

**TESTING FOR MARKET OVERREACTION AT THE NAIROBI SECURITIES  
EXCHANGE**

**BY  
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## DECLARATION

This research project is my original work and was not sent to any other institution for any degree.

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Date

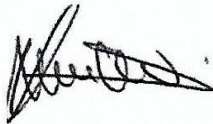
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This research project has been submitted for examination and presentation with my approval as the Supervisor

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Date 23/11/2021

**DR. KENNEDY OKIRO**

## **DEDICATION**

This study is dedicated to my loving family. Dedicated to my dear wife Macrine and my two daughters Michelle and Meg.

## **ACKNOWLEDGEMENT**

I thank the Almighty God for His guidance and providence that enabled me to pursue this project that was too time-and-resource-involving.

For their understanding and encouragement during the project, I wish to express my sincere gratitude to my family.

Finally, I would also like to express my sincere gratitude to the supervisor Dr Kennedy Okiro for agreeing to oversee this research paper and their patience in reading the drafts and directing me sometimes, without which the study would not have been a possibility.

## **ABSTRACT**

This research tests validity of the theory of market performance based on current literature findings dealing with stock returns. Market efficiency theorem notes that using past trading evidence; it is not possible to beat the market. Predictability of returns using past trading data also questions the notion of market effectiveness. I present a survey of studies recording long-term return reversals and short- to medium-term return continuity, which is contrary to market efficiency hypothesis expectations. The reversal effect is usually due to investor overreaction while the momentum effect is due to investor underreaction. The phenomenon of "overreaction" and "underreaction" are examples of potential market efficiency abuses, these hypotheses indicate that investors are inclined to make revenue either by investing in past losers and long-term selling big names, or by buying past winners and short-term selling experience of negative, respectively. The population under study was made up of all companies quoted at the Nairobi Stock Exchange (NSE) as of 31 December 2019. Secondary data was sourced from the Nairobi Stock Exchange (NSE). The study employed parametric tests of data analysis by assuming the population is normal. I attempted to employ both t and Z test for different samples. The Z statistics of daily market return is less than 1.65, which means that there is over reaction at NSE. The researcher found that there was a statistical significant evidence of overreaction at NSE. The researcher found that there was a statistical significant relationship between size of firm and overreaction at NSE. The findings support the hypothesis that there is over reaction of market at NSE. Size of the firms at the NSE did not influence the magnitude of the overreaction. The study recommends the stock authority to focus on increasing the GDP of the NSE. Government policy makers will have to consider the recurrent expenditure and reduce it since it negatively impacts on the real side of the economy.

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## CHAPTER ONE: INTRODUCTION

### 1.1 Background to the Study

This research presents a review that records long-term return reversals and short- to medium-term return continuity, and tests the validity of the theory of market efficiency based on the empirical results of relevant literature as recorded by De Bondt and Thaler (1985). One of the main pillars of financial analysis is the notion of market effectiveness. A number of empirical studies show that, in the long run, losers appear to outperform the winners of prior era. Tversky and Kahneman (1974) posited that the setback effect is as a result of investors' overreaction. Another research group reveals that winners appear to live as winners and losers in the short run. The "overreaction" and "underreaction" phenomenon are examples of potential market-efficiency abuses as these theories suggest that we can earn profit either by long-term "buying losers and selling winners (contrary strategies)" or short-term, respectively, "buying winners and selling losers (momentum or relative strength strategies). Daniel & Hirshleifer (2015), adopted the use of cognitive psychology in testing market overreaction thus stock losers over a given time are always qualified to the market for a given time, typically 3-5 years, which is the duration of portfolio growth, steadily outdo the market in succeeding months, commonly referred to as portfolio "test" or "evaluation duration". Likewise, stocks winners that is those with high returns usually underperform during the appraisal process during the portfolio formation period.

NSE offers an effective framework to investigate the nature of an overreaction of investors as the target population is 68 listed firms, the share index being the oldest of the stock market key indicators, the price weighted index measured as an average of the shares of 20 publicly traded companies selected weighted linear investment returns. The index is a strong reference for the stock market because these 20 companies represent 80 percent of the entire exchange when calculated by market capitalization and is only an index used before 2008, making it the most appropriate sample for this analysis.

#### 1.1.1 Market Overreaction

Being an African country, Kenya practices a collectivist culture that influences investment decisions by investors. Due to intense price instability, Nairobi Securities Exchange has undergone instances of stock market reaction that point to the likelihood of underlying inefficiencies that affect shareholder value. Proof of overreactions and underreactions of investors on the Nairobi Securities Exchange was seen using the study of monthly returns on stocks (Aduda & Muimi, 2011).

In Kenya, stock market reactions have occurred in the Nairobi Securities Exchange triggered by irrational investor activity such as herd behavior, loss aversion, overconfidence and mental accounting, as demonstrated by the 2008 Safaricom IPO, for example, was overwhelmingly

oversubscribed and traded below the Kshs par value. 5 with the shares falling as low as Ksh 2 for over 5 years after the IPO. As a result of investor irrational conduct, the scramble for Safaricom's stock was witnessed anchored by salient past events of the lucrative returns seen in the 2006 KenGen IPO, where the share price of the power producer was more than three times after listing the bid at Kshs.11.90 per share. In the NSE, there was evidence of behavioral influences on individual investment decision-making processes (Mbaluka, 2008).

The decisions of investors investing in NSE were influenced by behavioral factors such as representativeness, overconfidence, anchoring, gambler's fallacy, availability bias, loss aversion, regret aversion and mental accounting (Waweru, Munyoki & Uliana, 2008). Loss aversion affected NSE investor decisions, investors were frame based and loss averse aversion affected NSE investor decisions (Mbaluka, Muthama & Kalunda, 2012). Investors who held shares in Uchumi Supermarkets Limited have witnessed loss aversion behaviour. After discovering in the early 2000s that Uchumi Supermarkets Limited began to face financial and operational difficulties caused by a sub-optimal growth plan, weak internal control structures and mismanagement that share prices were losing value, investors nevertheless kept the shares in the hope of improving financial results.

Behavioural economics played a role in investment decisions based on return evaluation and investor actions affected investor decisions at NSE (Kotieno, 2012). The stock of Kenya Airways closed 19.39 percent higher in 2016 than in 2015. At the end of 2016, when one major investor bought its shares worth Kshs.2 million, Herding's behaviour was witnessed on the KQ share. Herd behaviour has been shown to cause KQ share prices to rise while other investors imitated the large investor by purchasing the share forcing higher prices for the troubled Kenyan airline.

For companies listed on the Nairobi Stock Exchange, Aduda and Muimi (2011) tested investor rationality and the findings were consistent with the notion of overreaction, showing that investors overreacted to both good and bad news. The authors did not however, analyze the variables of investor conduct to find out how to measure the abnormal returns at the NSE by the impact on stock market reaction. Aduda and Muimi (2011) tested investors' overreaction to news and results as an anomaly that had been confirmed in other markets for companies listed on the Nairobi Stock Exchange.

Study into whether NSE was successful and in what type of efficiency was studied in previous studies. Kiprono (2014) found evidence around the earnings announcement times of a major abnormal price reaction implying that earnings announcements contained relevant details. Earnings announcements established a benchmark that was used by the public to measure a firm's equity and profitability. If the market was successful, the share price instantaneously reflected any new

information issued. Consequently, when earnings were publicly released, the share price immediately reflected this disclosure and thereby denied investors any above-average risk-adjusted earnings. However, after the announcement of earnings, investor behavior calculated demand and supply on the basis of stock purchases and sales and as determined in this report, its effect on the stock market reaction in Kenya

### **1.1.2 Nairobi Securities Exchange**

Stock markets consist of Indices which track the performances of specific companies listed on a given exchange. The securities indexes are often tabulated daily by summarizing the daily movement of the share prices of the listed securities that make up the index and are thus weighted in accordance to the contribution of each individual company to the overall performance of the index (Odhiambo, Weke & Wendo, 2020).

NSE is a market established in 1953 and licensed by the CMA with the main mandate of regulating the security market and ensuring exchange of ownership of securities by bringing borrowers and investors together at low cost. Regulation of the quoted firms is achieved by ensuring that firms abide by the rules and regulations set by submitting their periodic performance reports. Also, the NSE educates the general public on investment issues. The products traded are securities which consist of shares/equities and bonds/debt investments. The shares of forty-seven companies listed at the NSE trade in the four sectors namely agriculture, commercial and services, finance and investment and industrial and allied while bonds traded consist of government and corporate bonds (NSE, 2011) Trading activities are conducted through the stockbrokers, licensed trading agents, who meet at the floor and facilitate exchange of share / bond ownership through the auctioning process. The market has made tremendous improvements from its inception to date. These include the first privatization at the NSE to be carried out in 1988 when the government off-loaded its 20% shares in Kenya Commercial Bank, in 1996, the market witnessed the largest share 6 issue of Kenya Airways and in 2006, the NSE trading was fully automated. From these developments, the NSE becomes a point of interest to be studied.

### **1.2 Research Problem**

Investors' stock market decisions play an important role in deciding the market trend that then affects the economy (Wan, Cheng & Yang, 2014). When stock prices are pushed away from fundamental values, stock market reactions occur, and then prices eventually return to fundamental values. EMH was unable to resolve stock market anomalies induced by irrational investor activity caused by market inefficiencies. In the underlying asset pricing model, stock market anomalies revealed either market inefficiency, profit potential or inadequacies. Share prices are pushed away from fundamental values by the market forces of demand and supply, based on the irrational actions of investors in

their investment choices. In different sample periods, systemic risk, size effect, liquidity, i.e. buy-ask spreads, macroeconomic factors and value effect did not hold up and showed that the metrics had lost the predictive ability to be used as an investment strategy indicator. A successful investment strategy to determine the return predictability in the financial markets is likely to provide a model to determine the impact of investor behavior variables on stock market reactions. In violation of the Bayes rules, individuals overweighed recent information and underweighted prior data or base rate, triggering stock market reactions (Debondt & Thaler, 1985). Therefore, stock market reaction was triggered by irrational actions of investors that led to stock market inefficiencies.

Stakeholders in the stock market of the NSE lost close to Kshs. 500 billion to the market value in 2016 as share prices decreased by 25.35 percent compared to 2015, priced at Kshs, 1.931 trillion from 2.42 trillion (Statistical Bulletin of the CMA Quarterly Capital Markets, Q2/2016). In the face of sustained uncertainty that had an effect on stock prices at the Nairobi Share Exchange, the demand for stocks was constrained by the continued wait-and-see attitude of investors.

The presence of behavioral effects on the individual investment decision making process at the NSE was described by Mbaluka (2008). Werah (2006) indicated that because of anomalies such as herd behavior, regret aversion, overconfidence and anchoring, the behavior of investors at the NSE was to some extent irrational with regard to fundamental estimates. Evidence of investor overreaction and under-reaction at the NSE was confirmed by Aduda and Muimi (2011). Previous studies have looked at the effect on investment decisions, investor efficiency and inventory of investor behavior biases.

An investor behavior model was needed to explain the observed pattern of abnormal returns that explained stock market reactions. The research used investor behavioral variables i.e. herd behaviour, loss aversion, mental accounting and overconfidence to determine predictability of abnormal returns in Kenya. Research gap was to develop a model that provides an effective investment strategy to determine return predictability in the financial market using investor behavior biases variables hence answering the question is there evidence of market overreaction at the Nairobi Stock Exchange?

### **1.3 Objective of the study**

The main objective of the study was to test whether there is evidence of overreaction at the Nairobi Stock Exchange.

### **1.3.1 Specific objectives**

1. To determine the effect of loss aversion on stock market reaction in Kenya.
2. To evaluate the effect of herd behaviour on stock market reaction in Kenya.
3. To ascertain the effect of overconfidence on stock market reaction in Kenya.
4. To establish the effect of mental accounting on stock market reaction of in Kenya.

### **1.4 Research Hypotheses**

This study sought to address the following pertinent research hypothesis;

**H01:** Loss aversion has no significant effect of on stock market reaction in Kenya.

**H02:** Herd behavior has no significant effect of on stock market reaction in Kenya.

**H03:** Mental accounting has no significant effect of on stock market reaction in Kenya

**H04:** Overconfidence has no significant effect of on stock market reaction in Kenya

### **1.5 Value of the Study**

#### **Investors**

Evidence of market overreaction would send a signal to investors to avoid making hasty investment decisions guiding them in making buy and sell decisions. Extent of market overreaction that may be attributed to market imperfections and inefficiencies may be reduced through enhanced automation, information availability and flow and automation of the operations at the NSE.

#### **Researchers**

It will contribute to existing literature and knowledge on this subject as to date no evidence has been documented about the subject of overreaction at the NSE.

#### **Policy Makers / Regulators**

The research will enable the policy makers to devise new standards in establishing an appropriate level of liquidity for firms and come up with more effective methods of managing liquidity levels of a firm. In addition, the research will shed light on importance of information distribution and development of the capital market in order to reduce the level of market imperfection

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter provides a study of the relevant literature published by numerous researchers, academics, and writers on the topic under investigation. It draws materials from various sources closely linked to the study's theme and goals. Scholarly models are used to illustrate the various sub-themes described. This section usually covers the theoretical and analytical analysis.

### **2.2 Theoretical Review**

This section explained the theoretical literature from prior researchers regarding stock market overreaction at the Nairobi securities exchange.

#### **2.2.1 Efficient Market Hypothesis**

Orthodox classical economics have always dissuaded the market from being competitive, thus the Efficient Market Hypothesis, in that stock prices always represent the complete knowledge available at that time on the market. Fama (1970) was a supporter of the efficient market hypothesis who identified an effective market as one in which all the knowledge available on the market at that time was reflected in the prices. Nevertheless, there has been a growing interest, recognized by advocates of behavioral finance, in the study of investor behavior in the financial markets and how equity values have been influenced in both the short and long term. There are two building blocks of behavioral finance: restriction to arbitrage, which claimed that the dislocation created by less rational traders could be impossible for rational traders to undo; and psychology, which clarified the kinds of deviations from full rationality.

A critical error in the argument for the efficient market model was clarified by Shiller, Fischer and Friedman (1984). The authors said that the fact that the statistical studies had not shown that returns were not predictable was overlooked; they had only shown that returns were not very predictable. The successful market model could be similarly consistent with the normal finding in the literature on event-studies that announcements had their effect on returns as soon as the data were public and had no predictable effect thereafter. Fama (1998) questioned behavioral finance research for not being pure occurrence studies and thus not completely believing in the maxims of modern methodology in finance. The rejection of behavioural finance by Fama challenges it on the grounds that it was technically and methodologically contradictory as a field of research. In doing so, Fama (1998) clarified that the problem from the literature on long-term return anomalies was resolved by market performance. Apparent overreaction to data was about as usual as under-reaction and post-event continuation of pre-event abnormal returns was about as frequent as post-event reversal, consistent with the market efficiency hypothesis that the anomalies were chance outcomes. Most notably, most long-term return anomalies disappeared with rational improvements in technique,



consistent with the business efficiency forecast that apparent anomalies may be attributable to methodology. From the methodological point of view, Yen and Lee (2008) summarized the empirical findings from the 1960s to the 1990s on the EMH under the headings supporting empirical findings as reported in the 1960s, mixed empirical findings as merged in the late 1970s through 1980s, and difficult empirical findings as appeared in the 1990s. Based on empirical data available, the authors went on to sketch the current debate in the 21st century and then provided an overall evaluation of the EMH.

Fama (2014) said that during the 2008 financial crisis, the Efficient Market Theory held up well and that the markets were a casualty of not the cause of the recession. Despite this the author acknowledges that potentially, poorly informed investors could lead the market astray and that stock prices could therefore become somewhat irrational. In a randomized experiment, there was a disparity in output between seasoned and inexperienced traders. There can be no distinction between these two groups of traders if the market swings arbitrarily. Traders who are more knowledgeable about technical research, however, greatly outperform those who are less knowledgeable.

The importance of the Efficient Market Hypothesis was that it revealed the shortcomings of CAPM and APT or Modern Portfolio Theory in conventional finance and the whole of mainstream finance. It clarified how behavioral economists empirically and logically questioned the efficient market hypothesis and attributed the imperfections in financial markets to a combination of cognitive biases such as overconfidence, overreaction, herd behaviour, loss aversion, representative bias in mental accounting, knowledge bias, and numerous other predictable human errors in reasoning and information processing.

### **2.2.2 Mental Accounting Theory**

In three distinct fields, Thaler (1985) introduced new theories: coding profits and losses, analyzing transactions i.e. transaction utility, and budgetary laws, called the theory of mental accounting. The author speculated that people were trying to code results i.e. the hedonic editing hypothesis, to make themselves as happy as possible. Decision makers were characterized by the hedonic editing hypothesis as value maximizers who consciously separated or merged results depending on which mental representation was more desirable. The author indicated that people under-consumed hedonic leisure products on mental accounting and mental budgeting. For purposes of self-control, the author argued that hedonically pleasurable luxuries were frequently under-consumed, which was why they were desirable gifts.

On behavioral life-cycle theory, Shefrin and Thaler (1988) suggested that individuals psychologically allocated resources over existing income, current assets, and potential income classifications. From the current income account, the tendency to spend was highest, whereas sums designated as future income were more conservatively handled. In theory, to optimize their happiness, individuals may arbitrarily divide or merge gains and losses entirely. There were however, limitations to the degree to which individuals could psychologically segregate and incorporate findings.

Massa and Simonov (2004) analyzed the way investors responded to previous gains/losses and used a new and specific dataset with comprehensive information on the different components of wealth, income, demographic characteristics and stock-level portfolio holdings found by investors. The theory of loss aversion against the alternative offered by standard utility theory and the house-money effect was tested by the authors. The authors showed that investors did not act on an annual horizon in accordance with loss aversion and more in line with standard utility theory or the house money effect. The authors have also shown that investors have not benefited from the mental prejudice of accounting. Investors found wealth in its entirety and gains/losses in overall wealth, financial wealth and real estate wealth influenced risk taking in the financial market.

The mental accounting theory significance was that it was a deep-seated prejudice with several forms that caused investors a number of problems. The most fundamental of these problems was the placement of investment assets in separate "buckets" as per type of asset, regardless of possible correlations that bind investments across categories.

### **2.3 Stock Market Reaction**

Kenya, as an African country, has a collectivist culture, which has an impact on investor investment decisions. The Nairobi Securities Exchange has seen some significant price volatility, which could indicate underlying inefficiencies that have an impact on shareholder value. Investors' overreactions and underreactions at the Nairobi Stock Exchange have been observed using monthly stock returns analysis (Aduda and Muimi, 2011).

Stock inefficiencies at Kenya's Nairobi Securities Exchange have been reported as a result of irrational investor activity. Safaricom's 2008 IPO, which was overwhelmingly oversubscribed, traded for less than Kshs. 5 for more than 5 years after the IPO, with shares as low as Kshs. 2.00. The investor response to Safaricom's shares was fueled by recent events such as the rich returns seen in the 2006 KenGen IPO, which saw the power producer's share price more than treble after the offer was listed at Kshs.11.90 per share. Mbaluka (2008) proves that individual investment decision-making processes are influenced by behavioral factors.

Werah (2006) suggested that the behaviour of investors at the NSE is to some extent irrational regarding fundamental estimations because of anomalies such as herd behaviour, regret aversion, overconfidence and anchoring. Overconfident investors may more readily sell winners, because the run-up they expected had occurred, but incrementally was less willing to sell losers, because they remain confident that the runup will eventually occur and this is witnessed in the Mumias Sugar Company share investments at the NSE. Loss aversion affects investor decisions at the NSE, investors are frame dependent and loss averse (Mbaluka, Muthama & Kalunda, 2012). Loss aversion behavior was witnessed with investors that held shares at Uchumi Supermarkets Limited. The investors after learning in early 2000s when Uchumi started experiencing financial and operational difficulties that were caused by a sub-optimal expansion strategy, poor internal control systems and mismanagement that the share prices were losing value, the investors still held the shares in the hope that the financial performance will improve. Human psychology played a role in investment choices based on assessment of returns and investor behavior influences investor investment decisions at the NSE (Kotieno,2012).

Kiprono (2014) finds evidence of significant abnormal price reaction around the earnings announcement periods suggesting that earnings announcements do contain relevant information. Earnings announcements provide a yardstick that can be utilized by the market to assess the wealth and profitability of a firm. If the market is efficient, then any new information released is instantaneously reflected in the share price. Therefore, as earnings are publicly announced, the share price should immediately reflect this announcement and therefore deny investors any above-average risk-adjusted profits. However, investor behavior after the announcement of earnings determine the demand and supply based on purchases and sells of stock and that will be determined in the research on its effect on stock market reaction in Kenya. Wamae (2013) investigated herding, prospecting, risk aversion and anchoring and found that all the factors affect investment decision, with herding having the most impact, followed by prospecting; anchoring and finally the risk aversion factor had the least impact on investment decisions.

## **2.4 Empirical Literature Review**

This section reviews literature from prior scholars regarding the effect of investor behaviour variables: herd behaviour, loss aversion, mental accounting and overconfidence on stock market reaction, the dependent variable

### 2.4.1 Herd Behaviour

The relation between market volatility and investor behaviour was tested by Blasco, Corredor and Ferreruella (2012), arguing that irrational investor behaviors destabilize prices. The primary aim of the research was to examine the relationship between herding and volatility during days of market stress. The research population was on the Ibex-35 Index. The sample was Ibex-35, 15-minute price results, for a total of 1750 trading days, from 1 January 1997 to 31 December 2003. In the period under review, the independent variables were the number of stock sales, the percentage change in returns year by year and the number of transactions. The volume traded and stock cost volatility were the dependent variables. Quantitative research design was the research design used. The research adopted a herding stress scale from Patterson and Sharma (2006), which was calculated using regression analysis. The authors showed that herding behaviour in stock markets was closely related, both directly and indirectly, to market stress and volatility through the variance of the latter during periods of market stress. The findings revealed proof of the asymmetric effects of herding during extreme market fluctuations on volatility, which was in line with the various psychological consequences of extreme up- and down-market movements.

The objective of Thirikwa and Olweny (2015) was to investigate the determinants of herding at the stock exchange in Nairobi, Kenya. Quantitative research design was the research design used. Corporations identified on the NSE were the target population. Domestic stock returns, market capitalization, book to market value and foreign market returns were the independent variables. Market large herding measured using CSAD was the dependent variable. In order to analyze results, the approach followed was quantitative study design, i.e. longitudinal sample design, i.e. panel data regression analysis. The authors focused on how deviations in returns on individual stocks are affected by market performance (returns), company market capitalization, company book-to-market valuation, and the performance of the external market. For the duration between 2008 and June 2015, the analysis utilized regular time series data. The empirical analysis was a regression analysis of the Ordinal Least Square (OLS). The main results of the study were as follows: fat tailed (leptokurtic) and not usually distributed were the stock returns. The findings showed proof of herding around market efficiency, market capitalization and book-to-market valuation in the NSE. The result showed that, calculated by  $\beta_3$ , the magnitude of the effect of market performance on the variance on individual stock returns is relatively high at 9,475 and substantial at 1%. The market capitalization and the book-to-market ratio, while both relatively low, were also influenced by deviations in stock returns at  $= 0.670$  and  $= -0.242$  at a relatively large 1 percent range.

Messis and Zepranis (2014) used Hwang and Salmon (2004) to analyse investor daily, weekly and monthly data of securities traded at the Athen Stock Exchange. Hwang and Salmon (2004) also used state space models check on the Cross-Sectional variability of factor sensitivities. The objective of study was to investigate the existence of herding in the Athens Stock Exchange over the 1995-2010 periods and examine its effects on market volatility and to analyze investor daily, weekly and monthly data of securities traded at the Athen Stock Exchange. The population of study was investors at Athens Stock Exchange. The sample was investors at Athens Stock Exchange over the period 1995-2010. The independent variables were market return, the systematic risk, price volatility beta and size of the selected stocks. The dependent variable was the excess return of asset. Quantitative research design was used. The methodology used panel data regression model to examine herding over portfolios formed on beta and size of the selected stocks. The detection of herding was done using the state space model of Hwang and Salmon (2004). Four volatility measures were employed. The findings depicted the presence of herding over two different periods of time. Large differences were observed among the portfolios regarding the herding periods. The results confirmed a linear effect of herding on all volatility measures considered. Stocks exhibiting higher levels of herding or adverse herding presented higher volatility, and from this point of view, herding was regarded as an additional risk factor in the market.

Lee and Lee (2015) used the computational methodology of Agent-Based Modelling that allowed an analyst to construct, evaluate and experiment with artificial worlds consisting of agents that interact within a particular context. Quantitative research design was the research design used. The goal was to illustrate that excess volatility in the stock market is explained by irrational agents. The research population was the Fundamentalist and Chartist agents in the South Korean Stock Market. Quantitative research design was the research design used. In order to analyze the results, correlation analysis was used. The results showed that the market deflation did not occur automatically when the agents had different perceptions on the tipping point and price variations were always small and even some seemingly flat intervals existed. Their results confirmed that bubbles and price bursts were more likely to occur when heterogeneous price expectations were combined with agent-to-agent herding actions, so that agents in the same group shared similar price change expectations.

#### **2.4.2 Mental Accounting**

The aim of Barberis and Huang (2001) was to research firm-level equilibrium stock returns in two economies: one in which investors were averse to losses over their stock portfolio fluctuations, and another in which they were averse to losses over the fluctuations of the individual stocks they own. For person and portfolio stocks, the dependent variable was Stock Returns. The independent variable

was the utility of the dividend ratio of stock price gains and losses. Quantitative research design was used by the authors and panel data was the model specification. The results were that there was a high average and excess volatility in the standard individual stock return, and there was a significant value premium in the cross section that could be captured by a widely used multifactor model to some degree.

The purpose of Lim (2004) was to evaluate how psychological and reputational factors influence the actions of individual investors and security analysts by analyzing the tendency of investors to frame their gains and losses using individual investor trading records at a large discount brokerage firm. The result showed that investors appeared to bundle loser sales on the same day and isolate winners' sales over multiple days. The outcome was consistent with the mental accounting principles (Thaler, 1985), according to which, by combining losses and segregating profits, individuals gained greater utility.

Heath, Chatterjee and France (1995) designed an experiment with the objective to test the robustness of mental accounting of multiple events in USA. Two methods had been used to test the mental accounting of multiple events. Thaler's (1985) original approach asked subjects to evaluate the relative happiness of two fictitious consumers facing financially equivalent situations. One faces a single event i.e. integrated version while the other faces two events i.e. segregated version. The independent variable was multiple gain or loss ratio. The dependent variable was change in value of stock. The research found out that mental accounting principles for multiple events were replicated and then extended to pricing situations that were designed to moderate these principles if reference dependence was proportional i.e., if consumers evaluate events in terms of proportional deviations from reference states rather than raw deviations. Prices were stated with or without popular percentage-based pricing frames such as 33% off. Mental accounting principles generally prevailed in the absence of percentage-based frames. However, percentage-based frames altered two principles and increased tendencies toward the others. The findings demonstrated that mental accounting principles, price perception and reference dependence were sensitive to the ways in which deviations from reference states were framed.

The purpose of Lim (2006) was to evaluate whether the trading decisions of investors were affected by their preference for framing gains and losses. The author used the hedonic editing hypothesis (Thaler, 1985) to explain that the data collection of individual investor trades used in the analysis is from a large U.S. discount brokerage house containing regular trading records from January 1991 to November 1996 of 158,034 accounts (78,000 households). The file held more than 3 million records of common stock transactions, bonds, mutual funds, American Depositary Receipts (ADRs), etc. Benefit or loss ratio were the independent variables. The number of stocks sold was a dependent

variable. From the hedonic editing hypothesis, the study used quantitative analysis design and developed testable hypotheses on investor trading activity (Thaler, 1985) and presented proof that the stock selling decisions of investors were consistent with the implications of prospect theory and mental accounting. The author discovered that the degree of trade clustering was connected to the stock preferences and portfolio returns of investors.

### **2.4.3 Loss Aversion**

The objective of Barberis, Huang and Santos (2001) was to research asset prices in an economy where investors not only derive direct utility from demand, but also from volatility in the value of their financial assets. Investors were averse to losses over such fluctuations, and the degree of aversion to losses depended on their prior output of the investment. Loss aversion and mental accounting were the dependent variables. The utility of the benefit or loss ratio and price-dividend ratio of returns were independent variables. There was the use of quantitative analysis design. Study of panel data regression was used. The findings showed that the aversion to losses and the mental accounting system could help to explain the high average, excess volatility and predictability of stock returns, as well as their poor correlation with growth in consumption. Prospect theory and experimental data about how prior findings affected risky choices inspired the design of the model.

The aim of Barberis and Huang (2001) was to research firm-level equilibrium stock returns in two economies: one in which investors were averse to losses over their stock portfolio fluctuations, and another in which they were averse to losses over the fluctuations of the individual stocks they own. The independent variable was the utility of the stock and price-dividend ratio for profits and losses. For person and portfolio stocks, the dependent variable was Stock Returns. A panel data regression model was used for quantitative analysis design and model specification. The results were that there was a high average and excess volatility of the standard individual stock return, and there was a significant value premium in the cross section that could be captured by a widely used multifactor model to some degree.

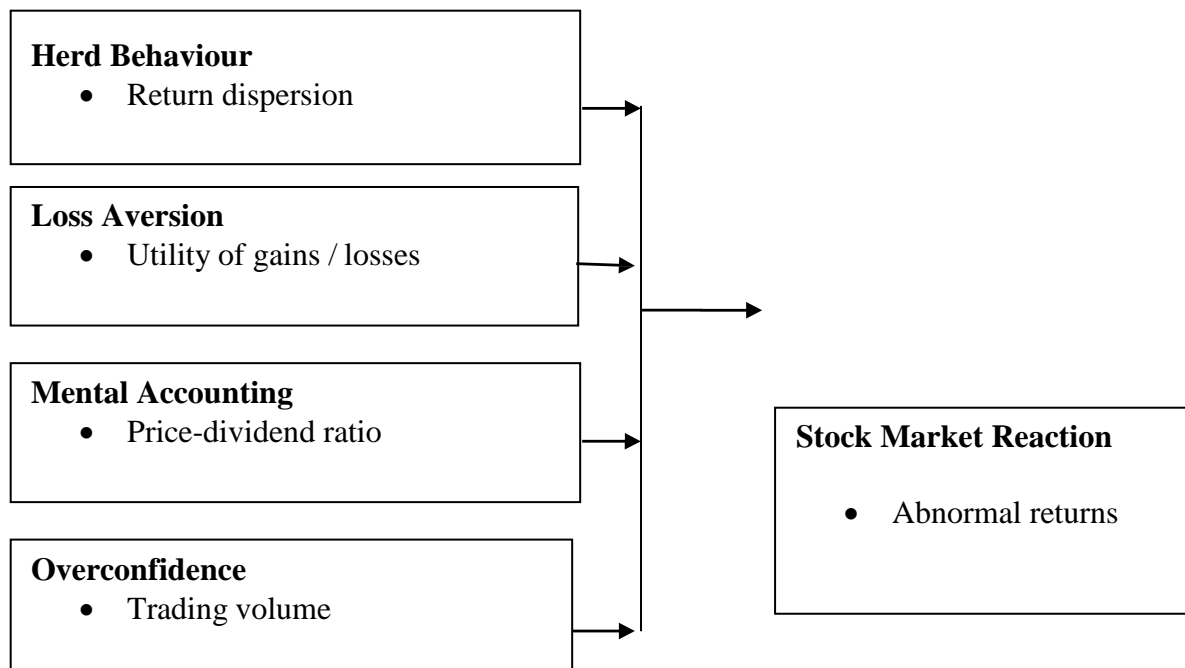
The goal of Gächter, Johnson and Herrmann (2007) was to decide whether loss aversion existed in riskless and risky decisions. The authors performed an investment fund effect experiment and randomly selected a total of 660 customers at a large German car manufacturer who participated in the task of lottery choice that ostensibly tests loss aversion in risky decisions. In total, the study population was 660 customers at a major German automotive manufacturer. The study consisted of 360 subjects randomly chosen by the car manufacturer's customers. The independent variable was the endowment effect of the same individual - willingness-to-accept (WTA) and willingness to buy (WTP). The dependent variable was the exchange value. The participants all spoke German and lived in Austria, Germany and Switzerland. Quantitative architecture for analysis was adopted.

Analysis of the correlation was used. All subjects participated in a simple lottery choice task which arguably measured loss aversion in risky choices. The research found that substantial heterogeneity in both measures of loss aversion. Loss aversion in the riskless choice task and loss aversion in the risky choice task were highly significantly and strongly positively correlated. The research found that in both choice tasks loss aversion increases in age, income, and wealth, and decreases in education.

## 2.5 Conceptual Framework

Cooper and Schindler (2011) defined dependent variable as a variable that is measured, predicted or monitored and is expected to be affected by manipulation of an independent variable. Independent variable is also define as a variable that is manipulated by the researcher and the manipulation causes an effect on the dependent variable Figure 2.10 shows the conceptual framework of the study depicting interrelationship between study variables. The dependent variable being stock market overreaction and independent variable was the investor behaviour variable represented by overconfidence. Mental accounting, loss aversion and herd behaviour.

### Independent Variables



Independent variable

Dependent variable

Figure 2.1: Conceptual Framework



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Research Design**

The study applies the concept of a longitudinal survey. A longitudinal study is a correlational research study involving repeated observations over long periods of time of the same elements (Sekaran, 1992). This involves tracking changes over time on a wide range of members of the population which is desirable for comparison purposes. The analysis given is primarily descriptive thus sample statistics are used to interpret population parameters. This study focused on the success of different NSE companies and the trend of their book value to discern if there is any proof of the overreaction phenomenon.

#### **3.2 The Population and Sample**

All the companies listed on the NSE were target population of this analysis and formed the study population. The sampling frame adopted in the analysis was obtained from the list of listed companies as of January 2010. This was because the study analyzed stock returns for listed companies over a five-year period.

The study determined the effect of investor behavior on stock market reactions in Kenya. The population for this study comprised of all the 67 listed companies at the NSE for the period of 2018 to 2019. A sample of 48 listed companies was used in this study. The period 2018 to 2019 was sufficient to cover stock market reaction during periods of market stress, recovery periods of the market and the current price declines experienced at the NSE.

#### **3.3 Data Collection**

The secondary sources are mainly to provide the data used in this study. At the end of each trading day, the NSE offers a summary listing for the various indices, such as the NSE-20, the average high, minimum and value weight cost of each share, the amount of stocks traded, market capitalization, bonus notices and closing values. A collection of financial statements is also issued for the business from out of which results are derived

#### **3.4 Data Processing and Analysis**

The panel data regression model adopted is the Auto Regressive Distributed Lag model because of panels in which both T, the number of time series observations, and N, the number of groups are quite large and of the same order of magnitude. Mean Group estimators estimate N separate regressions and calculate the coefficient means or to pool the data and assume that the slope of coefficients and error variances are identical. Pooled Mean Group estimator constraints the long run coefficients to be identical but allows short run coefficients and error variances to differ across

groups. Pool Mean Group estimator considers both cases where the independent variables are stationary or where they follow unit root process, and for both cases derive the asymptotic distribution of the Pool Mean Group estimator as T tends to infinity.

### 3.5 Variables Measuring

Herding behavior, Loss aversion behaviour, mental accounting behaviour and overconfidence behaviour are the independent variables. Stock market reaction is the dependent variable.

#### 3.5.1 Stock Market Reactions

Stock market reaction was measured using abnormal returns. Excess return AR<sub>it</sub> are computed as the difference between the stock return and the market portfolio return to get market adjusted return. Market adjusted returns was measured as follows:

Abnormal return = Observed return – Expected return

$$Ar_{i,t} = R_{i,t} - R_{m,t} \dots\dots\dots(1)$$

Where for the monthly period t, market return constant R<sub>mt</sub> is subtracted from R<sub>it</sub>. R<sub>mt</sub> is the equal-weighted return of the entire 20 share index. There is no risk adjustment except for movements of the market as a whole and the adjustment is identical for all stocks (DeBondt & Thaler, 1985); (Boussaidi, 2017).

#### 3.5.2 Loss Aversion Behaviour

Loss aversion behaviour is measured using utility of gains or losses of prior returns to measure loss aversion behavior (Barberis & Huang, 2001). The gain or loss on stock i between time t and t + 1 was measured as follows:

$$X_{i,t+1} + S_{i,t} R_{i,t+1} + S_{i,t} R_{f,t}$$

Where  $X_{i,t+1}$  measures the gain or loss on stock  $i$  between time  $t$  and time  $t+1$ , a positive value indicating a gain and a negative value, a loss. The utility the investor receives from this gain or loss is given by the function  $v$ , and it is added up across all stocks owned by the investor. It is a function not only of the gain or loss itself, but also of  $S_{i,t}$ , the value of the investor's holdings of stock  $i$  at time  $t$ , and of a state variable  $z_{i,t}$ , which measures the investor's gains or losses on the stock prior to time  $t$  as a fraction of  $S_{i,t}$ . By including  $S_{i,t}$  and  $z_{i,t}$  as arguments of  $v$ , we allow the investor's prior investment performance to affect the way subsequent losses are experienced. In words, the gain is the value of stock  $i$  at time  $t + 1$  minus its value at time  $t$  multiplied by the risk-free rate. Expected return lead by one month minus equals to market return minus risk free rate.

### 3.5.3 Investor Herd Behaviour

Investor herd behavior was measured using return dispersions using Cross Sectional Absolute Deviations (CSAD) method (Thirika&Olweny, 2015).

CSAD is expressed as:

$$CSAD_{it} = \frac{1}{N} \sum_{i=1}^N |r_{it} - r_{mt}| \quad \dots\dots\dots(2)$$

CSAD is the measure of dispersion, where N is the number of firms in the aggregate market portfolio,  $r_{it}$  is the observed stock return on firm i for month t and  $r_{mt}$  is the cross-sectional average return on month t. This means that the dispersions will decrease or at least increase at a less-than-proportional rate with the market return. Herding exists when there is a small difference between the returns of individual stock and the market index.

### 3.5.4 Investor Mental Accounting

Investor Mental Accounting is measured using Price-dividend ratio. Price-dividend ratio is financial ratio that indicates how much a company pays out in dividends each year relative to its share price. A stock with a high price–dividend ratio (a growth stock) is often one that has done well in the past, accumulating prior gains for the investor, who then views it as less risky and requires a lower average return. A stock with a low price- dividend ratio (a value stock) has often had dismal prior performance, burning the investor, who now views it as riskier, and requires a higher average return.

The investor mental accounting variable was first calculated by forming five portfolios. The portfolios formation was based on the price-divided ratio annually. These portfolios were rebalanced each year to form new portfolios. Barberis and Huang (2001) subtracted the average returns of the portfolio of the companies that had the highest price-divided ratio from the average returns of the companies that had the lowest price- divided ratio. This resulted in a portfolio referred to as difference portfolio. The intention of creating this portfolio is to assess whether mental accounts formed on the basis of the price-divided ratio have any explanatory power on the market reaction. It is to assess whether the companies that pay lower divided are able to beat the high paying divided companies.

Stocks with low price–dividend ratios (dividend yield) have higher average returns than stocks with high price–dividend ratios. Multifactor models that have been shown to use the value premium in actual data and matches empirical features of aggregate asset return (Barberis &

Huang, 2001). In equilibrium, aggregate stock returns have a high mean, excess volatility, and are moderately predictable in the time series, while the risk-free rate is constant and low.

### 3.5.5 Investor Overconfidence

Investor overconfidence shall be measured using trading volume to ascertain turnover. Turnover rate will be used as a measure of volume of transactions (Adel & Mariem, 2013). The trading volume is measured by turnover as follows:

$$\text{Turnover} = \frac{\sum_{i=1}^n \text{nit}}{\text{Nit}} \dots\dots\dots(4)$$

Where nit is the number of shares traded of stock i (volume traded per month); Nit is the number of exchanges of stock i (number of deals); t is time; i is listed company. Excessive trading of shares on investor confidence contributes to excessive volatility (Adel & Mariem, 2013).

### 3.6 Statistical Model

Panel data regression models was used to pool data observations on a cross-section of the sampled 48 listed companies under study over a period of thirteen years. The study used panel regression models to analyze secondary data as the secondary data collected will exhibit both time series and cross-sectional dimensions. Stock market reactions variable was modelled because of herding, loss aversion, mental accounting and overconfidence. The study determined the effect investor behavior on stock market reactions in Kenya, panel regression equation will be specified as follows:

Where:  $SMR_{it}$  is Stock Market Reactions as measured by Abnormal Returns to determine stock market reaction, X is the investor behaviour variables (Investor Herd Behaviour, Investor Loss Aversion, Investor Mental Accounting and Investor Overconfidence). The variable effect on the stock market to determine if there is overreaction or underreaction in the stock market.  $\alpha_0$  is the intercept term,  $\alpha_i$  are the independent variables,  $\epsilon_{it}$  is the

**CHAPTER FOUR**  
**DATA ANALYSIS AND RESULTS**

**4.1 Introduction**

This chapter presents details of NSE 20 share index performance for the 2015 to 2019 periods. The findings were obtained from an analysis at the end of each month during the periods of study. The data sets were assessed for difference in three ways by means of the pooled-variance t-test. The three forms are pre- and post-3 year periods.

**4.2 Descriptive Statistics**

**Table 4.1: Presents some elementary tests of descriptive statistics and normality.**

	<b>Stock Market Reactions</b>	<b>Investor Herd Behavior</b>	<b>Investor Loss Aversion</b>	<b>Investor Mental Accounting</b>	<b>Investor Overconfidence</b>
Mean	0.239585	7.446169	- 2.120756	1.271245	7.452941
Median	-0.325554	4.978227	0.109167	0.515701	7.599967
Maximum	122.4242	122.4242	958.8919	53.17610	14.38127
Minimum	-97.94357	0.002961	- 1199.735	-31.50250	-0.572519
Std. Dev.	12.10587	9.547525	107.5521	8.298008	1.825437
Skewness	0.512158	4.451179	- 0.791119	1.762223	-0.355976
Kurtosis	19.61086	32.89297	18.30443	14.78702	4.150125
Jarque-Bera Probability	73258.50 0.000000	257316.5 0.000000	62141.37 0.000000	40033.52 0.000000	483.9462 0.000000
Sum	1520.883	47268.28	- 13360.76	8069.866	47311.27
Sum Sq. Dev.	930165.6	578562.3	72863450	437035.0	21149.60

From the results, the standard deviation of the variables was found to be outside the acceptable range of 3 standard deviations for stock market reactions, investor herd behavior, investor loss aversion, investor mental accounting variables while investor overconfidence was within the normal distribution bound. The results of standard deviation were supported by those of skewness which is a measure of dispersion with only investor overconfidence having a skewness close to zero.

The skewness value for all the other variables shows that the variables are not all normally distributed since their value of skewness disperse from zero significantly. In extension, the result of kurtosis was away from the expected value of 4 for a normal distribution for stock market reactions, investor herd behavior, investor loss aversion, investor mental accounting variables and only investor overconfidence had a value of 4. The probabilities of the Jarque-bera are all away from the value of one (1) which means that all the variables are not normally distributed per this test statistic which weighs the information between skewness and kurtosis. The interpretation is that special methods that takes care of the dispersions from normality was adopted to minimize any bias that may arise.

The results for descriptive statistics for stock market reactions showed that for mean is 0.239585, median is 0.325554, maximum is 122.4242, minimum is -97.94357, standard deviation is 12.10587, skewness is 0.512158, kurtosis is 19.61086 and Jarque-Bera is 73258.50. The probability is 0 meaning the data is not normally distributed. When data is normally distributed the p-value is 1.

The results for descriptive statistics for Investor Herd Behavior showed that for mean is 7.446169, median is 4.978227, maximum is 122.4242, minimum is 0.002961, standard deviation is 9.547525, skewness is 4.451179, kurtosis is 32.89297 and Jarque-Bera is 257316.5. The probability is 0 meaning the data is not normally distributed. When data is normally distributed the p-value is 1.

The results for descriptive statistics for Investor Loss Aversion showed that for mean is -2.120756, median is 0.109167, maximum is 958.8919, minimum is -1199.735, standard deviation is 107.5521, skewness is -0.791119, kurtosis is 18.30443 and Jarque- Bera is 62141.37. The probability is 0 meaning the data is not normally distributed. When data is normally distributed the p-value is 1.

The results for descriptive statistics for Investor Mental Accounting showed that for mean is -1.271245, median is 0.515701, maximum is 53.17610, minimum is -31.50250, standard deviation is 8.29808, skewness is 1.762223, kurtosis is 14.78702 and Jarque-Bera is 40033.52. The probability is 0 meaning the data is not normally distributed. When data is normally distributed the p-value is 1.

The results for descriptive statistics for Investor Overconfidence showed that for mean is 7.452941, median is 7.599967, maximum is 14.38127, minimum is -0.572519, standard deviation is 1.825437, skewness is 0.355976, kurtosis is 4.150125 and Jarque-Bera is 483.9462. The probability is 0 meaning the data is not normally distributed. When data is normally distributed, the p value is 1.

As evidence in this section, the variables data has departures from the normal distribution. One of the key reasons is that the variables could be suffering from the integration problem. If a time series variable is integrated, it means its values could be wandering around. This would cause the normality assumption of a variable to be violated. The interpretation from the results in this section was that before the use of these variables in further analysis, there was the need to utilize special tools that help us to check whether by introducing the lag structure for the individual variables in order to update the financial information from the previous periods, help improve the distribution of variables before further analysis. Some of the more formal techniques that are used to check whether updating a variable's information, by including lags is the execution of the unit root tests. Unit root is a formal test of a variable stationarity in time series analysis. A series is said to be (weakly or covariance) stationary if the mean and autocovariances of the series do not depend on time. Any series that is not stationary is said to be non-stationary.

### 4.3 Investor Loss Aversion Unit Root Test

**Table 4.2: Investor Loss Aversion Unit Root Test**

**Panel Unit Root Test: Summary**

**Series: Investor Loss Aversion**

<b>Method</b>	<b>Statistic</b>	<b>P-value</b>	<b>Cross-sections</b>	<b>Observation</b>
Null: Unit root (assumes individual unit root process)				
Levin, Lin & Chu t*	-94.5903	0.0000	48	6236
Null: Unit root (assumes common unit root process)				
Im, Pesaran and Shin W-stat	-86.6497	0.000	48	6236
ADF - Fisher Chi-square	3511.31	0.000	48	6236
PP - Fisher Chi-square	3807.87	0.000	48	6252

The results from the unit root test for all the cross-sections in table 1.4 above shows that all the 48 cross-sections for the investor loss aversion variable were stationary. The first part of the table presents the common unit root test developed by Levin, Lin and Chu (2002). The test shows that considering simultaneously the cross section are all stationary for the investor loss aversion variable. In other words, they do not have the unit root problem since the null hypothesis of unit root is rejected as depicted by the significant p-value of 0.0000.

The lower section presents three other tests of stationarity in panel data setting. These are Im, Pesaran and Shin (2003), ADF - Fisher Chi-square Maddala, and Wu (1999), PP - Fisher Chi-square (Choi, (2001). These tests assume the test for unit root on individual cross sections. As depicted by the p-values which are very statistically significant, the null hypothesis of non-stationarity was rejected. The interpretation was that the investor loss aversion variable was stationary in the two cases of test. In conclusion, the test of stationarity is important because it helps to identify the order of integration of a variable and avoid spurious regression. In this case, the investor loss aversion variable is integrated of order zero (0).



### 4.3.1 Investor Herd Behaviour Unit Root Test

**Table 4.3: Investor Herd Behaviour Unit Root Test**

<b>Panel Unit Root Test: Summary</b>				
<b>Series: Investor Herd Behavior</b>				
<b>Method</b>	<b>Statistic</b>	<b>P-value</b>	<b>Cross-sections</b>	<b>Observation</b>
Null: Unit root (assumes individual unit root process)				
Levin, Lin & Chu t*	-67.8411	0.0000	48	6295
Null: Unit root (assumes common unit root process)				
Im, Pesaran and Shin W-stat	-62.9233	0.0000	48	6295
ADF - Fisher Chi-square	2729.07	0.0000	48	6295
PP - Fisher Chi-square	2874.81	0.0000	48	6300

The results from the unit root test for all the cross-section in table 1.3 above shows that all the 48 cross sections in the investor herd behavior variable were stationary. The first part of the table presents the common unit root test developed by Levin, Lin and Chu (2002). The test shows that considering simultaneously all the cross-section are all stationary for the investor herd behavior variable. In other words, they do not have the unit root problem since the null hypothesis of unit root is rejected as depicted by the significant p-value of 0.0000.

The lower section presents three tests of stationary in panel data setting. These are Im, Pesaran and Shin (2003), ADF - Fisher Chi-square, Maddala, and Wu (1999), PP - Fisher Chi-square (Choi, 2001). These tests assume the test of unit root on individual cross-sections. As depicted by the p-values which are very statistically significant, the null hypothesis of non-stationarity was rejected. The interpretation was that the investor herd behavior variable was stationary in the two cases of test. In conclusion, the test of stationarity is important because it helps identify the order of integration of a variable and

avoid spurious regression. In this case, the investor herd behavior variable is integrated of order zero (0).

### 4.3.2 Investor Mental Accounting Unit Root Test

**Table 4.4: Investor Mental Accounting Unit Root Test**

<b>Panel Unit Root Test: Summary</b>				
<b>Series: Investor Mental Accounting</b>				
<b>Method</b>	<b>Statistic</b>	<b>P-value</b>	<b>Cross-sections</b>	<b>Observation</b>
Null: Unit root (assumes individual unit root process)				
Levin, Lin & Chu t*	- 91.3319	0.0000	48	6300
Null: Unit root (assumes common unit root process)				
Im, Pesaran and Shin W-stat	- 83.5193	0.000 0	48	6300
ADF - Fisher Chi-square	3642.26	0.000 0	48	6300
PP - Fisher Chi-square	3642.29	0.000 0	48	6300

The results from the unit root test for all the cross-sections in table 1.5 above shows that all the 48 cross sections for the investor mental accounting variable are stationary. The first part of the table presents the common unit root test developed by Levin, Lin and Chu (2002). The test shows that considered simultaneously in the cross-section are all stationary for the investor mental accounting variable. In other words, they do not have the unit root problem since the null hypothesis of unit root is rejection as depicted by the significant p-value of 0.0000.

The lower section presents yet another three tests of stationarity in panel data setting. These are Im, Pesaran and Shin (2003), ADF - Fisher Chi-square Maddala, and Wu (1999), PP - Fisher Chi-square (Choi, (2001). These tests assume the test of unit root on individual cross sections. As depicted by the p-values which are very statistically significant, the null hypothesis of non-stationarity was rejected. The interpretation was that the investor mental accounting variable was stationary in the two cases of test. In conclusion, the test of stationarity is important because it helps identify the order of

integration of a variable and avoid spurious regression. In this case the investor mental accounting variable is integrated of order zero (0).

### 4.3.3 Investor Overconfidence Unit Root Test

**Table 4.5: Investor Overconfidence Unit Root Test**

<b>Panel Unit Root Test: Summary</b>				
<b>Series: Investor Overconfidence</b>				
<b>Method</b>	<b>Statistic</b>	<b>P-value</b>	<b>Cross-sections</b>	<b>Observation</b>
Null: Unit root (assumes individual unit root process)				
Levin, Lin & Chu t*	- 9.00532	0.0000	48	6250
Null: Unit root (assumes common unit root process)				
Im, Pesaran and Shin W-stat	- 15.5181	0.000 0	48	6250
ADF - Fisher Chi-square	499.442	0.000 0	48	6250
PP - Fisher Chi-square	1075.90	0.000 0	48	6300

The results from the unit root test for all the variables in table 1.6 above shows that all the 48 cross sections of the investor overconfidence variable were stationary. The first part of the table presents the common unit root test developed by Levin, Lin and Chu (2002). The test shows that considered simultaneously all the cross section are all stationary for the investor overconfidence variable. In other words, they do not have the unit root problem since the null hypothesis of unit root is rejection as depicted by the significant p-value of 0.0000.

The lower section presents yet another three tests of stationarity in panel data setting. These are Im, Pesaran and Shin (2003), ADF - Fisher Chi-square Maddala, and Wu (1999), PP - Fisher Chi-square (Choi, (2001). These tests assume the test of unit root on individual cross sections. As depicted by the p-values which are very statistically significant, the null hypothesis of non-stationarity was rejected. The interpretation is that the Investor overconfidence variable is stationary in the two cases of test. In conclusion, the test of stationarity is important because it helps to identify the order of integration of a

variable and avoid spurious regression. In this case, the investor overconfidence variable is integrated of order zero (0).

#### 4.4 Multicollinearity Test/Correlation Test

**Table 4.6: Pair-wise Correlation Test**

	<b>Stock market reaction</b>	<b>Investor herd behavior</b>	<b>Investor loss aversion</b>	<b>Investor mental accounting</b>	<b>Investor overconfidence</b>
<b>Stock market reactions</b>	1.000000				
<b>Investor herd behavior</b>	0.148535	1.000000			
<b>Investor loss aversion</b>	-0.826320	-0.168335	1.000000		
<b>Investor mental accounting</b>	0.035048	0.050570	-0.026333	1.000000	
<b>Investor overconfidence</b>	0.017307	-0.038426	-0.032091	-0.054848	1.000000

Table 4.6 shows the pair-wise correlation matrix. Brook (2002) asserts that multicollinearity is the problem that occurs when the explanatory variables are very highly correlated with each other. If there is no multicollinearity, then adding or removing a variable from a regression equation would not cause the values of the coefficients on the other variables to change. The result for pair-wise correlation shows that there is no multicollinearity problem since the highest correlation between the independent variables was 5.0570 % between investor herd behavior and investor loss aversion and the least one was -5.4848 % between mental accounting and investor loss aversion. Thus, all the independent variables were retained for further analysis.

#### 4.5 Regression Results

This section presents the results of the regression of investor behaviour variables on stock market reaction. The section looks at the effect of investor herding behaviour on stock market reaction in Kenya; effect of investor loss aversion on stock market reaction in Kenya; effect of investor mental accounting on stock market reaction in Kenya and effect

of investor overconfidence on stock market reaction in Kenya. This were as indicated in chapter one as the objectives and hypotheses of the research.

**Table 4.7: Regression Results**

<b>Dependent Variable: D (Stock Market Reaction)</b>				
<b>Method: ARDL</b>				
Variable	Coefficient	Std. Error	t-Statistic	P-value
<b>Long Run Equation</b>				
Investor herding behavior	-0.007668	0.012539	-0.611483	0.5409
Investor loss aversion	-0.081938	0.001262	-64.90446	0.0000
Investor mental accounting	0.046624	0.013585	3.431909	0.0006
Investor overconfidence	-0.161649	0.057601	-2.806351	0.0050
<b>Short Run Equation</b>				
Error correction term	-0.955183	0.019617	-48.69086	0.0000
D (Investor herd behavior)	0.008895	0.021210	0.419392	0.6749
D (Investor loss aversion)	-0.007500	0.002329	-3.220847	0.0013
D (Investor mental accounting)	-0.018467	0.005243	-3.522325	0.0004
D (Investor overconfidence)	0.173716	0.076641	2.266616	0.0234
c	-0.649702	0.329304	-1.972955	0.0485
@trend	0.018573	0.002610	7.116195	0.0000
Mean dependent variance	-0.024467		S.D. dependent variance	17.92854
S.E. of regression	6.337887		Akaike info criterion	6.486322
Sum squared residual	239406.1		Schwarz criterion	6.850516
Log likelihood	-20091.92		Hannan-Quinn criteria	6.612485

The research adopted Auto-Regressive Distributed Lag model because of panels in which both T, the number of time series observations, and N, the number of groups are quite large and of the same order of magnitude. Mean Group estimators estimate N separate regressions and calculate the coefficient means or to pool the data and assume that the

slope of coefficients and error variances are identical. Pooled Mean Group estimator constraints the long run coefficients to be identical but allows short run coefficients and error variances to differ across groups. Pool Mean Group estimator considers both cases where the independent variables are stationary or where they follow unit root process, and for both cases derive the asymptotic distribution of the Pool Mean Group estimator as T tends to infinity.

Table 4.7 presents the results on both the long run and short run effect of investor behavior on stock market reaction. The study employed the auto-regressive distributed lags method (ARDL) of model estimation. Shin, Pesaran and Smith (1999) say that this method is easily integrated with the pooled mean group estimator. The pooled mean group estimator constraints the long run parameters to be the same across all individuals while allowing the short-term dynamics to take place in panel data analysis. This estimator is also good in this study since it can handle panels with large time-series relative to the number of individual. The results are also shown in a single table since the estimation procedure employed requires that the error-correction term estimated in the long run step be incorporated in the short run dynamics model. The presentation also allows the researcher to view at a glance the difference between the short run results and long run expectation of parameter convergence.

## CHAPTER FIVE

### FINDINGS, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Findings

Effect of Investor Loss Aversion on Stock Market Reactions in Kenya from the regression results the long run coefficient of investor loss aversion was found to be -0.081938. This value shows that holding other variables in the model constant, an increase in the investor loss aversion by one unit causes the stock market reaction to decrease by a value of 0.081938 percent. The negative effect shows that there is an inverse relationship between investor loss aversion and stock market reaction.

The coefficient was also found to be statistically significant with a t-statistic value of -64.9044. In econometrics and statistical analysis, a t-statistic of 1.96 and above is normally accepted to be the threshold for significant. The standard error was found to be 0.001262 and the p-value was found to be 0.0000. The interpretation was that in Kenya the investor loss aversion has a statistically significant effect on stock market reaction in the long-run horizon. This implies that increase in loss aversion would cause a reduction market reaction.

From the regression results the short run coefficient of investor loss aversion was found to be -0.007500. This value shows that holding other variables in the model constant, an increase in the investor loss aversion behavior by one percent causes the stock market reaction to increase by a value of 0.007500 percent. The negative effect shows that there is an inverse relationship between investor loss aversion and stock market reaction in the short run which is contrary to the long run situation.

The coefficient in the short run equation was also found to be statistically significant with a t-statistic value of -3.220847. The standard error was found 0.002329 and the p-value was found to be 0.0013. The interpretation was that in Kenya the Investor loss aversion has a statistically significant effect on market reaction in the short-run horizon as well as in the long run horizon. The other implication is that the investors view the short run horizon to be closely related to the long run. The findings therefore indicate that investor loss aversion influences stock market reaction in Kenya.

Seo, Goldfarb and Barrett (2010) results were consistent with the results in this study as it showed that the degree of gain was significantly and positively related to pleasant feeling, whereas the degree of loss was significantly and negatively related to pleasant feeling. Similarly, the degree of loss was positively and significantly related to unpleasant feeling, and the degree of gain was significantly and negatively related to unpleasant feeling. These findings support those of Genesove and Mayer (2001) who found that investor loss aversion had positive effect on stock market reaction when considered to enter the model linearly and negative when raised to the second power. Harinck, Beest, Dijk and Zeeland (2012) results were consistent with this study because the results showed that loss aversion increases when larger amounts of money are at stake, but especially when people fill in the loss side of the gambles. Asley and Yang (2015) were inconsistent with results in this study because the findings showed that if loss-averse investors and arbitrageurs only differ in the way of deriving loss aversion utility, then loss-averse investors vanish and have no effect on long run asset prices for an empirically relevant range of parameters.

### **5.1.1 Effect of Investor Herd Behaviour on Stock Market Reaction in Kenya**

From the regression results the long run coefficient of investor herding behavior was found to be -0.007668. This value shows that holding other variables in the model constant, an increase in the investor herd behavior by one unit causes stock market reaction to decrease by a value of -0.007668 units. The negative effect shows that there is an inverse relationship between investor herd behavior and stock market reaction.

The coefficient was also found to be statistically insignificant with a t-statistic value of -0.611483. In econometrics and statistical analysis, a t-statistic of 1.96 and above is normally accepted to be the threshold for significant. The standard error was found to be 0.012539 and the p-value was found to be 0.5409. The interpretation was that in Kenya, the investor herd behavior has a statistically insignificant effect on stock market reaction in the long-run horizon. The findings indicate that investor herd behavior has no effect on stock market reactions in Kenya.



From the regression results the short run coefficient of investor herding behavior was found to be 0.008895. This value shows that holding other variables in the model constant, an increase in the investor herd behavior by one percent causes the stock market reaction to increase by a value of 0.008895 percent. The positive effect shows that there is a direct positive relationship between investor herd behavior and stock market reaction in the short run which is contrary to the long run situation. The coefficient was also found to be statistically insignificant with a t-statistic value of 0.419392. The standard error was found 0.021210 and the p-value was found to be 0.6749. The interpretation was that in Kenya, the investor herd behavior may have a statistically insignificant effect on market reaction in the short-run horizon contrary to the long run horizon. However, the variable has some economic influence on stock market reaction that cannot be ignored entirely. The other implication is that the investors view the short run horizon differently from the long run. The findings indicate that investor herd behavior has an insignificant effect on stock market reactions in Kenya.

The findings were consistent with Blasco, Corredor and Ferreruela (2012) findings that indicated that herding affects current market volatility but has no impact on implied or future volatility. Imitation trading or herding does not transfer significant volatility effects on option markets but affects stock market dynamics. Thirika and Olweny (2015) results were inconsistent with our findings that indicated a significant positive relationship between the deviation in earnings of a security and the squared market returns evidence that herding exists in the NSE. There was a positive insignificant result between market returns and herding. Vieira and Pereira (2015) results were inconsistent with our findings as results did not show any evidence in favour of herd formation during periods of significant change in market returns. The regressions show positive and statistically significant coefficients. All the coefficients are significantly positive, indicating that stock return dispersions increase during periods of large price changes. Lee and Lee (2015) findings were inconsistent because results indicated that by changing the size of agent groups, it was established that the more agents share the same expectations about the tipping point, the higher volatility of the asset price emerges.

Linde (2012) result shows a negative and statistically significant value of coefficient in finish market which was inconsistent with the results in this study. However, the results indicate that there was no evidence of herding in Sweden, Denmark and Norway which was consistent with the findings in this research. Spyrou (2013) findings review more than two decades of empirical and theoretical research that provided a significant insight on investor herding behavior.

Messis and Zepranis (2014) findings were inconsistent with the findings in this study because it depicts the presence of herding over two different periods of time. Large differences are observed among the portfolios regarding the herding periods. The results confirm a linear effect of herding on all volatility measures considered. Stocks exhibiting higher levels of herding or adverse herding will also present higher volatility, and from this point of view, herding can be regarded as an additional risk factor. Results were significant at 5 and 10 per cent level respectively. Hachicha (2010) results show the level of significance of the relation herding/returns remains strong, but it decreases at the individual level. The non-stability of the relation between herding behavior and stock returns is not due to individual level hence consistent with the findings in this study.

### **5.1.2 Effect of Investor Mental Accounting on Stock Market Reaction in Kenya**

From the regression results in table 1.15 above the long run coefficient of investor mental accounting was found to be 0.046624. This value shows that holding other variables in the model constant, an increase in the Investor loss aversion by one unit causes the market reaction to increase by a value of 0.046624 percent. The positive effect shows that there is a direct relationship between investor loss aversion and stock market reaction.

The coefficient was also found to be statistically significant with a t-statistic value of 3.431909. In econometrics and statistical analysis, a t-statistic of 1.96 and above is normally accepted to be the threshold for statistical significance. The standard error was found to be 0.013585 and the p-value was found to be 0.0006. The interpretation was that in Kenya investor mental accounting has a statistically significant effect on stock market reaction in the long-run. This imply that increase in loss aversion would cause an increase in market reaction

From the regression results in table 1.15 above the short run coefficient of investor mental accounting was found to be -0.018467. This value shows that holding other variables in the model constant, an increase in the investor mental accounting by one percent causes stock market reaction to decrease by a value of 0.018467 percent. The negative effect shows that there is an inverse relationship between investor mental accounting and stock market reaction in the short run which is contrary to the long run situation.

The coefficient in the short run equation was also found to be statistically significant with a t-statistic value of -3.522325. The standard error was found 0.005243 and the p-value was found to be 0.0004. The interpretation was that in Kenya the investor mental accounting has a statistically significant effect on market reaction in the short-run horizon as well as in the long run horizon. The other implication is that the investors views the short run horizon to be differently related to the long run horizon regarding returns on securities. The findings therefore indicate that investor mental accounting has a significant effect on stock market reaction in Kenya.

Desari and Huang-Meir (2015) results were consistent with the results in this study because findings indicated that abnormal revisions in the value of a stock are more strongly positively (negatively) associated with future increases (decreases) in dividends when the market valuation of the stock contains more private information that managers can exploit. Kumar and Lim (2008) results suggested that investors' framing choices are likely to have implications for stock returns and found that investors' stock preferences vary systematically with the degree of trade clustering was consistent with this study because findings indicated that the degree of trade clustering is related to investors' stock preferences and portfolio returns. Frydman, Hartzmark and Solomon (2015) findings were consistent with this study because results showed that selling an asset and buying another one in quick succession is a way of extending the original investing episode and maintaining the initial mental account. Lim (2004) results were consistent with the principles of mental accounting (Thaler (1985) according to which individuals attain higher utility by integrating losses and segregating gains which was positive and significant ( $\frac{1}{2} = 0:193$ , p-value= 0:000), which is consistent with the findings in this

study. Lim (2006) results suggested that mental accounting is likely to play a significant role in investors' trading decisions.

### **5.1.3 Effect of Investor Overconfidence on Stock Market Reaction in Kenya**

From the regression results in table 1.15 above the long run coefficient of Investor overconfidence was found to be -0.161649. This value shows that holding other variables in the model constant, an increase in the Investor overconfidence by one percent causes the market reaction to increase by a value of 0.161649 percent. The negative effect shows that there is a direct relationship between Investor overconfidence and market reaction.

The coefficient was also found to be statistically significant with a t-statistic value of -2.806351. In econometrics and statistical analysis, a t-statistic of 1.96 and above is normally accepted to be the threshold for statistical significance. The standard error was found to be 0.057601 and the p-value was found to be 0.0050. The interpretation was that in Kenya the investor overconfidence has a statistically significant effect on market reaction in the long-run horizon. This imply that increase in Investor overconfidence would cause an increase in market reaction.

From the regression results in table 1.15 above the short run coefficient of Investor overconfidence was found to be 0.173716. This value shows that holding other variables in the model constant, an increase in the Investor overconfidence by one percent causes the market reaction to decrease by a value of 0.173716 percent. The negative effect shows that there is an inverse relationship between Investor overconfidence and market reaction in the short run which is contrary to the long run situation.

The coefficient in the short run equation was also found to be statistically significant with a t-statistic value of 2.266616. The standard error was found 0.076641 and the p-value was found to be 0.0234. The interpretation was that in Kenya the Investor overconfidence has a statistically significant effect on market reaction in the short-run horizon as well as in the long run horizon. The other implication is that the investors views the short run horizon to be differently related to the long run horizon regarding returns on securities. The findings therefore indicate that investor overconfidence influences stock market reaction in Kenya.

Huisman, Sar and Zwinkels (2010) were consistent with results in this study because the findings confirmed that surveyed retail investors exhibit a significant overconfidence bias. Daniel and Titman (1999) findings were inconsistent with the results in this study because the findings indicated that returns are unrelated to past accounting performance, but strongly negatively related to the component of past returns orthogonal to this publicly available fundamental information. Grinblatt and Keloharju (2009) were consistent with results in this study because the numbers of flat fines are positively and marginally significantly related to log of turnover. Biais, Hilton, Mazurier and Pouget (2005) empirical results show that miscalibration reduces and self-monitoring enhances trading performance which is consistent with the results in this study. Biais, Hilton, Mazurier and Pouget (2005) showed that miscalibration reduces and self-monitoring enhances trading performance.

Daniel and Titman (2006) was consistent with the results in this study because finding indicated that returns are unrelated to past accounting performance, but strongly negatively related to the component of past returns orthogonal to this publicly available fundamental information. Glaser and Weber (2001) results were not consistent with the findings in this study because the results did not find significant correlations between the monthly gross return in our 51-month period and our overconfidence measures. Glaser, Langer and Weber (2003) showed that overconfidence is a pervasive bias among market participants including professional investors.

## **5.2 Conclusion**

The study concluded that in the NSE, Kenyan stock market, the investor herd behavior has a no significant effect on stock market efficiency. The study concludes that the herd behavior has statistically insignificant effect on stock market reaction. This variable was insignificant in the primary model that uses the pooled mean group as an estimator as well as the other two techniques that considers the pooling and the group aspect separately.

This variable was only significant in only one of the five regressions that were ran to reveal the dynamics of the effect of investor behavior on market reaction. This shows that

investors may remain silent at times and withhold trading even when the other investors are sharing information that might trigger trading. In extension, though this variable has a statistically insignificant effect it should be retained since statistical significance and economic significance are different.

The study concludes that in Kenyan stock market, the investor loss aversion has a significant effect on stock market reaction. The study concludes that the investor loss aversion has a statistically significant effect on market reaction. This variable was significant in the primary model that uses the pooled mean group as an estimator as well as the other two techniques that considers the pooling and the group aspect separately.

This variable was significant in all the five regressions that were ran to reveal the dynamics of the effect of the investor loss aversion on market reaction. This showed that investors are concerned about the losses or gains in their investment decisions in Kenya which results in stock market reactions.

The study concluded that in Kenyan stock market, the investor mental accounting has a significant effect on stock market reaction. The study concludes that the investor mental accounting has a statistically significant effect on stock market reaction. This variable was significant in the primary model that used the pooled mean group as the estimator as well as the other two techniques that considers the pooling and the group aspect separately.

This variable was significant in all the five regressions that were ran to reveal the dynamics of the effect of the investor mental accounting on stock market reaction. This showed that investors are concerned about the divided announcement by the listed companies and that they are likely to make investment decisions in securities in Kenya based on divided information.

The study concluded that in Kenyan stock market, investor overconfidence bias has a significant effect on stock market reaction. The study concludes that the investor overconfidence has a statistically significant effect on stock market reaction. This variable was significant in the primary model that used the pooled mean group as an

estimator as well as the other two techniques that consider the pooling and the group aspect separately.

This variable was statistically significant in all the five regressions that were ran to reveal the dynamics of the effect of the investor overconfidence on stock market reaction. This shows that investors are likely to purchase more stocks in the market when they are overconfident. Overconfidence therefore causes stock market reaction in Kenya.

### **5.3 Recommendations**

#### **5.3.1 Investor Loss Aversion and Stock Market Reactions in Kenya**

The investors and stock brokers should be keen on the investor loss aversion bias in the market. The investor bias could lead to stock prices moving from its fundamental values causing abnormal returns hence stock market reaction resulting from to variations in returns. In this research, it has been revealed that investor loss aversion has a significant effect on stock market reaction. It was noted that the investor loss aversion has significant effect on reaction which meant that it leads to the fluctuation of abnormal returns in the market. Since the influence of loss aversion was supported by all the results from the different models to be statistically significant, it would be of help to the investors and stock brokers to consider this variable when tracking the prices of securities.

CMA and the NSE should work to improve the modelling of stock prices so as to be able to reflect the information flow and factor in some behavioural factors that may be significant in influencing returns in the market. This will have the effect of increasing transparency and confidence in the market hence attracting more investors and surely more capital flows into the capital markets.

#### **5.3.2 Investor Herd Behaviour and Stock Market Reactions in Kenya**

The investors and stock brokers should be keen on the investor mental accounting bias in the market. The investor bias could lead to stock prices moving from its fundamental values causing abnormal returns hence stock market reaction resulting from to variations in returns. The investors and stock brokers should be keen on investor herd behavior in the market. In this research, it has been revealed that herd behavior has an insignificant effect on stock market reaction. However, these key players should not ignore the

investor herd behaviour in the market. Though insignificant, this variable still could have some negative effect on returns and prices of stocks in the market. The study also recommends that CMA (Capital Market Authority) should be keen on malpractices that may cause information asymmetry in the market on securities prices in the market. The regulator should ensure that the trading activities are disclosed to the market players to ensure that investors make informed decisions when deciding on the investment strategies investing. CMA and the NSE should work to improve the modelling of stock prices so as to be able to reflect the information flow and factor in some behavioural factors that may be significant in influencing returns in the market. This will have the effect of increasing transparency and confidence in the market hence attracting more investors and surely more capital flows into the capital markets.

### **5.3.3 Investor Mental Accounting and Stock Market Reactions in Kenya**

The investors and stock brokers should be keen on the investor mental accounting bias in the market. The investor bias could lead to stock prices moving from its fundamental values causing abnormal returns hence stock market reaction resulting from to variations in returns. In this research, it has been revealed that investor mental accounting has a significant effect on market reaction. It was noted that the investor mental accounting has significant effect on stock market reaction which meant that it leads to the fluctuation of abnormal returns in the market. Since the influence of investor mental accounting was supported by all the results from the different models to be statistically significant, it would be of help to the investors and stock brokers to consider this variable when tracking the prices of securities.

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#### **5.3.4 Investor Overconfidence and Stock Market Reactions in Kenya**

The investors and stock brokers should be keen on the investor overconfidence in the bias in the market. The investor bias could lead to stock prices moving from its fundamental values causing abnormal returns hence stock market reaction resulting from to variations in returns. In this research, it has been revealed that investor overconfidence has a significant effect on market reaction. It was noted that the investor overconfidence has significant effect on stock market reaction which meant that it lead to the fluctuation of abnormal returns in the market. Since the influence of investor overconfidence was supported by all the results from the different models to be statistically significant, it would be of help to the investors and stock brokers to consider this variable when tracking the prices of securities.

CMA and the NSE should work to improve the modelling of stock prices so as to be able to reflect the information flow and factor in all behavioural factors that may be significant in influencing returns in the market. This will have the effect of increasing transparency and confidence in the market hence attracting more investors and cause more capital flows into the capital markets.

#### **5.4 Suggestion for Further Research**

Prices react to investor behaviour in our model because investors herd, practice mental accounting, are loss averse and overconfident. This research was not able to identify conclusively all the possible variables with explanation power on stocks pricing in Kenya. It is therefore in this light that the future researchers are encouraged to consider other investor behavior biases that are deemed to cause stock market reaction which would increase the predictive capability of the model. Event study to analyze the change in expected and actual earnings. Neuroeconomics research on brain activity of economics and behavioral psychology to study how the brain affects financial decisions should also be the next area of further research. Effects of Social Economic and Political changes in a country on Investor Behaviour and How Macro-Economic Factors affect Stock Pricing Models in NSE should be studied.

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## APPENDICES

### Appendix I: LIST OF COMPANIES IN THE NSE

1. A.Baumann CO Ltd
2. Atlas Development and Support Services
3. Athi River Mining
4. B.O.C Kenya Ltd
5. Bamburi Cement Ltd
6. Barclays Bank Ltd
7. Britam Holdings Ltd
8. Britam Holdings Ltd
9. Car and General (K) Ltd
10. Carbacid Investments Ltd
11. Centum Investment Co Ltd
12. CFC Stanbic Holdings Ltd
13. CIC Insurance Group Ltd
14. CMC Holdings Ltd
15. Co-operative Bank of Kenya Limited
16. Crown Berger Ltd
17. Diamond Trust Bank Kenya Ltd
18. E.A. Cables Ltd
19. E.A. Portland Cement Ltd
20. Eaagads Ltd
21. East African Breweries Ltd
22. Equity Group Holdings Ltd
23. Eveready East Africa Ltd
24. Express Ltd
25. Flame Tree Group Holdings
26. HF Group Holdings
27. Home Africa Limited
28. Hutchings Biemer Ltd
29. I&M Holdings Ltd
30. Jubilee Holdings Ltd
31. Kakuzi Ltd
32. Kapchorua Tea Co. Ltd
33. KenGen Ltd
34. KenolKobil Ltd
35. Kenya Airways Ltd
36. KCB Group Ltd

37. Kenya Orchards Ltd
38. Kenya Power & Lighting Co Ltd
39. Kenya Re-Insurance Corporation Ltd
40. Kurwitu Ventures
41. Liberty Kenya Holdings Ltd
42. Limuru Tea Co. Ltd
43. Longhorn Kenya Ltd
44. Marshalls (E.A.) Ltd
45. Mumias Sugar Co. Ltd
46. Nation Media Group
47. National Bank of Kenya Ltd
48. NIC Bank Ltd
49. Nairobi Securities Exchange
50. Olympia Capital Holdings Ltd
51. Pan Africa Insurance Holdings Ltd
52. Rea Vipingo Plantations Ltd
53. Safaricom Ltd
54. Sameer Africa Ltd
55. Sasini Ltd
56. Scangroup Ltd
57. Standard Chartered Bank Ltd
58. Standard Group Ltd
59. Stanlib Fahari I-REIT
60. The Co-operative Bank of Kenya Ltd
61. Total Kenya Ltd
62. TPS Eastern Africa (Serena) Ltd
63. Trans-Century Ltd
64. Uchumi Supermarket Ltd
65. Umeme Ltd
66. Unga Group Ltd
67. Deacons Ltd
68. Business Venture



## APPENDIX II: DATA COLLECTION SHEET

<b>Independent variable</b>	<b>Herd Behaviour</b>	<b>Loss Aversion</b>	<b>Mental Accounting</b>	<b>Investor Overconfidence</b>	<b>Stock Market Reactions (SMR)</b>
<b>Measurable variable</b>	<b>Return dispersion</b>	<b>Gains or loss ratio</b>	<b>Price-dividend ratio</b>	<b>Trading volume</b>	<b>Abnormal Returns</b>
<b>2015</b>					
<b>2016</b>					
<b>2017</b>					
<b>2018</b>					
<b>2019</b>					

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