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Effect of price volume momentum on stock returns at the Nairobi Securities Exchange

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EFFECT OF PRICE VOLUME MOMENTUM ON STOCK RETURNS AT THE NAIROBI SECURITIES EXCHANGE

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Submitted in partial fulfillment of the requirements for the award of the degree of Master of Commerce at Strathmore University

School of Management and Commerce

Strathmore University

Nairobi, Kenya

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DECLARATION

I declare that this thesis is my original work and has not been presented to any other university for a ward of a degree. Any work done by other people has been duly acknowledged. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person. It has been examined by a board of Examiners of the Strathmore University

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7, June 2017

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ABSTRACT

The purpose of the study was to examine the existence of price volume momentum. The period of study was between 2011 and 2016 and was divided into 2011-2013 and 2014-2016. The study also went further to analyze the behavior of trading volume and stock returns on a nonlinear basis. Finally, the study assessed perception of trading participants on price volume momentum. The existence of momentum returns was assessed using the Jegadeesh and Titman methodology in which portfolios were formed based on past returns as well as past volume. Momentum returns were measured as the difference between winner and loser portfolio for every holding period. From the analysis, momentum returns were found to exist at the NSE even though in the short run, three to six months. A bivariate momentum strategy that was formed using trading volume and returns was not found to report higher returns as compared to a univariate strategy. The relationship between trading volume and stock returns was tested using granger causality and impulse response. A nonlinear relationship was found to exist between trading volume and returns, with the relationship moving from returns to stock volume, with index returns being more responsive as compared to stock returns over the period of analysis. Lastly, the trading market participants had varying views as far as price and volume momentum is concerned. From the analysis, a lot of attention is paid to price momentum as compared to the volume momentum arguing that trading volume can be due to the disposition effect. The findings of this study indicate that investors stand a chance to make better returns when they buy into the winning stock and go short on the losing stock. However this can only happen in the short run, over a period of three to six months. Secondly, investment managers can use the findings of the second objective to advice investors since price-volume momentum has been traced at the bourse. Focusing on the trends in trading volume can help predict the future performance. For the market regulators the findings of this study are key as far as market efficiency is concerned. Momentum returns exist at the bourse even though in the short run, if compared to momentum returns reported in the developed markets which report momentum returns up to a period of five months. This implies that NSE is not efficient if compared to the developed markets. The study contributes to the existing knowledge on price volume momentum, where momentum returns have been found to exist in the short run three to six months, as well as the relationship between trading volume and stock returns, impulse response results indicate that even though the relationship between the variables moves from stock and NASI returns the effect is short lived up to five days after which no significant change is seen

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LIST OF ABBREVIATIONS AND ACRONYMS

CBD – Central Business District

CMA – Capital Markets Authority

EMH – Efficient Market Hypothesis

NSE – Nairobi Securities Exchange

RWH – Random Walk Hypothesis

DEFINITION OF TERMS

Price Momentum – Refers to a situation whereby stock prices will maintain their historical patterns, that is, winner stocks will continue being winners and loser stocks will continue being losers

Volume Momentum – Refers to a situation whereby stocks with a history of low trading volume demand an illiquidity premium as compared to stocks with a high past trading volume

Impulse Response – Refers to the reaction of a VAR system when an external shock is effected on one variable of the system.

Momentum Returns – Refers to the difference in returns between the winner and looser portfolio over a given period of time.

ACKNOWLEDGEMENT

CHAPTER ONE

INTRODUCTION

1.1 Background

Price volume momentum has gained popularity in financial markets (Floros & Salvador, 2016; Sehgal & Vasishth, 2015; Sun, Duong, & Singh, 2014). Empirical studies done have investigated the existence of this strategy in both developing and emerging markets (Agathee, 2012; Galariotis, 2014; Chui, Titman, & Wei, 2010). From the studies, it has been unanimously agreed that past price patterns can have predictive power over the behavior of returns in future, in what is predominantly known as price momentum. This is in contradiction to what Fama (1970) argued in his seminal work on Efficient Market Hypothesis, that security prices at always reflect all the relevant information and investors cannot earn above normal returns. In a more recent study but with interesting findings, Fama (1991) argued that stock prices reflect information up to the point where the marginal costs are equal to the marginal benefits. Price momentum refers to a situation whereby stock prices will maintain their historical patterns, that is, winner stocks will continue being winners and loser stocks will continue being losers (Maheshwari & Dhankar, 2017). On the other hand, volume momentum refers to a situation whereby stocks with a history of low trading volume demand an illiquidity premium as compared to stocks with a high past trading volume (Chan, Chung, & Fong, 2017).

The EMH as postulated by Fama (1970) has been a subject of great debate in empirical finance with some researchers agreeing to the EMH (Bollen, Mao, & Zeng, 2011; Borges, 2010) while others have come out strongly to oppose it (Sehgal & Vasishth, 2015; Titman, 1993), arguing that markets do experience inefficiencies also known as anomalies and thus prices in the market are distorted and do not reflect the EMH. These anomalies have been classified as calendar, fundamental and technical (Kuria & Riro, 2013). From empirical studies, volume and price momentum have been predominantly identified as strategies or trading rules upon which investors can leverage on to make above normal returns (Jegadeesh & Titman, 2002; Ansari & Khan; 2012). The underlying assumption of this strategy is that stocks will maintain their historical pattern in the future (Subadar Agathee, 2012). The behavior of the prices post holding period have elicited mixed reaction with some studies arguing that price will continue with their past historical

behavior post holding (Subadar Agathee, 2012). On the contrary, others have argued that prices will exhibit reversal characteristics (Drew et al., 2007).

Though widely researched, price volume momentum has elicited contradicting findings (Agathee, 2012; Ansari & Khan, 2012; Choudhry & Wu, 2011). Opponents of price volume momentum have argued that the level of efficiency and market development informs the level of market returns; hence, developed markets experience more pronounced momentum returns as compared to emerging markets (Hameed & Kusnadi, 2002; Jarrett, 2008; Okpara, 2010) . On the contrary, Rouwenhorst (1998) found that emerging markets experienced strong momentum and expected returns in emerging markets were not different from those in the developed markets.

Momentum in security prices can be attributed to a number of drivers even though the exact driver of momentum is still a subject of academic debate. Chen (2012) argued that stock prices underreact to any new information in the market and therefore the speed at which the information is reflected in the prices is gradual. In the same vein Agathee (2012), Lee and Swaminathan (2000), and Sehgal and Vasishth (2015) asserted that analysts take time to incorporate new information in trying to forecast the expected performance of the securities and thus delayed consideration might lead to momentum returns in the short run. Conrad and Kaul (1998) argued that momentum returns are as a result of the cross-sectional variation in the mean returns of individual stocks; thus, buying stocks that are classified as winners and short selling those stocks that are classified as losers makes loser stocks to be considered less risky and winner stocks highly risky. On the contrary, other studies (Jegadeesh & Titman; 2002; Nakhli, 2013) argued that even though momentum returns exist, it is not clear whether momentum returns are due to risk based factors, behavioral factors or industry specific factors.

An old adage at the Wall Street argues that 'it takes volume to move prices'. However from studies done, the relationship between trading volume and stock returns has generated a number of findings that contradict and agree in equal measure. In some studies (Gallo & Pacini, 2000; Kim & Kon, 1994), the relationship between trading volume and stock returns was found to be causal whereas in other studies the relationship has been found to be nonlinear (Chen, 2012). In other studies, no clear relationship has been established between trading volume and stock returns. Llorente & Michaely, (2002) and Mulherin, Revue, & Mulherin (2017) argued that returns cause

volume whereas others (Girard & Omran, 2009) argue that it is trading volume which causes returns.

In the emerging or less developed markets, mixed results have been achieved as far as price volume momentum is concerned. While Pyun, (2000) and Bohl and Henke (2003) provide evidence of the positive relationship at the Korean stock market and Polish stock market, Subadar and Agathee (2012) find an inverse relationship between volume and returns at the Mauritius stock exchange which was attributed to the emerging market status of Mauritius. Chen (2012) argued that trading volume only causes the stock returns in the short run, but found no evidence of the relationship in the long run. Min ye (2007) argued that past trading volume played a significant role in forecasting price momentum.

Price and volume factors did not play a role in explaining returns in some select emerging markets, in which case the unexplained aspects can be attributed to either investor under or over reaction to past information (Sehgal & Vasishth, 2015).A contemporaneous relationship was found to exist between trading volume and futures contracts in India Floros and Salvador (2016). Studies done in Africa in relation to price and volume momentum have come up with interesting findings. In Egypt, the momentum profits were found to be contributed more by the winner portfolios as compared to the loser portfolios performance, implying that the market was susceptible to information from winner stocks as compared to loser stocks.

In Kenya, concerted efforts have been directed towards enhancing the level of market efficiency. These include the automation of equity and bond trading in the year 2006 and 2009 respectively. These efforts were expected to lead to a reduction in the speed of executing a transaction and improvement in the price discovery process. Demutualization and self-listing of the NSE in 2014 was done to allow an increase in number of shareholders by allowing the investing public to have a portion of NSE. From the empirical findings, even though scarce, this has not been the case. Lishenga (2011) in a study on price momentum at the NSE found that price momentum in returns existed at the bourse even though in the short run. The cause and extent to which momentum affects the market is still debatable. Kuria and Riro (2013) asserted that even though momentum returns exist at the NSE they could not be adopted by the multifactor models adopted in the studies.

Nairobi Securities exchange is a vibrant stock market in the East African region. It is classified as the largest in the region in terms of market capitalization and the number of companies listed (ASEA, 2015). Equity investors at the exchange has grown to a high of 1.6M over the last ten years (CMA, 2016), with a big proportion being individual investors. Despite this development, the market has not reached the level of developed markets in terms of efficiency. This implies that the level of momentum returns at the bourse is different. The extent to which it is affected is equally dependent on the existing market microstructure, thus providing a good basis for further interrogation on the level and nature of momentum returns combining both price and volume information.

Previous studies done at the NSE (Lishenga, 2011; Omuronji, 2005) looked at momentum at the NSE both using the Jegadeesh and Titman methodology using past returns as the basis for portfolio formation. This studies equally adopted an overlapping approach to portfolio formation. This study took a slightly different approach, using the Jegadeesh and Titman methodology portfolios using two both past returns and trading volume as well as the study the study adopted the non-overlapping strategy and tested for the existence of momentum at the NSE

1.2 Statement of Problem

The investment management process is quite dynamic (Hameed 2002). The ever changing capital market conditions as well as the characteristics of the investor have been cited as the contributing factors to this dynamic nature. The ability of investors to make above normal returns is dependent on how they develop their investment strategies and align them with market trends (Collins & Brink, 2016). Price volume momentum is one such strategy. The use of past information on price and volume patterns has been a subject of past research. From the studies, it is clear that price patterns can be used to explain future returns (Jegadeesh and Titman 1993; Sehgal & Vasishth, 2015). However the usefulness of past volume information has generated considerable debate, with some scholars arguing that there's no relationship between past volume information and stock returns in the future. Conversely, others have argued that it is stock returns which inform volume whereas some argue that there's no relationship between volume information and stock returns.

As far as combination of price and volume information is concerned, bivariate momentum investment strategies have been found to be more profitable if compared to univariate momentum strategies. However past low volume losers have been found to outperform past high volume losers

within three to six months while low volume winners take long to outperform high volume winners with no clarity on what exactly causes the difference in period of reversals. In Kenya, efforts have been directed toward enhancing market efficiency (introduction of the automated trading system for both equity and bond trading) by the regulatory bodies. Concentration in trading at the NSE has been among few companies. According to Kestrel (2015), the few companies attracting investors has been due to free float and availability of shares for trading. A number of companies, among them Safaricom, Limuru Tea, KCB, and Kakuzi, have been on upward trend; thus moving the market in terms of trading volumes and index performance. On the flipside, some stocks like Mumias Sugar, KQ and CIC Insurance have been on downward trend, thus negatively affecting the level of returns at the bourse over the period of 2011-2015.

This study therefore looked at price and volume momentum at the NSE, and sought to answer some of the questions that have elicited mixed reactions among scholars and practitioners in investment management: Do investors earn high returns when they use a bivariate price-volume momentum or when they use Univariate price momentum strategy? Does trading volume influence the stock returns in the market or returns in the market influence the trading volume and lastly; what do trading market participants perceive of price volume momentum?

1.3 Research Objectives

1.3.1 General Objective

To analyze the effect of volume and price momentum on stock returns with a special focus on companies listed at the NSE.

1.3.2 Specific Objectives

1. To examine price-volume momentum in stock returns at the NSE.
2. To assess the relationship between market trading volume and stock returns at the NSE.
3. To evaluate whether price-volume momentum influences market participants' investment decisions.

1.4 Research Questions

1. Does price-volume momentum exist at the Nairobi Securities Exchange over the period 2011 and 2016?

2. What did markets participants perceive of trading volume and price momentum in stock returns?

1.5 Scope of the Study

The study focused on listed firms at the NSE from the year 2010 to 2016.The period was selected to capture evidence on price volume momentum over the last six years. Secondly, previous studies (Girard & Omran, 2009; Howard et al., 2013; Sehgal & Vasishth, 2015) used a period of three to five years to evaluate these strategies and thus provided a good basis to select the period of study.

1.6 Significance of the Study

An examination of the effect of price and volume momentum on stock returns had important implications to a number of stakeholders in the market.

1.6.1 Fund Managers and Investment Analysts

They could use the findings of this study and particularly the first and second objectives to make investments from an informed position.

1.6.2 Capital Markets Authority and NSE

The findings of this study shed more light on the state of market efficiency in Kenya. These two regulatory bodies could use the findings to come up with better ways of enhancing efficiency in the market and reducing the extent of momentum in the market.

1.6.3 Academicians

Academicians can also benefit from the study because it attempted to shed more light on price and volume momentum from an emerging market perspective. The area of price volume momentum has generated a lot of debate as far as its effectiveness is concerned. Therefore, from the findings of this study, scholars can get additional information.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covered both the theoretical and empirical review of existing literature. Section 2.2 reviewed theories relevant to this study, which are EMH, Random Walk and Behavioral Finance. Section 2.3 reviewed the empirical literature as done by previous researchers. This chapter equally came up with the research gap in section 2.4 and developed a conceptual framework in section 2.5.

2.2 Theoretical Review

Many theories have been used to underpin studies on price volume momentum. This research was anchored on three theories due to their predominance in studies related to stock market returns. They include EMH, Random Walk Theory and Behavioral finance. The EMH was applied to evaluate the behavior of stock market returns in relation to the price and volume momentum, as to whether the behavior of returns at the bourse aligns with the EMH. Behavioral Finance was used so as to shed more light concerning the extent to which behavioral aspects of an investor influence the price-volume momentum. The random walk theory gave an insight on how stock returns behaved at the market; with regard to whether they follow a particular pattern?

2.2.1 Efficient Market Hypothesis

Market efficiency can be defined as the state in which information available is incorporated in the security prices. Security prices reflect information up to the point where the marginal costs are equal to the marginal benefits (Fama, 1970, 1991). Generally, it was assumed that securities markets were efficient and any information about stocks in the market and about   the market as a whole was duly and fully reflected in the prices. Investors will thus not be able to earn above normal returns irrespective of the analysis adopted as compared to those of randomly selected portfolios.

In his seminal study, Fama (1970) classified an efficient market into three different forms; strong, semi strong and weak form of market efficiency. Under the weak form of market efficiency security prices reflect all the past information and thus investors are unlikely to make abnormal returns by utilizing past information to make their investment decisions. Buguk and Brorsen (2003) agree with Fama (1970) on the weak form of market efficiency, arguing that some markets and

particularly those that are underdeveloped fall under the weak form of market efficient since transfer of information takes a little bit of time. However, Titman (1993) disputes this form of market efficiency and argues that irrespective of the level of stock market development, investors can use past prices to make abnormal returns especially in the Central and Eastern regions of Europe.

Fama (1970) posited that the semi strong form of market efficiency entails securities in markets that are deemed to reflect all the current and past information, for which investors stand no chance of earning abnormal returns. On the other hand, the security prices in strong form of market efficiency reflect all the available information public and private that is necessary for formation of prices in the market. According to Pandey (2011), markets can be efficient even if many market participants are quite irrational. Researchers who believe in market efficiency argue that securities markets are good devices for reflecting new information rapidly and accurately and in an efficient market the actual price of a security will be a good estimate of its intrinsic value (Islam & Khaled, 2005; Olowe, 1999). On the contrary, Shastark,(1989) argued that the major problem with EMH is the fact that it assumes that all market participants arrive at rational expectation forecast, implying that all market participants have the same expectations about future securities return. This is debatable since if investors had homogenous expectations about returns then it would be meaningless to trade and yet securities market have experienced a surge in trading activities. In the same vein Jensen and Meckling (1976) argued that the EMH can only be viewed as a frictionless idea that would exist if there were no capital market imperfections such as transaction costs, taxes, institutional rigidities. Malkiel (2003) argued that as long as the securities market exist, the collective judgment of investors will at times result in mistakes, some market participants are less rational thus markets are likely to experience pricing irregularities and even predictable patterns in the stock returns persistently overtime.

Fama (1970) described two forms of expected returns under the efficient markets theory: the submartinggale and the random walk. Under the submartinggale, the current price reflects the expected price of the next period based on the current information. On the other hand, under the random walk, changes in prices are independent and identically distributed. Some critiques of this theory however argue that perfectly information efficient markets are not possible. Grossman and Stiglitz (1980) argued that if markets had information efficiency it would be profitless to collect

information and yet most securities   markets in the world enhance their revenue base from selling information.

 EMH argues that investor's expectations of returns should be limited to the nature or the form of the market efficiency. NSE has been classified under the semi strong form of market efficiency Ndegwa and Mboya (2014), implying that securities reflect past and current information concerning a security in the market. Thus asset prices should not form patterns for predicting the future returns. The form of market efficiency was important when assessing level of momentum returns as it informed on the level of returns and over what period hence the need for EMH

2.2.2 Behavioral Finance

Behavioral Finance theory was first studied by Tversky and Kahneman (1992). This theory goes beyond the established market models for forecasting returns and looks at the personality aspect of the investor. Behavioral finance focuses on the sociological and psychological issues that influence the investment decision-making process (Aguila 2009). The two major building blocks for behavioral finance are investor decision making process and the cognitive biases (Ritter, 2003). The cognitive biases include heuristics, overconfidence, and conservatism and disposition effect. Ricciardi and Simon (2000) argued that generally behavioral finance has four underlying aspects that inform its place in the investment management process. They include the financial cognitive dissonance, overconfidence, prospect theory and regret theory.

With respect to the overconfidence aspect, human beings have the tendency to over-rely on their technical skills and ability to predict their breakthrough. In other studies (Agathe 2012) this has been classified as self-attribution bias where investors want to associate the good performance of their investment on their ability to correctly predict whereas they distance themselves from those investments that earn losses. The financial cognitive dissonance postulates that as human beings we try to reduce the level of internal conflict by either trying to review our previous values, feelings or opinions or else by finding more reasons to justify our decision. Investors in the stock market at times can apply this theory where they are required to make a decision but that decision might have to be rationalized or require them to review what they have previously believed in. Investors exhibit a positive bias towards the current psychological models and the choices made are dependent upon previous investor choice Goetzmann & Peles (1997) .

As far as the regret theory is concerned, investors will re-evaluate the future turn of events or situation before committing or making a decision currently. Bell (1982) defined regret as the emotion caused by comparing a given outcome or state of events with the state of a foregone choice. In the securities market an investor chooses to either buy or sell a stock so as to avoid the regret of making a wrong investment decision (Ritter, 2003). The prospect theory states that people do not always behave rationally. The decisions that people make are based on psychological factors that influence people under certain conditions. In a study on portfolio theory as far as asset allocation is concerned (Stracca, 2004) found that the portfolios, including those of the investor with a loss aversion coefficient of 2.25, are extremely unstable across decision horizons whereas in dynamic settings the portfolios of investors with loss aversion on the order of two perform well. Critics of this theory argue that in as much as investor behavior plays a role in the investment decision, the underlying fundamental and technical strategies inform the final decision on the securities to invest in.

The moods of an investor go hand in hand with his investment behavior and at large the stock market performance in terms of stock returns. The behavioral theory shed more light on this study in the following ways: nominated advisors apart from having knowledge and skills have to listen to what the investors want; do the demands or requirements of the investors follow a particular line of thought? To what extent does behavioral finance influence the investment decisions at the bourse? Thus this theory emphasized the role played by investor sentiment on the level of returns as well as the trading volumes in the market.

2.2.3 Random Walk Theory

This theory traces its roots to the 1900s. It posits that stock price fluctuations are independent over time and can only be described by a random process similar to tossing a coin or selecting a sequence of numbers from a random number table. As far as this theory is concerned, use of technical trading rules or trading procedures cannot assist the investor in making above normal returns, but rather adopting the buy and hold strategy can enable them earn high or above normal returns. According to this theory the current market price of a given security is not dependent upon the previous price patterns in the market. At any given point in the market, the share price reflects the true value of the stock, any information generated in the market shall be assimilated into the stock prices in a random manner and any changes reported in the value of security prices is a

reflection of the changes in the market estimate of the value of the stock. From this theory, it can be argued that if a market is considered efficient then the valuations of the stocks are correct and the market has enough rational participants who can be able to profit on such opportunities. Graig (1988) disputed this theory using stock prices of small firms at the American Stock Exchange. From the study the random walk hypothesis for weekly stock market returns by use of a simple volatility-based specification test was rejected. It was however argued that the rejection of the random walk hypothesis did not in any way imply inefficiency of stock price formation.

The random walk theory contributed to this study in the following ways; the movement of prices under this theory is assumed to be random and thus investors cannot certainly come up with a particular pattern, however from the studies done at the NSE (Kuria & Riro, 2013; Lishenga, 2011; Muimi, 2010; Omuronji, 2002) momentum has been traced, so based on this theory the behavior of stock returns are evaluated further to ascertain the nature of patterns at the NSE; are they random or they follow a particular pattern?

2.3 Empirical Review

The empirical review on price volume momentum focused on price momentum and its drivers, relationship between trading volume and stock returns and the relationship between trading volume and price momentum. The literature has been reviewed regionally starting from global markets then Latin America, Africa and then Kenya.

2.3.1 Price Momentum

Price momentum strategy refers to a situation whereby past winning stocks are expected to continue being winner stocks in the foreseeable future whereas the past loosing stocks will be expected to continue being loser in the future and thus rational investors will be expected to invest or buy winning stocks while going short on loosing stocks (Agathee, 2012; Titman, 1993). Agathe (2012), while doing a study on the Mauritius stock exchange using Jegadesh and Titman procedure, argued that the underlying assumption of this strategy is that stocks will maintain their historical pattern in the future, an assumption that has been justified in subsequent studies. The behavior of the prices post holding period has elicited mixed reaction. In some studies (Collins & Brink, 2016) it has been argued that prices will experience a price reversal whereas others (Gupta, Locke, & Scrimgeour, 2013) have argued that price continuation will be experienced. Equally the period over which the momentum will be experienced is debatable. Sehgal & Jain, (2011) did

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a study using portfolio formation based on company characteristics and short term prior returns using regression analysis and put the period as short term to the tune of three months to one year, whereas Ansari & Khan, (2012) put at it long term one year or more. Price reversal has been defined as the situation whereby prices of securities will be expected to take an opposite turn post holding period whereas price continuation refers to a situation whereby prices will maintain their historical state (Galariotis, 2014).

While doing a study on whether stock indexes in the US underreact or overreact Schnusenberg & Madura (2001) found that over the period of the study 1928 -1967 , stocks classified as losers achieved higher returns over six to twelve months as compared to stocks classified as winner stocks. Similarly asymmetric overreaction was found to be more pronounced for losers than for winners. Long term losers were found to outperform the winners only in the month of January. Chopra, Lakonishok and Ritter (1992) corroborated this findings in a study on the stock returns of NYSE between 1926 and 1986 introducing size, previous returns and betas in the regression model found that loser portfolios formed on the basis of prior five-year returns outperform winners by 5 percent to 10 percent per year during the subsequent five years. The month of January exhibited greater arbitrage opportunities for smaller firms as compared to large firms. On the other hand Agathee,(2012) argued that even though momentum returns existed at the market it was not clear how long the momentum lasted at the bourse. In the seminal study of Jegadeesh and Titman (1993), the strategy of six months formation and six months holding period yielded highest returns whereas in Ansari & Khan, (2012) the strategy of three moths formation period and three months holding period generated the highest returns.

Momentum strategies have a time frame within which investors stand to generate above normal returns. In New Zealand Gunasekarage & Kot, (2007) did a study using Jegadeesh and Titman model over the period of 1995-2004 and found that a strong continuation momentum effect than reversal effect existed in the market. Investment strategies were more profitable when formed on the basis of holding period of three to six months. Additionally it was profitable to buy past winners and sell past losers in short term (three to six months) and medium term (twelve months) as opposed to the long run. In the same breadth (Omuronji, 2002;Jegadeesh & Titman, 2002; Nakhli, 2013; Titman, 1993;Sehgal & Jain, 2011) in their respective studies found that indeed momentum returns do exist in the markets but in the short run.

Studies done at the Nairobi Securities exchange have classified it under the weak form of market efficiency (Ndegwa & Mboya, 2015; Kuria & Riro, 2013). Despite these findings; studies done on the bourse have come up with interesting findings as far as the ability of investors to earn above normal returns. First of all the market has been found to experience market anomalies despite the efforts being taken by the market regulators to enhance efficiency. Kuria and Riro (2013) and Lishenga (2011) in their study even though focusing on different aspects of stock market anomalies, found that momentum, calendar and day of the week anomalies existed at the market.

2.3.2 Drivers of Momentum Returns

The drivers of price and volume momentum can be partly risk based and partly behavioral. In a study on select emerging markets using data from 1998-2011, with portfolios formed on the basis of past prices, price momentum was found in countries like Brazil, India, South Africa and South Korea (Sehgal & Vasishth, 2015). Stocks that experienced low volumes outperformed stocks that experienced high volumes over the period. On combination of both price and volume strategies, it was found that bivariate strategies by far outperformed univariate strategies, which is in agreement with Lee and Swaminathan (2000) who found that low volume firms generated higher returns and price momentum continuation can be predicted by past trading volume. On the contrary, Chen, Hong and Stein (2001) using monthly stock return data for 470 BSE companies between 1997-2013 argued that stocks that exhibited higher trading volume over a period of the past six months had returns that were negatively skewed as opposed to the popular belief that low volume stock reported higher returns as compared to high volume stocks.

The momentum of stock returns can be explained by the performance of the winning stock as compared to losing stocks. While doing a study on the Indian Stock Exchange using monthly data from 1997-2013 using T statistics and risk adjusted Fama and French Model, Maheshwari and Dhankar, (2017) argued that momentum returns at the exchange were driven by winning stocks and therefore investors buying winning stocks and going short on loosing stocks have a chance of making higher returns. Momentum was still evident despite controlling for size, value and trading volume shocks implying that the presence of momentum effect did in any way signify presence of size and illiquidity effect. This was in agreement with Jegadeesh and Titman, (1993) even though with some short term effect of return continuation. Maheshwari & Dhankar,(2017) argued that short term return continuation is more pronounced among past winners as compared

to past losers. On the contrary Drew et al.,(2007), while doing a study on the Australian Stock Exchange, found that substantial momentum existed at the exchange, however the returns in post holding period were found to experience reversals   as opposed to continuation which is in conformity with the findings of Lee and Swaminathan (2000). The only difference from the study was that the period for price reversals was found to be shorter in Australia as compared to the USA. In the US return reversals were found to last for three to four years while in Australia they lasted for two to three years, with the speed of reversal found to be dependent upon the formation period. Long formation period was found to have quick reversals. The level of momentum returns is not only influenced by winning stocks but also the losing stocks that make up the portfolio. Ansari and Khan, (2012) in a study on the Indian stock market found that as opposed to what the EMH postulates, it's possible for investors to adopt a simple investment strategy and be able to earn above normal returns. It was argued that momentum returns at the exchange are not only driven by the good performance of winner stocks, but they are also influenced by the bad performance of the loser portfolio. However the study could not be able to explain the source of momentum returns pegged on the model used.

Culture equally plays a role in explaining the level of momentum returns. Chui et al. (2010), using event study methodology from 1986-2000, argued that their existed positive relationship between individualistic cultures and momentum profits. Western cultures were considered to be more individualistic as compared to the Eastern countries and therefore investors in less individualistic countries were less likely to be overconfident about the precision of their information and thus less likely to make investment decisions that generate momentum. In the same vein but with focus on behavioral aspects, Barferis et al. (1998), Daniel et al. (1998) and Hong and Stein (1999) used behavioral models to try and explain the momentum returns and found that the momentum anomaly could be explained by inherent biases in the way investors give value to information at their disposal, extra period returns could be attributed to the delayed overreaction to some specific firm.

Idiosyncratic volatility defined as the risk associated with a security at the firm level has also been cited as a determinant of momentum returns. Howard, Yong, Shin, & Pyo (2013) while doing a study on the relationship between the momentum returns and idiosyncratic volatility, found that the Korean Stock Exchange experienced excess returns due to momentum. Similarly, idiosyncratic

volatility was found to have a positive relationship with momentum profits at the Indian stock market which support the argument that behavioral factors do influence the momentum returns of the bourse at a given time. While doing a study at the Nairobi securities exchange to assess whether momentum returns existed at the bourse (Kuria & Riro, 2013; Lishenga, 2011) found that indeed momentum returns existed at the bourse, however the momentum returns could neither be explained by the Fama and French three factor model, nor the Carhart four factor model.

2.3.3 Relationship between Trading Volume and Stock Returns

Trading volume and price momentum have been studied widely, even though most of the studies done have reviewed them independently with contradicting results. Chandra (2012) in a study on the Indian market found that there existed one directional causality from stock returns to foreign institutional investment inflows .Trading volumes were found to cause variations in returns in the short run but in the long run its returns which cause changes in the FII trading behavior.

Trading volume plays an important role in providing the link between momentum and value strategies. While doing a study on the relationship between trading volume and value strategies, Lee & Swaminathan (2000) found that firms with high past turnover ratios manifest glamour features and earn lower returns, whereas firms with low past turnover ratios reveal value features and earn higher returns. Previous trading volume of stock was found to have a predictive power over the immensity and persistence of price momentum, specifically; price momentum was found to reverse over the period of five years and high volume winners experienced faster reversals as compared to low volume loser reversals. In the same vein Griffin, Nardari and Stulz (2007) argued that there existed a positive relationship between the turnover and past returns in many markets. On the contrary while evaluating the empirical linkages between stock returns and trading volume using monthly data for the S&P 500 price (Chen, 2012) argued that there existed strong evidence of asymmetry in the contemporaneous relationship. Stock returns were capable of predicting trading volume. However evidence of trading volume predicting returns was found to be weaker, a finding that is in agreement with Sehgal and Vasishth (2015) who argued that there was no evidence of stock prices changes influencing the trading volume, however trading volume was found to influence the stock price changes over time.

Trading volume around announcements by companies is dependent on the nature of shareholders that a company might be having. Mudalige, Kalev and Duong (2016), in a study on the Australian

Stock Exchange using the Jegadeesh and Titman procedure of portfolio formation, found that institutional investors as opposed to individual investors manifest abnormal trading volume before and after announcements. However, both the individual and institutional investors buy higher than sell volumes before and after scheduled and unscheduled announcements. Conversely Chae (2005) did a study on the changes in trading volume before scheduled and unscheduled announcements and found that cumulative trading decreases inversely to information asymmetry in case of scheduled announcements whereas trading volume before unscheduled announcements decreases dramatically.

Level of confidence and customer rationality can influence the level of trading in the market. While doing a study to test whether overconfident investors trade more than rational investors Lobato, Velasco and Lobato (2017) found that investors who suffered from self-attribution bias had a tendency to trade more. Sehgal & Jain (2011) corroborated these findings and found that investors more often than not suffer from the self-attribution bias whereby if they make an investment decision that yields above normal returns, they   attribute it to their prowess in making investment choices in the market. On the contrary, if they make an investment choice that results in losses, it is due to bad luck as of that moment. In agreement Statman, Thorley and Vorkink (2006) while doing a study on the relationship between overconfidence and trading volume, argued that there was a positive relationship between lagged returns for several months and trading volume. The relationship was cross cutting for both market wide and individual security an aspect they attributed to investor overconfidence and the disposition effect. The volume of each security was found to be more reliable in explaining market returns as compared to stock return shocks, with the relationship being predominant in small cap stocks largely held by individual investors.

The history of price behavior or performance influences an investor's decision to invest in or divest from a particular stock in the market. In a study on the relationship between past price and investor decision making, Huddart, Lang, Yetman, Huddart and Lane (2017) found that trading volume increased substantially when the stock prices either increased or reduced based on the past trading volume range. Increase in volume is more pronounced in instances where the time is longer, the size of the firm is smaller and higher interest from individual investors in the firm, a factor that was attributed to the bounded rationality of investor in the firm. In a study on the risk, return and trading volume relationship in emerging markets with a special focus on Karachi Stock Exchange,

Khalid Mustafa and Muhammad (2010) found that current changes in the trading volume has a positive impact on the returns in the market. Additionally volume information was found to have a positive information content in predicting returns.

Past market returns and past portfolio returns do affect the trading activity of investors and particularly for individual investors. Glaser and Weber (2009) argued that after period of high returns the propensity for individual investors to invest increased. High returns on portfolios led investors to buy high risk stock and reduce the number of low risk stocks in their portfolio thus past stock returns and past portfolio returns do affect the trading activity of investors especially for individual investors.

The character of investors influences the behavior of trading and consequently the price dynamics. Investors who pay attention to the information in the market and use the information for purposes of trading and those who ignore the information for trading purposes result in dynamic relations between trading volume and stock returns. On the other side Karpoff (1986) argued that whereas previous researches have argued that investor disagreement can lead to increased trading, increased trading is not as a result of investor disagreement but it can be due to identical interoperation of information in the market or as well as having divergent view on information in the market.

Trading volume was found to be lower in a costly market and volume increases as a result of persistence in the informational after the event period. Gündüz et al. (2017) while doing a study on the causal relations between stock prices and volume figures for stock markets in Czech Republic, Hungary, Poland, Russia and Turkey using granger causality test, found that there was no causal relationship between the variables in Czech Republic. In Hungary bidirectional causality existed irrespective of volume or market turnover tested whereas Poland reported a bidirectional causality running from market turnover to stock prices. In Russia and Turkey stock prices unidirectional cause both volume and market turnover.

Price momentum and trading volume appear to have a predictive ability on the expected stock returns of a company. Scott et al. (2017) argued that trading volume and price momentum do have a predictive power on the stock returns even though in a nonlinear fashion. This was attributed to the investor's behavior of under reaction to news in the market, a factor that is more pronounced for high growth companies. From the study it was argued that if growth of the company is

controlled then volume and momentum effect could be explained by investor news in the market. Thus the momentum-volume effect should not be considered as a technical trading rule but rather an investor's behavior of delayed reaction. Conversely Gabaix et al. (2017) while doing a study on the US market argued that returns in the US market on high volume days were likely to spill over to the home market from cross listed stocks subject to the greater risk of informed trading. Market movements were found to be due to trade by large institutional investors in relatively illiquid markets which ultimately generate increase in the stock returns and trading volumes in the market.

In a study on the dynamic relationship between the index returns, return volatility and trading volume for eight Asian markets (Sun et al., 2014) trading volume was found to be dependent upon the shocks in the domestic and foreign returns as well as on the volatility particularly for returns shocks originating from the US. Lee and Rui (2002) however found that trading volume does not granger-cause stock returns on each of the three market investigated but their existed a positive feedback relationship trading volume and return volatility at the exchange.

Based on the empirical review, the effect of trading volume on stock returns is not clear, with some scholars arguing that trading volume influences the level of stock returns up to some point beyond which it's the stock returns that influence the trading volume. Given this controversy on the relationship between trading volume and stock returns, a hypothesis is developed that seeks to address the relationship between trading volumes and stock returns.

H_O-Stock returns influence trading volume

H_1- Trading volume influences   stock returns

2.4 Research Gap

Trading volume and price momentum has received attention in past empirical researches (Floros & Salvador, 2016; Gündüz et al., 2017; Huddart et al., 2017). The existence of price momentum in the markets has been classified according to the market under investigation. From the studies done (Howard et al., 2013; Stork, 2011), developed markets have been found to have pronounced momentum returns as compared to emerging markets. However some studies done by Girard and

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Omran (2009) and Sehgal and Jain (2011) disputed this aspect arguing that emerging markets have come out to report high returns as compared to developed markets. Those that have argued that developed markets experience momentum more than other markets have attributed it to state of markets in emerging countries, regulations in emerging markets, liquidity, investor behavior among others. Based on these varying views a research gap exists to explore further the existence of momentum returns in the emerging markets.

The drivers of momentum returns have equally been studied in both emerging and developed markets even though opinion is divided on what exactly drives the momentum returns in the markets (Ansari & Khan; Sehgal & Jain, 2011; Sehgal & Vasishth, 2015). Some of the factors that have been identified even though debatable include size, liquidity, investor sentiment, risk, sector nature of share-holding, among others. The drivers can be explored further incorporating other aspects that might not have been considered in previous studies.

Volume momentum has been studied with a lot of focus placed on the more developed markets, a factor that is attributed to the level of development in those markets. Studies in the emerging markets are taking shape. From the studies the relationship between trading volume and stock returns has generated mixed findings. In some studies trading volume has been found to influence the stock returns (Gebka, 2012; Glaser & Weber, 2009; Gündüz et al., 2017) whereas in others stock returns have been found to influence trading volume (Girard & Omran, 2009). In other studies a bidirectional relationship has been established between trading volume and stock returns. Thus clarity on whether trading volume causes returns or stock returns causes trade volume is not there hence providing ground for further research.

The interaction of trading volume and price momentum has been done (Sehgal & Vasishth, 2015) with contradicting findings. Low volume stocks have been found to report high returns while on the other hand high volume stocks have been found to generate low returns. Other studies have found out differently. (Mudalige et al., 2016; Scott et al., 2017) have argued that high volume stock generate high returns in the market as compared to low volume stocks in the market, presenting a good opportunity to conduct further research on the interaction between trading volume and price momentum in the markets.

Trading market participants are faced with a number of challenges in the process of making investment decisions, especially coming up with a winning investment strategy. They have to balance between revenue margins of their firms and delivering value to the investor. A number of strategies have been developed to enable them beat the market with different participants having a different view on which ones are the best for their company. Price volume momentum is one of those strategies that can be used by the investment analysts. Does price volume momentum present the better option? Thus a knowledge gap exists on the effectiveness of the various investment strategies since the predominance of one strategy does not negate the importance of the other strategy.

2.5 Conceptual Framework of Price-Volume Momentum and Stock Returns

This section conceptualizes the study by bringing out the major variables under investigation. Dependent variable, is the momentum returns, and independent variables, price and volume momentum. Momentum returns exist in the market over a given period of time. The momentum can be a result of a rally in the stock prices commonly referred to as price momentum as well the changes in the trading volume(Volume momentum).Studies done have argued that price momentum can enable investors earn higher returns by buying into the winner stocks and going short on the loser stocks. Equally the level of trading volume has been as a factor in explaining the momentum returns. Thus based on the explanation, price and volume momentum were selected as independent variables, whereas the momentum return is the dependent variable as shown in the in the framework below. The winner portfolio refers to that portfolio which is made of the top performing securities as far as past returns is concerned. Looser portfolio refers to that portfolio with least performing securities over the test period.

Figure 2.1: Conceptual Framework of Price Volume Momentum and Stock Returns

Independent Variable   Dependent Variable

Price Momentum

Winner Portfolio

Loser Portfolio

Momentum Returns

Volume momentum

Winner portfolio

Loser portfolio
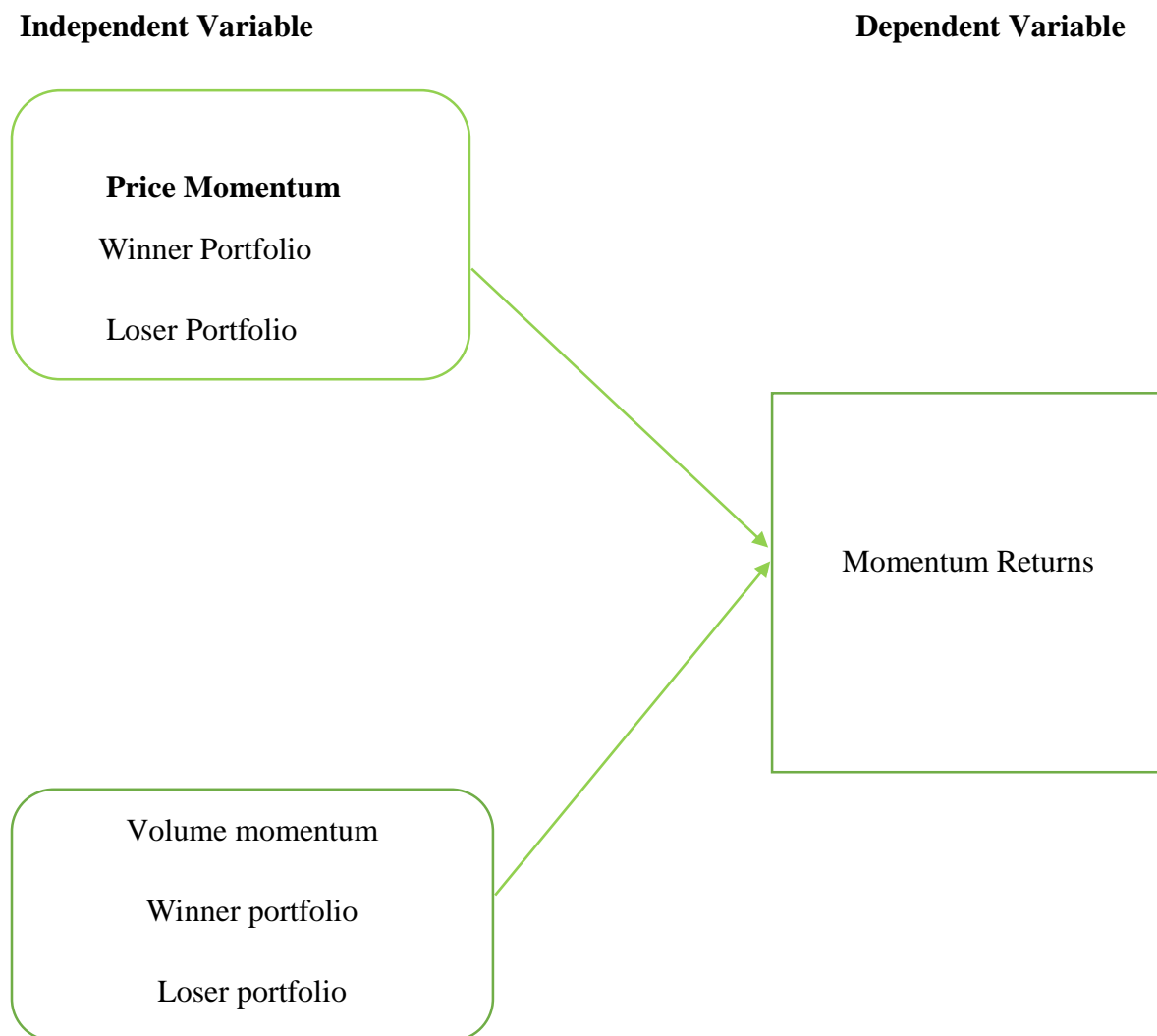
Source: Author (2017)

2.7 Chapter Summary

This chapter began by discussing relevant theories that underpin the research. The efficient market hypothesis, the random walk theory and the behavioral finance theory have been discussed to shed more light on price momentum, trading volume and stock returns. The chapter also included an empirical analysis of the major variables trading volume, price momentum and stock returns. It concluded by presenting a conceptual framework in diagrammatic form

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter covered the following aspects; research philosophy, research design, population and sampling, data collection, data analysis, research quality and ethical consideration. Sapsford & Jupp (2006) defined research methodology as a philosophical stance of worldview that underlies and informs the style of research.

3.2 Research Philosophy

Research philosophy focuses on the way things are perceived in the world (Saunders et al., 2009; Yin, 2009). The focus of the research philosophy was to further assess the assumptions that support the research strategy adopted together with the practical experiences, relationship to knowledge and the process through which they were formed in real life situations (Saunders et al., 2009).

This research adopted Pragmatic research philosophy. According to this philosophy, a concept is only accepted and considered relevant if at all it supports action. It argues that it's unrealistic to choose between two options and the most important determinant of which position to take is the research questions. Unlike positivism and interpretivism, pragmatism incorporates more than one research approach and strategy in the study.

3.3 Research Design

According to Kothari (2004) research design refers to the program of activities that guides the investigator in the process of collecting, analyzing, and interpreting observations. This study adopted an explanatory research design that uses both qualitative and quantitative data. This enabled the researcher to draw a wide range of data for listed companies at the Nairobi Securities Exchange. The researcher administered a standardized questionnaire to the identified trading market participants.

3.4 Population and Sampling

The population of this study comprised companies listed at the NSE for the period 2011-2016. Similarly authorized trading participants formed the target population for purposes of primary data. According to CMA (2016), a total of 66 companies were listed at the bourse. Appendix 1 and 2 shows the list of listed companies and trading market participants. Purposive sampling was

adopted for the purposes of collecting data for this study. According to (Kothari, 2004) purposive sampling is a non-probability sampling technique in which the researchers deliberately select particular units of the whole population to qualify as items of the sample. For this study, the study sample comprised companies which have been consistently trading throughout the period of study (2011-2016). Any company suspended, listed or delisted during this period was removed from the sample. Therefore the sample of study was a total of 40 companies since eighteen companies were suspended, listed or delisted from the bourse during the study period (Appendix 5).

3.5 Data Collection

The study used both primary and secondary data. Primary data was collected from the authorized trading market participants who are 23 in total (CMA, 2016). Data collected from these firms included views on price and volume momentum and how they influence the investment decision-making process; similarly the researcher sort to find out from them for how long the market exhibited momentum. Questionnaires were administered to only investment analysts and advisor in the firms authorized as trading participants. This kind of data was used because it was authoritative and the researcher got information from the individuals who were involved in the investment decision-making (Kothari 2004). However the primary data has its weaknesses which include lack of objectivity and incompleteness of the questionnaire (Kothari, 2004). Any incomplete questionnaire was removed from the sample to enhance completeness. The researcher contacted the respondents to seek their permission to participate in this study and thus the questionnaire was administered based on the response of the respondents. This primary data was used exclusively for the third objective.

Secondary data was collected from the NSE database. The nature of data collected was daily share prices, index performance, trade volumes for purpose of answering objectives 1and 2 With secondary data, diagnostic tests were conducted before subjecting it to the main analysis.

3.6 Data Analysis

According to Saunders et al. (2009) data analysis refers to the systematic application of statistical tools to process data into meaningful information. For this study, after the data had been collected and checked for completeness it was keyed into the eviews and Stata software where descriptive and inferential statistics were done as per the objectives of study.

3.6.1 Diagnostics Tests

Time series data is predominant in finance. However this kind of data can be challenging to deal with since it often violates the underlying assumptions of linear regression (Brooks, 2008). The mean or the variance of the explanatory variables can change over time thus resulting in invalid regression results i.e. spurious relationships. Any series is considered stationary if at all it has constant mean, variance and auto covariance for a given lag. Thus diagnostics tests were necessary before further data analysis. A total of three diagnostic tests were done; normality, stationarity and autocorrelation. The findings of the diagnostic tests are presented in chapter 4, Section 4.2

3.7 Operationalization of Variables

This section describes how the researcher measured trading volume, price momentum and stock returns.

3.7.1 Price Momentum

Refers to a situation whereby stocks will in future continue with their historical patterns; past (depending on the period of the investment strategy adopted) winning stocks are expected to continue being winner stocks in the foreseeable future while the past loosing stocks will be expected to continue being losers in the future (Titman, 1993) and thus rational investors will be expected to invest or buy winning stocks while going short on loosing stocks. Measurement of momentum as used by several different authors has been in line with that of Jegadeesh and Titman (1993). Stocks are grouped in a portfolio and portfolio returns computed with the top quintile representing the winner stocks and bottom quintile representing the loser portfolio (Lishenga, 2011). Returns of the portfolios (winner and loser) was determined by use of the log returns as used in the previous studies (Sehgal & Jain, 2011; Sehgal & Vasishth, 2015; Titman, 1993):

$$R_t = ln\frac{p_{1-p_0}}{p_0}$$

3.7.2 Volume Momentum

Volume momentum refers to a situation whereby stocks with a history of low trading volume demand an illiquidity premium as compared to stocks with a high past trading volume (Sehgal & Vasishth, 2015). Stocks are grouped in portfolios based on past trading volume for the period under review. Stocks above median trading volume are classified as high volume stocks and those below the median are classified as low volume stocks. Past studies have adopted the log returns formula

to assess the effectiveness of this strategy (Mudalige et al., 2016; Scott et al., 2017; Sehgal & Vasishth, 2015; Statman et al., 2006). Returns of the portfolios formed based on trading volume has been computed as follows: Log returns are used since more often than not stock returns are stationary and so as to remove the stationarity, log returns was used:

$$R_t = ln\frac{p_{1-P_0}}{p_0}$$

3.7.3 Stock Returns

Change in stock prices relative to the initial prices at the point of investor's decision to purchase the stock. In an efficient market changes in prices are expected to be random and unpredictable since stock prices are expected to reflect all available information in the market. Stock returns have been computed as follows:

$$R_t = ln\frac{p_{1-P_0}}{p_0}$$

3.8 Existence of Price-Volume Momentum Patterns in Stock Returns at the NSE

The researcher used portfolio formation and causal comparative analysis as developed by Jegadeesh and Titman (1993) and subsequently used by several researchers (Choudhry & Wu, 2011; Drew et al., 2007; Gupta et al., 2013; Howard et al., 2013). For this objective the researcher collected month end stock prices adjusted for stock splits, dividends and rights issues. After that they were converted into percentage returns using the eviews software for further analysis. Information on daily number of shares traded and the number of shares outstanding was equally collected so as to be able to come up with the daily turnover (number of shares traded/ number of shares outstanding) informed by the previous studies done.

The study employed 3-3, 6-6, and 12-12 strategies to determine the effects of the strategies on the returns reported. The first strategy involved a three month portfolio formation and holding period, 6-6 involved six months formation and holding period. And lastly 12-12 involved twelve months formation and holding period. Formation and holding period used was the same so as to avoid overlapping in a particular portfolio formed. In the third, sixth, and twelfth month of every year securities were ranked in ascending order on the basis of the average returns in the past corresponding period. Based on this ranking the stocks were divided in five different portfolios, P1 to P5, where P1 consisted of the top 20% of the stocks and P5 comprised of the bottom 20%

percent. Returns for the next period were estimated (3, 6, 12). The researcher then skipped one months and reformed and ranked the portfolios as done previously until the end of the study period.

Similarly for the trading volume the procedure used for developing a portfolio based on returns was used, even though ranking was based on the average daily turnover as opposed to the past return used in the previous test. The five volume portfolios was labelled as V1-V5 with V1 comprising of 20 % stocks with high volume and V5 comprising of 20% stocks with low volume as per the sample. So as to assess the combined effect bivariate ranking strategies was employed. Stocks were ranked accordingly on the basis of six months past return and form three equally weighted portfolios where P1 was composed of the top 33% P2-Middle 33 % and P3 bottom 33%. After that portfolio was independently formed based on the past six months turnover and formed three equally weighted portfolios similar to the ones formed using price patterns. From the two portfolios nine bivariate independently sorted portfolios were formed, whereby V3P1 comprised of stocks with a bottom 33% trading volume and top 33% stocks based on returns. The mean returns of the sample portfolios were then determined to assess the existence of these patterns and to evaluate whether bivariate or univariate strategies reported higher returns.

The portfolio choice was guided by prior research which showed that while high past return stocks outperform low past return stocks (price momentum), low past volume stocks do better than high past volume stocks in the future.

3.9 Relationship between Market Trading Volume and Stock Returns at the NSE

The researcher used vector autoregressive (VAR) model by conducting a granger causality test as used by (S. S. Chen, 2012) . Under the VAR, stock returns were run against trading volume to assess whether stock volume granger causes stock returns. This was based on the null hypothesis that stock returns do not granger-cause trading volume. The equation for the first step was as follows:

$$lnr_t = g + \sum_1 b_1 r_{t-1} + \sum_1 c_1 v_{t-1} + u_t$$

After step one, based on the null hypothesis that trading volume did not granger cause returns; trading volume was run against stock returns to assess if trading volume granger caused stock returns.

The second equation was as follows:

$$v_t = h + \sum_1 k_1 \, r_{t-1} + \sum_1 l_1 \, v_{t-1} + v_t$$

The choice of this model was based on the findings of previous studies which had argued that the relationship between stock returns and trading volume even though maybe in existence, it was nonlinear. The F value and critical value from the test was compared so as to assess whether to accept or reject the hypothesis.

The lag values for the dependent variable and independent variables were determined using the Akaike and Schwartz information criteria. Selection of the lag value was equally based on the fact that the NSE is in the semi strong form of market efficiency (Ndegwa and Mboya, 2015). In the first equation if the trading volume as measured by turnover influenced the current values of stock returns then it was to be concluded that trading volume ganger caused stock returns. Similar procedure was repeated for equation two and conclusion drawn from the two equations (Brooks, 2012).

Apart from the lag values, the F-value and critical value from the test was compared so as to assess whether to accept or reject the hypothesis (Brooks, 2012).

3.10 Impulse Response Function

Granger causality in itself may not have been able to give details about the variables under investigation. The impulse response function traced out the responsiveness of the dependent variables in the VAR to shocks to each of the (Brooks, 2012). For each variable from each equation separately, a unit shock was applied to the error term, and the effects upon the VAR system over time was noted. Thus to know the interaction between trading volume and stock returns, the response of trading volume to an impulse in the stock returns was done and similarly the response of stock returns on a shock in the trading volume was done and effects on the VAR noted.

The choice of this model was based on the findings of previous studies which have argued that the relationship between stock returns and trading volume even though maybe in existence, it's nonlinear.

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3.11 Evaluation of whether Volume and Price Momentum Influence Market Participants' Investment Decisions

Primary data was utilized for this objective and it was subjected to descriptive analysis, data collected was analyzed using the Eviews software and from the output, measures of central tendency; mean, mode median and standard deviation was used to assess whether trading volume and price momentum had a role to play in the investment decision process. Descriptive statistics played a significant role in providing summary of a given sample (Cooper & Schindler, 2014).

3.12 Research Quality

The quality of any research is determined by its validity and reliability (Lakonishok & Shapiro, 1986). The validity of a research can either be internal or external. The external validity is assessed by the findings ability to be generalized across environments and over time. For purpose of this study external validity was enhanced by use of a sampling method that greatly captured most elements under investigation. Internally the data collected both primary and secondary was subjected to careful analysis such that the quality of the content generated out of it was of high standards.

3.13 Ethical Considerations

Any research done promotes knowledge and truth and therefore should stick to ethical norms (Shamoo & Resnik, 2003). As a result, the researcher conducted this research in a candid and objective manner. Data collected was restricted for academic purposes and respondent confidentiality was enhanced by keeping their identity anonymous throughout the research. No respondent was coerced into giving feedback and anything that was unclear was explained at the point of data collection.

CHAPTER FOUR

PRESENTATION OF RESEARCH FINDINGS AND ANALYSIS

4.1 Introduction

The general objective of this study was to examine the existence of momentum at the Nairobi Securities Exchange by evaluating the test period behaviour of winner and loser portfolios, as well as how long the the momentum returns lasted at the bourse. In this chapter data analysis and report of the results are presented. The analysis is done as per the specific objectives of the study. Section 4.2 presents the general information as far as the primary and secondary data used is concerned. Section 4.2 covers the first objective; examination of price volume momentum strategies using one sample t-test. Section 4.3 discusses the second objective which looks at the relationship between stock trading volume and stock returns using panel VAR (granger causality). Section 4.4 covers the perception of trading market participants on price volume momentum, and lastly section 4.5 presents the chapter summary.

4.2 General Information

Data collected for the study was NSE All Share Index, daily share prices and daily trading volumes for the entire study period (2011-2016). The sample was made up of 40 companies, since any company suspended, listed or delisted during the period was not considered for analysis. Primary data was collected through use of questionnaires which were self administered to the registered trading market participants. In total, twenty three questionnaires were issued to the trading market participants, out of which 18 responded by completely filling the questionnaire making it 75.26 % response rate. Previous researchers (Saunders, Lewis, & Thornhill, 2009) have argued that 50% response was sufficient for data analysis. A 75% response rate was therefore considered sufficient for data analysis.

4.3 Diagnostic Tests

A total of three diagnostics tests were conducted on the time series data collected to ensure that any analysis done does not lead to spurious relationship.The data was tested for normality and from the test, all the secondary data collected was found to be non-normally distributed as shown by the Jarque Bera statistic. NASI returns 84.08 (0.000) stock volume 35.42(0.00) and stock returns12610.5 (0.00). Despite the non-normality no action was taken since the relationship

between trading volume and stock returns was done on a nonlinear basis. The NASI returns and stock returns were found to have a standard deviation of 0.002774 and 0.00698 respectively, which implies that they were close to mean returns reported by the stocks and index respectively over the review period .

After testing for normality, a stationarity test was conducted for the null hypothesis Ho=Existence of unit root in time series as well as $H_1 =$ Nonexistence of unit root in time series on the data at level 0 and the null hypothesis of non stationarity was rejected, as confirmed by Augmented Dickey Fuller and Philip Peron shown in the table below.The ADF was significant with a p-value of 0.000 at 5%, implying that the data was stationarity.

Table 4.1: Stationarity

Null: Unit root (assumes common unit root process)			Cross-	
Method	Statistic	Prob.**	sections	Obs
Levin, Lin & Chu t*	-15.874	0.0000	36	1308
ADF - Fisher Chi-square	321.085	0.0000	36	1308
PP - Fisher Chi-square	636.709	0.0000	36	1308

Source: Survey Data

A johansen cointergration test was done on the variables to test the long run relationship between the variables under investigation, and the null hypothesis of no cointergration was rejected, since the ADF was static and significant at 5% .The pvalue was significant for both philip peron statistic as well as the Augmented dickey fuller which were 0.0005 and 0.0063 respectively as shown in the table below

Table 4.2: Long-Run Relationship

Residual Cointergration Test				
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	-48.484	1.0000	0.002167	0.4991
Panel rho-Statistic	-5.4809	0.0000	-5.4809	0.0000
Panel PP-Statistic	-3.2642	0.0005	-3.2642	0.0005
Panel ADF-Statistic	-2.4966	0.0063	-2.4966	0.0063

Source: Survey Data

Lastly, under the dignostic tests was a correalational analysis, that sought to evaluate the relationship between the variables under investigation. From the test, NASI returns was found to be positevely correlated with stock volume and stock returns with correlation coeficients reported being 0.077 and 0.3261 whereas correlation coefficient for stock volume against stock returns was 0.0404.

Table 4.3: Correlation Matrix

	NASI_RETURNS	STOCK__VOLUME	STOCK_RETURNS
NASI_RETURNS	1	0.07722	0.3261
STOCK__VOLUME	0.0772	1	0.04039
STOCK_RETURNS	0.3260	0.0403	1

Source: Survey Data

4.4 Existence of Price Volume Momentum at the Nairobi Securities Exchange

The first objective examined the existence of price volume momentum at the Nairobi Securities Exchange for the period 2011-2016. This was to determine whether momentum returns existed at the exchange, for how long they existed and whether a univariate price momentum strategy outperfomed a bivariate price volume momentum strategy at the bourse. Stock prices, Index returns and trading volumes were used for this analysis. A data clean up was done to take care of corporate events such as rights issues,bonus issue and stock splits. Thereafter an analysis was

done. Equally weighted Portfolios were formed after every 3, 6 and 12 months based on the past stock returns. The top twenty percent (8 companies) were classified as winners and the bottom twenty percent (8 companies) as losers. The study adopted an overlapping approach such that 3/3 strategy was assessed for a period more than its formation period, which was repeated in the other strategies of 6/6 and 12/12, and as a result a total of nine trading strategies were assessed. The behaviour of the portfolios was assessed over the corresponding holding period of 3,6 and 12 months, with momentum returns measured as the difference between winner and loser portfolios over the study period. The momentum returns were tested for significance using the one sample t-test.

Previous studies done have advocated for skipping between one and six month before forming a new portfolio. This study skipped one month to take care of the market microstructure dynamics associated with bid ask, price pressure and the lagged effects. To avoid a survival bias it was not a requirement for a security to remain either as winner or a loser for the entire study period. The period was divided into two sub periods. Between 2011 and 2013 when the economy was hard hit by hunger in turn affecting the level of activity at the bourse and the second period covered 2014-2016.

Table 4.4: Momentum Returns 2011-2016

	Holding Period	2011-2013			2014-2016		
		3	6	12	3	6	12
Formation Period	Winner	0.0092	0.0021	0.0001	0.0063	0.0026	0.0001
3							
	Loser	-0.011	-0.1101	-0.0818	-0.0941	-0.0922	-0.2752
	W-L	0.0078***	0.0067**	0.041	-0.0003*	-0.0002*	-0.000752
	t-stat	[2.3592]	[2.2354	[0.69	[-1.(	[-1.6272]	[6.959]
6	Winner	0.0061	0.0015	0.0001	0.002	0.0009	0.0004
	Loser	-0.009	-0.0218	-0.0023	-0.0086	-0.0156	-0.0023
	W-L	0.01705***	-0.0603*	-0.0995	-0.0455*	-0.0648*	0
	t-stat	[2.4671]	[2.7674]	[-0.3925]	[1.4361]	[-1.9570]	[-0.6402]
12	Winner	0.0009	0.0002	0.00012	0.0003	0.0022	0.0013
	Loser	-0.0034	-0.0015	-0.0079	-0.0003	-0.002	-0.01
	W-L	0.0059***	0.02085*	0	0.02085*	-0.05685	-0.0001
	t-stat	[2.2727]	[2.120]	[-0.2580]	[1.9432]	[1.8701]	[-1.2379]
	Paired sample t-test						
					0.2122**	-9.9767*	1.4339***
		*	Significance at 10%				
		**	significance at 5%				
		***	Signficance at 1%				

Source: Survey Data

A total of nine momentum trading strategies were implemented over the period. During the first phase of analysis, buying into a 3 by 3 strategy earned an average return of 0.092% for winner portfolio per month which is higher if compared to buying into a looser portfolio that earned a return of -0.011% over 3 month holding period. The excess returns between winners and losers over the study period were significant at 1% with t-statistic of 2.3592 and a p value of 0.88. This implies that momentum returns do exist .The behavior of the momentum returns is the same using a 3 by 6 strategy where winner portfolios report momentum returns of 0.021% while looser portfolio report -0.011% over the period. However the trend changes when the portfolio is held for a period of 12 months when the momentum returns seem to have diminished and the momentum

returns are not significant at 10%. In the second period of analysis, the behavior of momentum returns is not significantly different from phase one, winner portfolios outperform the loser portfolios for up to six months, but beyond that momentum returns appear to have diminished.

The 6 by 6 strategy reported momentum returns of 0.0015% and 0.0009% for first and second period of analysis for the winner portfolios as compared to looser portfolios which reported -0.006% and -0.0023 % over the study period. However a 6 by 3 portfolio reported higher momentum returns for winner portfolios if compared to the 6 by 6 strategy. The 6 by 3 momentum strategy reported momentum returns of 0.061% and 0.002 % respectively with the excess returns being significant at 1%. The t-statistic reported was 2.4367 and -1.4361 being significant at 1% and 10 % respectively over the period of analysis. This implied that shorter holding period reported higher momentum returns. The 6 by 12 strategy reported minimal momentum returns since most companies previously classified as winners ceased being winners and were either under the loser portfolio or under the intermediate portfolio.

Using the 12 by 12 strategy, the momentum returns were insignificant at all the three levels of significance. However holding the portfolios for a period of three or six months reported momentum returns of 0.0059 and 0.0020 over the first period of analysis whereas the second period reported momentum returns of 0.0044% and 0.00105% all the momentum returns were significant at 1% and 10 % as shown by the t-values. Overall the excess monthly returns of going long on winners and short on losers range between -0.0003%   for 3 by 12 strategy to 0.0078% for 3by 3 strategy over the period.

4.4.1 A Bivariate Strategy Based on Past Returns and Trading Volume
Equally weighted portfolios were formed based on the trading volume over the past 3 and 6 months. The portfolios were not formed over the twelve months period since from the findings of this study, momentum returns exist for a period of three to six months. The portfolios were classified as either high volume (V1) or low volume (V3), subsequently they were combined with portfolios formed on the basis of past returns to form two extreme portfolios of High volume and losers (V1P3) and low volume and winners (V3P1). This basis of portfolio formation was informed by past research which has argued that stocks which have been previously performing highly outperform stocks which have been performing poorly (price momentum) and on the other side stocks with low past volume outperform stocks with high past volume (volume momentum).

Table 4.5: Price Volume Momentum 2011-2016

Formation period	Holding Period	Period One	2011-2013	Period Two 2014-2016	
		3	6	3	6
3	V1P3	0.0009	0.0008	0.0003	0.0006
	V3P1	0.0012	0.0098	0.0094	0.0094
	W-L	-0.0053***	-0.0038***	-0.0014*	-0.0003*
	t-stat	[2.7156]	[2.3241]	[-1.7245	-1.6628]
6	V1P3	0.0002	0.0008	0.0002	0.0092
	V3P1	0.0019	0.0008	0.0007	-0.0157
	W-L	-0.0051	-0.06	-0.0452	-0.0648
	t-stat	2.4670***	-1.1218*	-1.4361*	-1.9570*
	Paired two test			-0.8639*	2.8957***
		*	Significance at 10%		
		**	significance at 5%		
		***	Signficance at 1%		

Source: Survey Data

From the analysis, several results emerge. Composite portfolios made up of low volume and higher returns outperform high volume low return portfolios. In the first phase of analysis, the V3P1 portfolio reports an average monthly return of 0.012% compared to the returns on V1P3 portfolio which reported monthly returns of 0.0009% over the 3 by 3 strategy. The difference in momentum returns reported by the two composite portfolios are significant at 1% as shown by the t- stat of 2.7156. Similarly in the second phase of analysis, the V3P1 portfolio reports average monthly returns of 0.09 % compared to 0.006% average monthly returns reported by the V1P3 portfolio over three month holding period. The excess returns reported on the two composite portfolios are consistently negative for both phase one and phase two of analysis. The excess returns were found to be significantly different from zero as shown by the t statistic of 2.467 and -1.1218 at 1% significance level.

Based on the 6 by 6 strategy, the average monthly   returns generated are 0.008% for a V3P1 portfolio as compared to 0.006% reported for V1P3 portfolio over the six months holding period, the behavior of the momentum returns does not change in the second phase of analysis whereby the V3P1 portfolio reports average monthly returns of 0.009% whereas the V1P3 portfolio reports momentum returns of 0.002%. The excess returns between the two composite portfolios are negative for both phase one and phase two and they are significantly different from zero at 1% significance level, with t statistics being 2.4670 and -1.1218 respectively. The performance of the portfolios does not change with the 6 by 3 strategy, the low volume and high returns portfolio still outperforms the high volume low returns portfolio. However under this strategy momentum returns reported are higher if compared to a 6 by 6 strategy, which could be attributed to the period over which momentum returns exist in the market.

Table 4.6: Comparison between Univariate and Bivariate Momentum Trading Strategy

		3	6	3	6
Three Months	**Price**	0.0068	0.0067	-0.0003	-0.0002
Six Months	**Price**	0.01705	-0.0603	-0.0455	-0.0648

Three Months	**Volume**	-0.0053	-0.0038	-0.0014	-0.0003
Six Months	**Volume**	-0.0051	-0.06	-0.0452	-0.0648

Source: Survey Data

The univariate and bivariate trading strategies were compared to each other to see which one performs better than the other over the three and six months' formation and holding period .The bivariate volume based price strategy did not report higher returns as compared to the returns reported by a univariate price based investment strategy. The t-stat reported was 1.9115 at 5% significance .This was confirmed by the pvalue of 0.076 which was not significant. Based on the six months formation period, in the second period of analysis, the finding is still the same where the returns of a bivariate strategy are not high as compared to a univariate strategy as shown by the t-stat of 0.9641 and a p-value of 0.2031.

There is no evidence that a bivariate volume- based price momentum generates higher returns if compared to a univariate price momentum strategy. What is clear, is the fact that low volume stocks outperform high volume stocks over a period of three to six months. This finding is in agreement with findings of Chen et al. (2011) as well as the findings of Vashitha (2013) who argued that volume momentum exists in markets but the ability of a volume based price momentum generating higher returns as compared to a univariate strategy cannot be determined with certainty. The findings equally contradict other previous scholars (Gallo & Pacini, 2000; Kim and Kon, 1994), who have argued that it takes volumes to move prices and therefore, volume based price momentum strategy is bound to generate higher returns as compared to a univariate price momentum strategy.

4.5 Relationship between Trading Volume and Stock Returns

The second objective sought to assess the relationship between stock trading volume and stock returns at the NSE. Data collected was of returns on the different sample stocks, index returns, and daily trading volume of the securities making up the sample. The data was tested for normality and from the test, all the secondary data collected was found to be non-normally distributed as shown by the Jarque Bera statistic. NASI returns 84.08 (0.000) stock volume 35.42(0.00) and stock returns12610.5 (0.00).Despite the non-normality no action was taken since the relationship between trading volume and stock returns was done on a nonlinear basis. The NASI returns and stock returns were found to have a standard deviation of 0.002774 and 0.00698 which implies that they were close to mean returns reported by the stocks and index respectively over the review period. Long run relationship using Johansen test and correlational analysis was done and finally the main test which was using the granger causality technique to determine the nature of relationship between trading volume and stock returns.

After performing the diagnostic tests, the main analysis was done. First of all the appropriate lag order was determined .According to Brooks (2008) an appropriate lag order is that which minimizes the information criteria. Lag (1) was chosen by all the three (AIC, SC, HQ and FPE) information criteria as shown in the table below. AIC refers to the Akaike information criteria, SC-Schwarz criteria, HQ-Hannan Quinn.

Table 4.7: Lag Order Selection

VAR Lag Order Selection Criteria						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	2966.003	NA	4.14e-05	-4.417293	-4.40954	-4.4143
1	5033.824	4126.396*	1.91e-06*	-7.4930*	-7.4697*	-7.4843*
2	5036.041	4.4167	1.91e-06	-7.4903	-7.4516	-7.4758

The asterick(*) represents the lag order selected by the respective selection criteria.

Source: Survey Data

 Finally a granger causality test was done to determine the direction of relationship between the variables. The study used both NASI returns and stock returns against the trading volume of individual securities.The index returns were used to reflect the market as a whole while the stock returns were used as they are more company specific.

Table 4.8: Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
STOCK_RETURNS does not Granger Cause STOCK__VOLUME	1343	3.17560	0.0075
STOCK__VOLUME does not Granger Cause STOCK_RETURNS		0.09237	0.7612
NASI_RETURNS does not Granger Cause STOCK__VOLUME	1343	5.28868	0.0216
STOCK__VOLUME does not Granger Cause NASI_RETURNS		0.20522	0.6506

Source: Survey Data

From the test, the null hypothesis that stock volume does not granger cause stock returns could not be rejected as shown by the p-value of 0.7612,neither could the null hypothesis that stock volume does not granger cause NASI returns be rejected as indicated by the p-value of 0.6506.The pvalues are higher than 0.05 implying that they are not significant at 5 % significance level. However the null hypothesis that stock returns and NASI returns do not granger cause stock volume was rejected. The p-values obtained are 0.0075 and 0.0216 which is less than 0.05 .This implies that to some extent the level of index returns in the market as well as the level of stock returns explain the level of stock volume in the market. The stock returns appear to be more signicant in explaining the direction of relationship as compared to the NASI returns.

After conducting the granger causality,an impulse response was done on the residuals to assess the extent to which a shock in trading volume affects both NASI and index returns as well as a shock on the returns and see how it affects the movement of the stock volume

**Figure 4.2: Impulse Response Output of Stock Volume and NASI Returns**
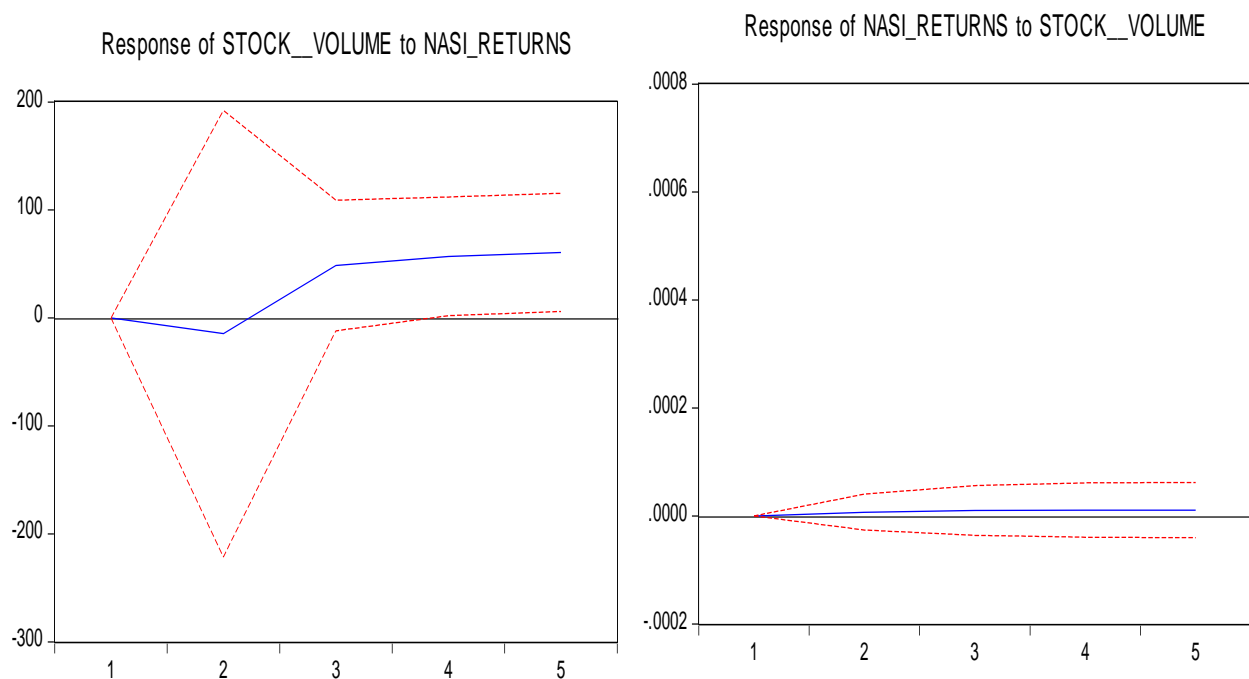
Source: Survey Data

In the analysis,the order of the variables under investigation was given a consideration .This was due to an existing correalation between the variables as indicated in the correalational matrix.As a result the variables were arranged in two different ways;Order one-NASI returns,stock volume,stock returns;Order two-Stock returns,stock volume,NASI returns.

From the graphs shocks to the NASI returns account entirely for any chages in the stock trading volume.A one unit percentage shock in NASI returns causes a corresponding one unit change in trading volume as shown by the solid blue line in the graph.On the other hand a unit shock in the trading volume has a negative response on the NASI returns upto the first three days,after which it fades away as shown by the solid blue line. From the impulse responses it can be deduced that a shock in NASI returns affects the trading volume more than a shock in the trading volume. This implies that trading volume is affected by both current and past returns. Similarly from the graphs, a unit shock on trading volume has been found to have an effect on the trading volume for upto three days.This finding casts confirms and contradicts the findings of previous studies.

Figure 4.3: Impulse Response Output of Stock Returns and Stock Volume
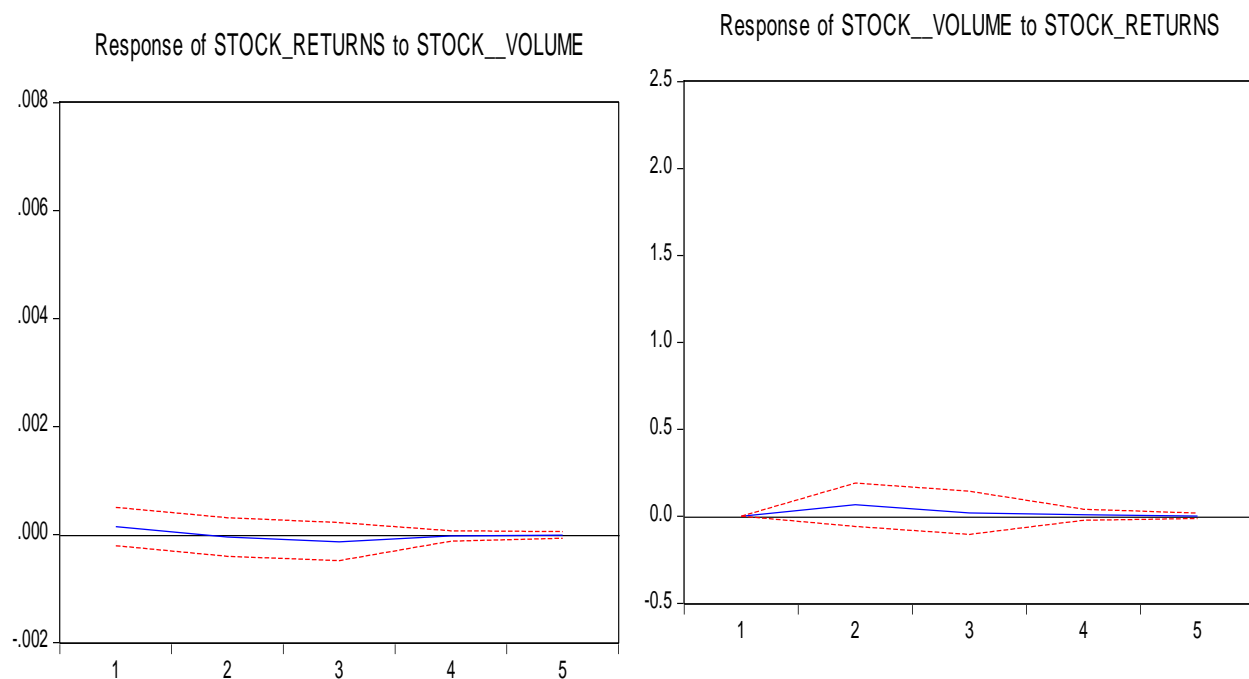
Source: Survey Data

Stock returns give a negative response on trading volume upto the first four days ,but the shock ceases after that as indicated by the solid blue line,From the analysis a unit shock in the stock volume has a negative impact on the stock returns upto 4 days out of the five days assessesd. On the other side a one percentage unit shock on the stock returns has a postive impact on the trading volume, with the shock being in existence for over four days assessed.This implies that a a shock on the stock returns explains more the perfomamnce of stock volume as compared to a unit shock on the trading volume. A unit shock in the trading volume only lasts for two days and after that the shock seems to dissappear. This is confirmed by the graph above and table below. From the table stock volume is responsive to shocks in the trading volume for upto an average a period of four days after which the shock effect appears to remain constant or diassppear

Table 4.9: Numerical Response of the Variables

Response of STOCK__VOLUME:			Response of NASI_RETURNS:		
Period	NASI_RETURNS	STOCK_RETURNS	Period	STOCK__VOLUME	STOCK_RETURNS
1	0	0	1	0	0
2	40.7739	13.6687	2	-7.20E-18	-3.31E-16
3	56.427	3.6381	3	-8.17E-18	-4.70E-16
4	59.8514	0.7196	4	-8.31E-18	-5.01E-16
5	60.478	0.1253	5	-8.33E-18	-5.06E-16
6	60.5825	0.0203	6	-8.33E-18	-5.07E-16
7	60.5989	0.0031	7	-8.33E-18	-5.08E-16
8	60.6014	0.0005	8	-8.33E-18	-5.08E-16
9	60.6017	0.00E+00	9	-8.33E-18	-5.08E-16
10	60.6018	0.00E+00	10	-8.33E-18	-5.08E-16

Source: Survey Data

4.6 Perception of Trading Market Participants on Price Volume Momentum

The third objective sought the views of trading market participants on the price volume momentum. The years experience of the respondents was considered since the experience of a financial or investment advisor greatly informs the level and of analysis adopted; to what extent they considered the price and volume information in the investment decision and finally what factors explained the price volume momentum at the Nairobi Securities Exchange. Out of the 18

respondents, 77.78 percent had a job experience of 5 years or less,whereas those who had experience of 5-10 and over 10 years were 11.11% and 11.1% respectively. It was therefore deduced that most respondents had worked for a period of less than five years as shown in the chart below.

However, this did not pose risk to the feedback process. Most respondents were in their second or third jobs at the time. From the analysis, over 70% of the respondents used information on the past trading volume and stock returns, however usage of trading volume was limited to those companies that participants considered active over a particular period, with over 70 % arguing that trading volume of a consistently trading stock strongly influences the level of stock returns of a particular stock over a given time horizon. A summary of the findings is as shown in the table below.

Figure 4.4: Trading and Price Information
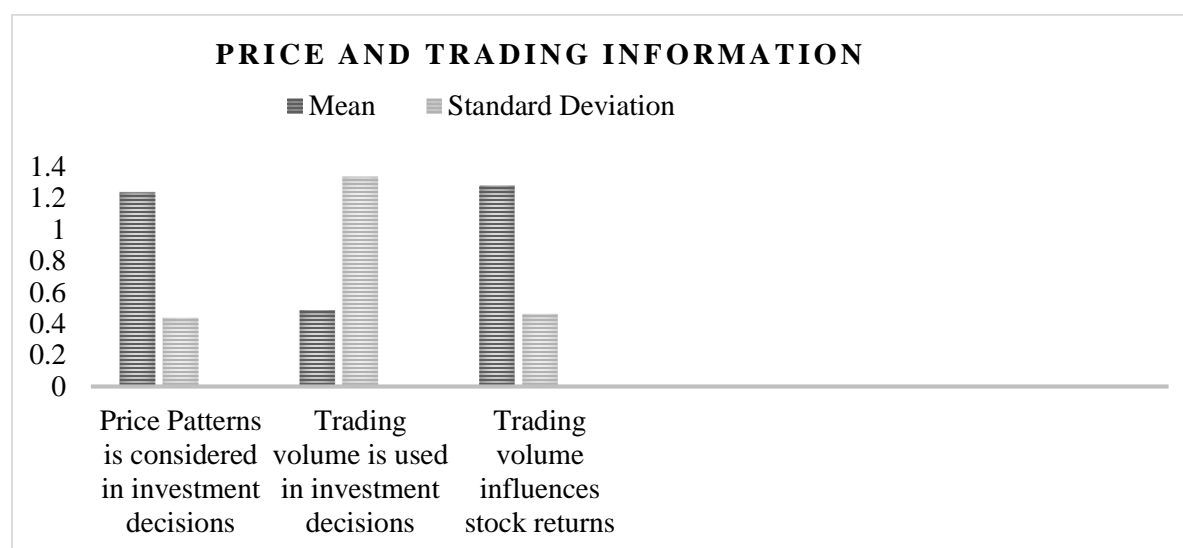
Source: Survey Data

The period over which the price momentum existed was equally investigated. Out of the eighteen respondents, (33.33%) assessed the price momentum over a period of 12 months, 27.78% over a period of 9 months, 22.22% over a period of six months and three months was considered by only 16.67% which is somehow interesting given the fact that previous studies done in the emerging markets have found that momentum strategies are best assessed in the short run as compared to

the long run. Findings on volume momentum indicate that participants consider volume momentum in the short run with 33.33% considering it in three and six months respectively, whereas the remaining 33%considered trading volume in 9 and 12 months respectively as shown in the chart below.

Figure 4.5: Period of Assessment
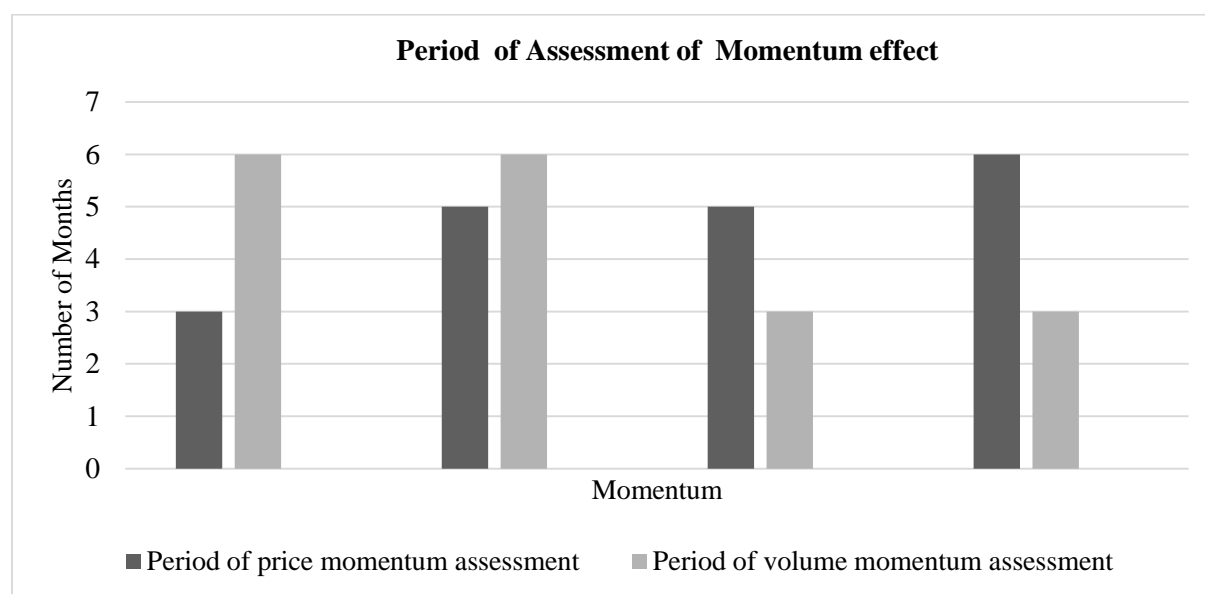
Source: Survey Data

The behavior of returns in the post holding period was equally investigated with respondents limited to two options (continuation or reversal). On average, 55.55% of the respondents argued that security returns exhibited return continuation as compared to 44.44% who argued that the securities experienced a reversal over the period. The respondents alluded to this behavior to a number of factors that include information released in the market, investor sentiment, loss aversion and herding. However the overriding argument was, stock price patterns had a tendency of returning to normalcy after some time. The respondents advised investors to always buy 12 month low and sell at 12 month high.

Price and volume information are two sets of information very key to the investment decision making and thus can either be used independently or combined. From the study, the researcher

sought to find out how well the information was used. On average most respondents used both price and trading volume information with a standard deviation of 1.328, univariate price based strategy was found to generate higher returns as compared to a bivariate price volume strategy. Most of the respondents disagreed that past low volume losers outperformed past high volume losers over a period of three to six months. Low volume winners were however found to take long to outperform high volume winners.

The performance of winner stocks as determinant of momentum returns was equally assessed with most respondents arguing that it's not only the good performance of winner stocks that influences the level of momentum returns but also the poor performance of the losing stocks over time as shown in the graph below.

Figure 4.6: Usage of Price and Volume Information

Use of Price and Volume Information
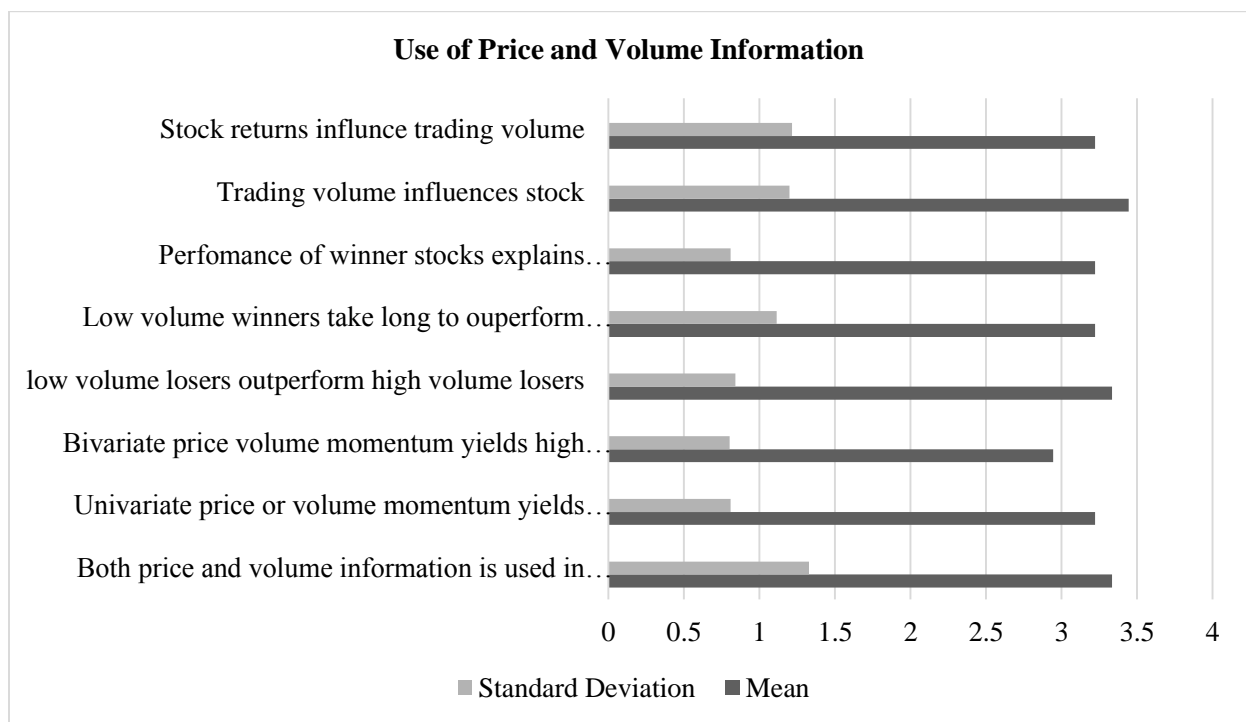
Source: Survey Data

4.6.1 Drivers of Momentum Returns

Momentum returns have been traced at the NSE by this study and other previous studies (Lishenga 2011; Omuronji, 2005). However the drivers of this returns are not clear from the existing literature. From the study, size of the firm was considered to have an effect on the level of momentum returns with most respondents (4.00) arguing that the larger the firm the higher the momentum returns. Stocks which had high liquidity in the market were found to report high momentum returns as compared to low liquidity firms. Overall, over 60% respondents agreed that market liquidity influenced momentum returns due to the fact that high market liquidity greatly attracts investors thus driving momentum returns at a given time for a particular stock.

Investor reaction has been found to influence the level of momentum returns, and from this study, most of the respondents (2.9) agreed that that investors at the market took time to incorporate information about a security in the investment making decision, which was attributed to the process of information dissemination in the Kenyan market. However most of the respondents felt that news generated by firms in the market are not quickly reflected in the performance of the share price. The value of stock in the market was equally assessed to see whether it influences the level momentum returns and high value firms stocks were found to influence momentum returns as compared to low value stocks.

Figure 4.7: Drivers of Momentum Returns
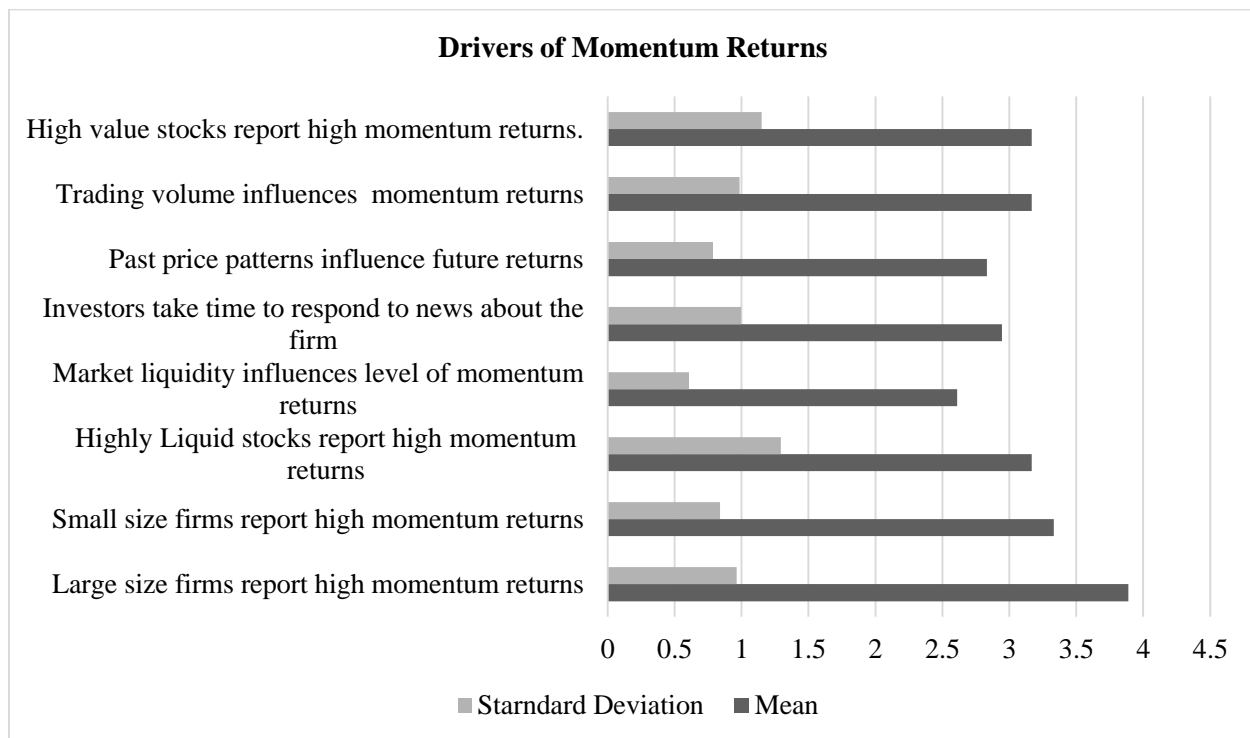
Source: Survey Data

4.7 Chapter Summary

The study sought to answer three objectives, the existence of price volume momentum at the NSE, the relationship between trading volume and stock returns and finally the perception of the existing trading market participants on price volume momentum. Descriptive and inferential analysis was done. From the analysis the existence of momentum returns has been collectively confirmed by this study through the Portfolio formation test as well as from the responses given by the trading market participants. Momentum returns have been found to exist over a period of three to six months while the returns have been found to diminish in twelve months. On the relationship between trading volume and stock returns, the null hypothesis that NASI returns do not grange-cause stock volume was rejected since p-value obtained indicate statistical significance in favor of NASI returns influencing trading volume. On the contrary the null hypothesis that stock volume does not granger-cause stock returns could not be rejected since the p-values obtained indicate non statistical significance. In the third objective of analysis, the perception of trading market

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participants; a number of issues were assessed. Predominantly, it was found that momentum exists at the bourse with the period of existence being three to six months.

CHAPTER FIVE

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, discussions, conclusions and recommendations that emerge from the study. It gives a discussion of the findings based on the objectives in section 5.2, conclusions are given in section 5.3, whereas areas for further studies and limitations of the study are in section 5.4 and 5.5 respectively.

5.2 Discussion of the Findings

5.2.1 Existence of Price Volume Momentum

In the first objective, the study sought to assess the profitability of volume based price momentum at the NSE. The analysis of this objective happened in two stages. In the first stage, the presence of momentum returns at the NSE was tested using portfolio formation and from the findings, momentum returns were found to exist at the bourse even though in the short run over a period of three to six months. This finding is in agreement with Lishenga (2011) and Omuronji (2002) who found that price momentum existed at the bourse, however the momentum returns could neither be explained by the Fama and French model nor the carhart four factor model. On the contrary, the findings contradict the findings of Hameed and Kusnadi (2002), Chui et al. (2003) and Griffin et al. (2007), who reported that emerging markets, Kenya among them, reported minimal or no momentum returns attributing the low momentum returns to the cultural and behavioral difference among the Asian and Latin American countries. In studies done in the developed markets (Lee and Swaminathan, 2000; Vashitha, 2013), momentum returns were found to exist for up to three years which could be attributed to the level of development associated with those markets. Hung Wang (2007) argued that there should be no significant difference between momentum returns in the emerging and developed markets given the fact that drivers of momentum returns in these markets have got a lot of similarities. To assess whether a bivariate strategy generated higher momentum returns as compared to a univariate strategy, profitability of volume based momentum was assessed. From the analysis, using a bivariate strategy seems not to report higher returns compared to using a single strategy based on the past prices. Sehgal (2015) did not find any evidence from the Indian market that using a bivariate strategy reported higher returns as compared to using a univariate trading strategy. Similarly, Lee and Swaminathan (2013) argued that an increase or

decrease in trading volume is a function of several factors and thus high and low trading volume should not be misconstrued for high or low returns from the securities. Increase in trading volume could be as a result of the disposition effect where investors decide to buy or sell shares based on the prevailing conditions in the market and specifically for that company. However, Lokman (2005) argued that since there's no clear relationship between trading volume and stock returns which explains why volume based price momentum does not yield better or higher returns if compared to a univariate price momentum strategy. There is no evidence from this study that using a bivariate strategy generates higher momentum returns as compared to using a univariate strategy. Investors should therefore not expect high returns on grounds that they are using a bivariate strategy.

5.2.2 Relationship between Trading Volume and Stock Returns

In the second objective, the study sought to find out the relationship between trading volume and stock returns, with a presumption that the relationship is nonlinear and thus used granger causality to evaluate the kind of relationship between the variables. The findings of the study indicate that there's relationship between trading volume and stock returns, the null hypothesis that stock returns do not granger cause stock returns could not be rejected and so was the null hypothesis that stock returns do not granger cause stock volume since the p-value indicated that they were significant at 5%, these findings corroborates and contradicts the findings of previous researchers at the same time. While some (Chen et al., 2011; Salvador ,2016) argue that its stock returns which influence trading volume, others have come out strongly to argue that the relationship between stock returns and trading volume is bidirectional (Lokman, 2005), implying that trading volume can cause stock returns in the same way stock returns can cause trading volume. Chan (2008) argued that trading volume influences stock returns in the short run but in the long run it's the stock returns which influences the trading volume. That notwithstanding the null hypothesis that trading volume does not granger cause stock returns could not be rejected since the p values were found to be non-significant at 5 %. From the findings of this objective it can be deduced that, it's important that investor pays attention to the level of market returns in the market since they can act as pointer to the volumes being experienced in the market at a particular time.

5.2.3 Perception of Trading Market Participants

In the third objective, the researcher sought to find out the perception of trading market participants on past price and volume information in predicting the stock performance as well as the extent to which they use this information. Generally past price information has been used by the trading participants as compared to the trading volume with most respondents arguing that it is stock returns that influence trading volume and not the other way round. This finding corroborates with other previous researchers (Chen et al., 2011; Rouwenhorst, 1998) who argued that past stock returns and trading volume information were critical in predicting the performance of a stock in future. Similarly they argued that its stock returns that influence trading volume. This finding equally confirms the findings of this study under the second objective in which the null hypothesis that stock returns could not granger cause stock volume could not be rejected. This implies that the stock returns in the market played a significant role in explaining the trading volume at a given time. Period when momentum returns were reported in the market was equally investigated and the findings indicate that momentum returns in the market predominantly existed for a period of three to six months which is in agreement with Jegadeesh and Titman (1993). On the contrary studies done in the developed markets reported that momentum returns existed for up to five years (Lee and Swaminathan, 2000) implying that if investors wanted to benefit from price momentum they should invest in those stocks for a period of three to six months .

The drivers of this momentum returns were equally assessed and the respondents argued that size, value, liquidity and investor sentiment played a role in the level of momentum returns which is in agreement with (Lishenga, 2011) .However opinion was divided on whether performance of the respective winner or loser portfolios significantly influenced the level of momentum returns, with some respondent arguing that the level of momentum returns goes beyond the performance of the individual stock performance to include other external factors in the market. On average, most of the respondents argued that security returns exhibited return continuation which is in agreement with Jegadeesh and Titman (1993) as compared to 44.44% who argued that the securities experienced a reversal over the period a finding that is in contradiction with Jegadeesh and Titman (1993) but in agreement with Lee and Swaminathan (2000). It can therefore be deduced that the Kenyan market experiences price volume momentum but investors have put into

consideration the period over which the momentum returns exist in the market as well as the behavior of the portfolio over the holding period.

5.3 Conclusions

For investors, both existing and potential, momentum returns can be a source of wealth accumulation. However due diligence should be done to ensure the extent and period over which this anomaly exist in the market is paid attention to. A combined trading strategy even though might have its benefits in terms of the kind of information provided, it does not guarantee high returns, even though they can use this information to make more informed decisions. Momentum returns so far cannot be explained and thus focusing on them alone to make a decision is not conclusive. The relationship between trading volume and stock volume as well as the relationship between trading volume and NASI returns is very key. It gives an investor an idea on what to expect both in the short and long run and therefore they need to pay attention to this kind of information before deciding whether to invest or divest from the company. Index performance seems to be more informative on the level of trading volume as compared to the stock volume as shown in the findings of this study.

For companies, momentum returns have been attributed to a number of factors that include size, value, investor sentiments among others. Some of these factors can be controlled by the companies, for example the value of the company. Therefore companies should strive to ensure that such factors are put into check over time. The overall market performance as well as the individual stock performance is very key in informing the level of trading volume, and given that the market performance is pegged on the performance of individual companies listed, it is important for companies to at all times ensure they create attention from the investors.

For academicians, price volume momentum has received considerable attention in research. This underscores its importance in empirical finance .This study contributes further to the existing body of knowledge as far as volume based price momentum, trading volume, index performance and stock returns are concerned. It combines existing literature on the relationship between trading volume and stock returns and thus provides literature for future researchers in this area.

For the market regulators, an increase or decrease in trading volume of a company is dependent upon the perception of investors on a company's performance and so is the momentum returns, thus regulators should strive to ensure that investors have confidence in the way the market operates, since a positive attitude on the market enhances its level of activity, thus regulators should ensure that listed companies uphold the corporate governance principles.

5.4 Areas for Further Research

This study focused on the profitability of volume based price momentum at the NSE. Future studies can look at the same concept using a different methodology and see if it obtains the same results as the ones reported in this study. Additionally, another study can be done on the drivers of this momentum returns paying special attention to the behavioral aspect of the investors. Similarly the relationship between trading volume and stock returns has been assessed by this study but the study paid little attention to the state of the market, was it bullish or bearish? Future researchers can look at the relationship between trading volume and stock returns focusing on the two major bullish and bearish conditions in the market. The study also looked at the relationship between trading volume and stock returns without paying attention to the different sectors of the stock market, thus future researchers can look at the relationship controlling for the different sectors.

5.5 Limitations of the Study

The study had a sample period of 2011-2016 which implies the periods prior to and after were not considered thus the effect of the missing periods cannot be ruled out.

The study focused on only one market, the Nairobi Securities Exchange, and thus the findings of the study cannot be used to conclusively make recommendations on other markets particularly in the emerging markets. Other markets can be studied further to see if the findings are similar to the findings of this study.

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APPENDICES

Appendix I: Introductory Letter

Strathmore UNIVERSITY

6th April 2017

TO WHOM IT MAY CONCERN

Otinga, Noah Keya-057372

Mr. Otinga Noah Keya is a postgraduate student in our Master of Commerce (MCom) programme. In partial fulfilment of the MCom degree, students are required to carry out a research project and write a thesis on a contemporary subject within their field of specialisation. Among other activities, the project involves data collection and analysis.

Noah is requesting to gather information to be used in his research. The information he will obtain from your organization will be used for this academic purpose only and will be kept confidential. The results of the survey will be in summary form and will not disclose any individual, company name or company information in any way.

The research study is entitled **"EFFECT OF PRICE VOLUME MOMENTUM ON STOCK RETURNS AT THE NAIROBI SECURITIES EXCHANGE."**

We hope that your organization can assist by providing information to the above named student.

Yours faithfully,

Josphat Manani
MCOM Coordinator
School of Management and Commerce
Email: jmanani@strathmore.edu

Appendix II: Questionnaire

26/2/2016

To whom it may concern.

RE: REQUEST FOR PARTICIPATION AS A RESPONDENT IN MY RESEARCH STUDY.

I am a Master of Commerce student at Strathmore University doing a study titled "***Effect of Price Volume Momentum on Stock Market Returns; A Case of Nairobi Securities Exchange***." I am conducting this research in partial fulfillment of the requirements of my Master's Program**.**

At this point of my study, the focus is on collecting data that will generate important findings for the investing public, academicians, among others. Potential and existing investors will greatly benefit given the findings will shed more light on how price volume momentum influences the level of returns in the market and in turn the investment decision making process.

I promise to ensure confidentiality of your responses by making no specific reference to your feedback and not to cause any harm to you throughout this process. A full report of this study can be made available to you at your request. I look forward to your participation. Thank you.

SECTION 1: GENERAL INFORMATION

Name of the company (Optional)………………..

Kindly tick against the age group you correspond to:

25 years and   below   [ ]

26-35 years   [ ]

Over 35 years   [ ]

Please indicate your highest level of education

Post graduate [ ]   Graduate [ ]   Diploma [ ]   Certificate [ ]

      SECTION 2: Price Momentum

1. Does your firm consider past price patterns when coming up with investment strategies?

   Yes [ ]   No [ ]

2. If yes, to what extent does price momentum influence your investment decision?

   Large extent [ ] Moderately [ ] Low Extent [ ]

3. Over what period do you assess the price momentum?

   3Months [ ] 6Months [ ] 9Months [ ] 12Months [ ]

4. In the post holding period what has been the behavior of returns
   Continuation [ ] Reversal [ ]

5. In your opinion, what explains the behavior of returns in number 4 above?

   ……………………………………………………………………………

Section 3: Trading Volume

5. Does information on trading volume contribute to your investment decision making?
   Yes [ ] No [ ]

6. Does trading volume influence the level of stock performance in future?
   Yes [ ] No [ ]

7 .Over what period do you consider volume momentum?

   3Months [ ] 6Months [ ] 9Months [ ] 12Months [ ]

Section C Price-volume momentum

The following statements relate to price volume momentum. Kindly indicate the extent to which you agree or disagree with the statements on a Likert scale of 1-5 by ticking in the appropriate space

The numbers labeled indicate; **1 .Strongly disagree, 2 Disagree, 3. Somehow agree, 4 Agree, 5 strongly agree**

Statement	Scale				
	1	**2**	**3**	**4**	**5**
Our organization combines price and volume information while making or advising investors					
A univariate price or volume momentum yields high returns					
A bivariate price volume momentum yields high returns					
Past low volume losers outperform past high volume losers within three to six months					
Low volume winners take long to outperform high volume winners with					
Momentum returns are explained by winners stocks as compared to loser stocks					
Trading volume influences stock returns at the NSE					

Stock returns influences trading volume					

Section D: Drivers of momentum returns at the NSE

The following statements relate to drivers of momentum returns in securities markets, kindly indicate the extent to which you agree or disagree with the statements on a Likert scale of 1-5 by ticking in the appropriate space.

The numbers labeled indicate; 1 strongly disagree, 2 disagree, 3 somehow agree, 4 agree, 5 strongly agree

Drivers	Statement	Scale				
		1	**2**	**3**	**4**	**5**
Size	Large size firms report high momentum returns					
	Small size firms report high momentum returns					
	Size of the firm does influence the level of momentum returns					
Liquidity	In the market ,stocks which have a high liquidity report high momentum returns					
	Momentum returns are not influenced by stocks which are not liquid					
	Overall market liquidity influences the level of momentum returns in the market					

Investor sentiment	Investors take time to respond to news about a firm in the investment decision					
	Any news generated about the firm is quickly reflected in the investment decision made by investors					
Price-Volume Momentum	Information about the past price patterns affect the returns in the future					
	Information on trading volume influences returns in the future					
Value effect	Stocks which have a high value in the market report high momentum returns					
	Stocks which have a low value in the market report high momentum returns					

Thank you for your cooperation.

Appendix III: List of Authorized Trading Participants

	Name of Trading Participant
1	Dyer & Blair Investment Bank Ltd
2	Francis Drummond & Company Limited
3	Ngenye Kariuki & Co. Ltd. (Under Statutory Management)
4	Suntra Investment Bank Ltd
5	Old Mutual Securities Ltd
6	SBG Securities Ltd
7	Kingdom Securities Ltd
8	AIB CAPITAL LTD
9	ABC Capital Ltd
10	Sterling Capital Ltd
11	ApexAfrica Capital Ltd
12	Faida Investment Bank Ltd
13	NIC Securities Limited
14	Standard Investment Bank Ltd
15	Kestrel Capital (EA) Limited
16	African Alliance Securities
17	Renaissance Capital (Kenya) Ltd
18	Genghis Capital Ltd
19	CBA Capital Limited
20	Equity Investment Bank Limited
21	KCB Capital
22	Barclays Financial Services Limited
23	Securities Africa Kenya Limited

Source (NSE database, 2017)

Appendix IV: Listed Companies at the Nairobi Securities Exchange

AGRICULTURAL	
Eaagads Ltd	**AUTOMOBILES AND ACCESSORIES**
Kapchorua Tea Co.	Car and General (K)
Kakuzi	Sameer Africa Ltd
Limuru Tea Co. Ltd	Marshalls (E.A.)
Rea Vipingo Plantations	
Sasini Ltd	
Williamson Tea Kenya	
	COMMERCIAL AND SERVICES
BANKING	Express Ltd
Barclays Bank Ltd	Kenya Airways Ltd
CFC Stanbic Holdings Ltd	Nation Media Group
I&M Holdings Ltd	Standard Group Ltd
Diamond Trust Bank Kenya Ltd	TPS Eastern Africa (Serena)
HF Group Ltd	Scangroup Ltd
KCB Group Ltd	Uchumi Supermarket
National Bank of Kenya	Hutchings Biemer Ltd
NIC Bank Ltd	Longhorn Publishers
Standard Chartered Bank	Atlas Development and Support Services
Equity Group Holdings	Deacons (East Africa)
The Co-operative Bank of Kenya	Nairobi Business Ventures Ltd
CONSTRUCTION AND ALLIED	**ENERGY AND PETROLEUM**
Athi River Mining	KenolKobil Ltd
Bamburi Cement Ltd	Total Kenya Ltd
Crown Berger Ltd	Kengen Ltd
E.A.Cables Ltd	Kenya Power & Lighting Co Ltd
E.A.Portland Cement Ltd	Umeme Ltd
INSURANCE	**INVESTMENT**

Jubilee Holdings Ltd	Centum Investment Co Ltd
Pan Africa Insurance Holdings Ltd	Trans-Century Ltd
Kenya Re-Insurance Corporation Ltd	Home Afrika Ltd
Liberty Kenya Holdings Ltd	Kurwitu Ventures
Britam Holdings Ltd	Olympia Capital
CIC Insurance Group Ltd	**INVESTMENT SERVICES**
	Nairobi Securities Exchange Ltd
MANUFACTURING AND ALLIED	
B.O.C Kenya Ltd	
British American Tobacco Kenya	
Carbacid Investments Ltd	
East African Breweries Ltd	
Mumias Sugar Co. Ltd	
Unga Group Ltd	
Eveready East Africa Ltd	
Kenya Orchards Ltd	
A.Baumann CO Ltd	
Flame Tree Group Holdings Ltd	
TELECOMMUNICATION AND TECHNOLOGY	
Safaricom Ltd	
Real Estate Investment Trusts	
Stanlib Fahari I-REIT	

Source (NSE database, 2017)

Appendix V: Companies Excluded from the Sample

Companies Listed During the Study Period		
Name of Company	**Method of Listing**	**Year**
British American	IPO	2011
Nairobi Securities Exchange	IPO	2014
Stanlib Fahari Reit	IPO	2015
CFC Insurance Holdings	Introduction	2011
Trans century	Introduction	2011
Longhorn Publishers	Introduction	2012
CIC Insurance	Introduction	2012
Umeme	Introduction	2012
Home Africa	Introduction	2013
Flame Tree	Introduction	2014
Kurwitu	Introduction	2014
Nairobi Business Ventures	Introduction	2016
Companies Suspended or Delisted		
Company	**Regulatory Action**	**Year**
CMC	Suspended	2011
EAPCC	Suspended	2011
City Trust	Suspended	2013
Rea Vipingo	Suspended	2013
Access Kenya	Delisted	2013
Atlas Development	Suspended	2016

Source (NSE database, 2017)