those carried out at the NSE that indicated the existence of a weak correlation between trading volume and share prices.

5.4 Recommendations for Policy

The study recommends that financial managers, investment advisors and other policy makers to ensure that they pay very close attention to the fundamental factors (like levels of earnings bases, expected growth in the those earnings and perceived risk of the stock), technical factors (like inflation and economic strength of the market) and the prevailing market sentiments before making any investment decisions, as these factors play a greater role in influencing the dynamic relationship between stock prices and trading volume. Investment decisions to be made based on mere observation of the movement of the stock prices and trading volume would lead to serious consequences as this study has demonstrated that a weak correlation of stock prices and trading volume does exist for firms listed at the NSE.

5.5 Limitations of the Study

The study had various limitations, first the study relied on weekly averages of the five years. Averages are subject to the effect of extremes that may not give a clear picture of the possible outcomes. The limited time and resources was partially the reason for the dependence on the averages.

Secondly, changes in the price and traded volumes are a function of many factors including key macro economic variables. This study therefore only gives a partial analysis.

Third, the study is subject to the general limitations inherent in analyzing security prices and trading volume data. When analyzing stock market prices which range over a very long period of time, one should be aware that the conditions that underlie the pricing process are likely to change. For example, a long sample period might include changes in

the structure of the quoted companies and changes in the trading protocol such as the recent automation of the NSE.

5.5 Suggestion for further Research

The study of similar nature may be carried out in the context of information arrival on the market and find out how volumes react to new information. This will establish whether trading volume change significantly with the arrival of new information.

It will also be important to carry out a study to establish if there exists a significant causal relationship between stock prices and trading volume for the listed firms in periods of earnings announcements because a lot of trading activities characterizes this period.

A similar study can also be undertaken across the sectors but with a different regression model. For instance a study should be carried out using the linear and non-linear Granger causality tests to establish if a relationship between stock prices and trading volume still exist for firms listed at the NSE.

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APPENDICES

APPENDIX 1

NSE LISTED FIRMS TRADING SEGMENTS AS AT DECEMBER 31st 2012

Agricultural

Eaagads	Kakuzi	Kapchorwa Tea
Limuru Tea Co.	Real Vipingo plantations	Sasini Ltd
Williamson Tea Kenya		

Automobiles & Accessories

Car & General (K)	Masharshalls E.A
CMC Holdings	Sameer Africa

Banking

Barclays Bank	CFC Stanbic of Kenya Holdings	Diamond Trust Bank
Equity Bank	Housing Finance	KCB Bank
NBK Bank	NIC Bank	Standard Chartered
Cooperative Bank		

Commercial & Services

Express Kenya	Kenya Airways	
Longhorn Kenya	Nation Media Group	Scan Group
Standard Group	TPS (Serena)	Uchumi Supermarket

Construction & Allied

ARM Cement	Bamburi Cement	E.A Portland Cement
Crown Paints Kenya	E. A. Cables	

Energy & Petroleum

KenGen	KenolKobil ltd
KP& LC	Umeme Ltd

Insurance

British American Investments	CIC Insurance Group
Jubilee Holdings	Kenya Re Corporation
Liberty Holdings	Pan Africa Insurance

Investment

Centum Investment	City Trust
Olympia Capital Holdings	Trans-Century

Manufacturing & Allied

B.O.C Kenya Ltd	BAT Kenya Ltd	Eveready E.A
Carbacid Investments	East African Breweries	Unga Group
Kenya Orchards	Mumias Sugar Co.	

Telecommunication & Technology

Access Kenya Group

Safaricom Ltd

(Source: Nairobi Securities Exchange)

APPENDIX 2

EXTRACT OF DATA USED IN COMPUTATION OF WEEKLY AVERAGE TRADING VOLUME AND PERCENTAGE CHANGE IN RETURNS

SECTOR	12-Nov		13-Nov		14-Nov		15-Nov		Week 45	Week 45
	MON		TUE		WED		THU		Average R%	Average V
AGRICULTURAL	R (%)	V	R (%)	V	R (%)	V	R (%)	V	Rt	Vt
EAAGADS	-2.88	200	-5.05	400	-1.02	2,200	-	1,000	-1.79	980
KAKUZI	1.41	8,000	-0.71	72,200	0.70	1,000	-	59,000	-0.01	70,460
KAPCHORWA TEA	-	-	-	-	-4.17	200	-	400	-0.83	120
LIMURU TEA	-	-	-	-	-	-	-	-	-	-
REAL VIPINGO PLANTATIONS	-0.27	10,800	0.27	2,200		300	-	1,400	-	3,140
SASINI LTD	2.11	29,500	0.42	58,000	0.42	17,600	0.42	29,500	0.67	30,820
WILLIAMS TEA	-	400	-0.50	1,300	0.50	700	4.76	600	-0.05	1,840
	MON		TUE		WED		THU		AVRG R%	AVRG V
AUTOMOBILE & ACCESSORIES	R (%)	V	R (%)	V	R (%)	V	R (%)	V	Rt	Vt
CAR & GENERAL (K)	-	800	-	-	-	200	-	3,900	-	980
CMC HOLDINGS	-	-	-	-	-	-	-	-	-	-
MARSHARLLS E.A	-1.43	100	1.41	100	-	-	-	-	-0.00	6,900
SAMEER AFRICA	-2.90	13,700	1.43	127,200	1.45	17,700	1.43	93,300	0.56	51,340
	MON		TUE		WED		THU		AVRG R%	AVRG V
BANKING	R (%)	V	R (%)	V	R (%)	V	R (%)	V	Rt	Vt
BARCLAYS BANK	-3.37	398,400	-0.68	2,280,000	1.34	1,500,000	1.64	231,600	-0.08	945,300
CFC STANBIC OF KENYA	-0.65	30,000	-0.65	14,100	-1.32	451,000	1.30	7,500	-0.26	102,260
COOPERATIVE BANK	-	606,200	-0.40	793,100	-0.81	917,600	1.20	1,410,000	0.13	870,880
DIAMOND TRUST BANK	-	31,600	-0.84	111,400	-	139,400	-0.85	900	-0.34	58,400
EQUITY BANK	-	78,800	1.02	4,530,000	-	98,500	1.00	1,170,000	-0.17	1,300,960
HOUSING FINANCE	1.33	39,500	-	135,700	1.01	168,800	2.60	129,400	0.99	95,720

Source: Mystocks Company licensed by NSE for Real Time Data Streaming

APPENDIX 3

AN EXTRACT OF THE MODEL SUMMARY RESULTS

When stock prices are held as dependent variable

When trading volume is held as dependent variable

SECTOR	R	R squire	Ajd. R Squire	Std. Error of the Estimate	R	R squire	Ajd. R Squire	Std. Error of the Estimate
Agricultural	0.471	0.222	0.216	3.73274	0.233	0.054	0.046	21083.0911
Automobiles	0.336	0.113	0.121	0.6506	0.22	0.048	0.034	37680.3898
Banking	0.187	0.035	0.026	0.63723	0.567	0.321	0.317	959145.6392
Commercial & Services	0.154	0.024	0.016	2.34107	0.486	0.236	0.23	2.6343
Construction & Allied	0.185	0.034	0.023	1.22642	0.197	0.039	0.027	63550.2006
Energy & Petroleum	0.135	0.018	0.004	1.20007	0.436	0.19	0.178	394946.0454
Insurance	0.099	0.01	0	0.99277	0.347	0.12	0.112	801047.0039
Investment	0.044	0.002	0.001	1.55785	0.466	0.218	0.206	155795.2693
Manufacturing & Allied	0.154	0.024	0.017	0.92793	0.759	0.576	0.573	306902.5524
Telecommunication	0.073	0.065	0.054	0.91992	0.69	0.476	0.461	5172994.5942
Consolidated NSE Sectors	0.187	0.035	0.031	1.64435	0.458	0.21	0.192	1155241.0239

Source: Research Findings

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DATE 15/08/2013

TO WHOM IT MAY CONCERN

The bearer of this letter ACHIENG OTIENO GEORGE

Registration No. D61/72710/2012

is a bona fide continuing student in the Master of Business Administration (MBA) degree program in this University.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate your assistance to enable him/her collect data in your organization.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.

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