SENTIMENT, RISK APPETITE, DEMOGRAPHIC CHARACTERISTICS AND STOCK RETURNS OF INDIVIDUAL INVESTORS AT THE NAIROBI SECURITIES EXCHANGE

BY

KITONYI SAITI

A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN BUSINESS ADMINISTRATION OF THE UNIVERSITY OF NAIROBI

NOVEMBER 2023

DECLARATION

I hereby declare that this PhD Thesis is my original work and has never been presented either in part of in full to any other University for the award of a degree.

Signature..... Date: ……23rd November 2023.....

SAITI KITONYI D80/50376/2016

This PhD research thesis has been submitted for examination with our approval as university supervisors.

Signature..... Date: 24/11/2023

PROF. CYRUS IRAYA MWANGI

DEPARMENT OF FINANCE & ACCOUNTING

UNIVERSITY OF NAIROBI

Signature..... Date: 24th November 2023

DR. KENNEDY OKIRO

DEPARMENT OF FINANCE & ACCOUNTING

UNIVERSITY OF NAIROBI

Signature..... Date: November 24, 2023

DR. KAMAU GATHIAKA

DEPARMENT OF ECONOMICS & DEVELOPMENT STUDIES

UNIVERSITY OF NAIROBI

COPYRIGHT

By

Kitonyi Saiti

saitikitonyi@gmail.com

ACKNOWLEDGEMENTS

I must start by thanking the University of Nairobi for the high quality education I have received while studying here. In my long period of being a student at the university, I have confirmed as true the vision; *World Class Institution*. I am proud to acknowledge that UON was at the frontline in adopting the virtual space when physical interaction was impeded by the COVID-19 pandemic. I feared for my studies when I heard of the closure without possible reopening dates, but these insecurities were soon put to rest by the digital transformation that expediently took place in the University. I wish to use this chance to thank the university for remarkably harnessing the threatening circumstances resulting from COVID-19. I enjoyed my interactions with my classmates and lecturers and I am happy about the networks I established, which pushed this survey forward.

I will always be indebted to Prof. Iraya who has taught and guided me for most of my academic life. His wisdom and willingness to share his knowledge has always made a very good impression on me. I am very grateful to Dr. Okiro who gave me insights to research and was humorous in the delivery of the message. This made it easier for me to carry on this arduous journey. I am most thankful to Dr. Gathiaka for reviewing my work and for the encouraging remarks he often made. This study was also affected by the pandemic therefore the questionnaire had to be virtual. Mr Ndehi and Mr Mwai digitized the survey and created a database to host the questionnaire and responses. I thank them for making it possible to share the questionnaire through modern technologies. I thank Kevin for his time and undying effort in working on all the statistical requirements of the study. I thank Max for the calls and the tips and to Jerusa gratitude for reading and rereading this work.

To my family and friends thanks for all the encouraging words. Among the many people I should thank, I direct myself specially to persons who I will never know; the participants of the survey, I thank you for making the study real. It is impossible for me to list everyone who accompanied me physically, spiritually and emotionally, along this journey and so to each and all not mentioned here thank you and may you be richly rewarded.

DEDICATION

I dedicate this thesis to my wonderful family, a priceless treasure. Dad & Mum, Muthui, Washuka & Kang'e, Wanjiku & Mbuthi, Kanngw'ele, Kibiwott & Tess may your unbounded generosity be rewarded boundlessly!

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS AND ACRONYMS

AAII	American Association of Individual Investors
AGM	Annual General Meeting
BSI	Buy-Sell-Imbalance Index
CAPM	Capital Asset Pricing Model
CCI	Consumer Confidence Index
CDSC	Central Depository & Settlements Corporation
CMA	Capital Markets Authority
COVID-19	Corona Virus Disease 2019
DJIA	Dow Jones Index Average
EMH	Efficient Market Hypothesis
FAHR	Fuzzy Analytic Hierarchical Regression
HPR	Holding Period Return
IPO	Initial Price Offer
NSE	Nairobi Securities Exchange
OLS	Ordinary Least Squares
SAD	Seasonal Affective Disorder
SEM	Structural Equation Model
S&P 500	Standard and Poor 500 Stocks
VIX	Volatility Index by Chicago Board Options Exchange
VIF	Variance Inflation Factor

ABSTRACT

The influence of investor sentiment on stock returns of individual investors is a field of research that is relatively new especially at the Nairobi Securities Exchange where studies on behavioural finance are just starting. The studies that have been conducted so far at the Nairobi Securities Exchange have been on behavioural biases. Hence the influence of investor sentiment is less understood especially within the context of the Kenyan market. There has been a lack of consensus about how investor sentiment affects stock returns in the studies that have been conducted up to now. Thus, the relationship between investor sentiment and stock returns is not clearly defined especially at the Nairobi Securities Exchange. In many of the reviewed studies, the indirect relationship between investor sentiment and stock returns considering the influence of other variables like risk appetite and demographic characteristics, has not been investigated. These variables so far have not been investigated together. Examining the mediation and moderating effects could contribute to resolving the existing conflict on the influence of investor sentiment on stock returns. In addition, most of the studies in this field have been conducted in developed countries with only a few done locally and thus they are not generalizable to an emerging market. Further, the political arena and public health status were not as turbulent as they recently have been. To fill the study gaps, this study investigated the relationship between investor sentiment and stock returns of individual investors at the Nairobi Securities Exchange. The study had four hypotheses to analyze in order to fill the gaps identified. The population of the study was 1.1 million individual investors at the Nairobi Securities Exchange and the sample size was 400. The philosophy of the study was positivism and it adopted a cross-sectional descriptive research design. The response rate was 70.3%. Descriptive statistics of the variables were computed and a correlation analysis among the variables was carried out using Spearman's rank correlation and Pearson's correlation coefficient and stepwise regression and tests of significance were conducted. The statistical analysis revealed that the relationship between investor sentiment and Sharpe ratio was not significant. Therefore, the study failed to reject the first hypothesis. The regression analysis demonstrated that there was no significant effect of risk appetite in the relationship between investor sentiment and Sharpe ratio therefore the second hypothesis was also not rejected. The investigation did not find a significant effect of demographic characteristics in the relationship between investor sentiment and risk appetite. Thus, the study failed to reject the third hypothesis too. The joint effect of investor sentiment, risk appetite, demographic characteristics and stock returns was not significant hence the study failed to reject the fourth hypothesis. The outcomes of the investigations contributed to knowledge and practice by demonstrating that Sharpe ratio was not related to investor sentiment. These findings contribute to the existing body of knowledge on investor sentiment. From this outcome an investor should not consider sentiment or risk appetite since they are not related to returns. The findings benefit investment managers as they get insights into investor sentiment which they can use to guide clients accordingly so that they do not to rely solely on subjective criteria. Corporate leaders learn from the outcome of the study to make financial information readily available since investor sentiment was found to have no impact on stock returns. The Government, Nairobi Securities Exchange can use the knowledge from this study to make policies that limit price fluctuations and foster stability in the market.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Sentiment is a phenomenon in the market that seems to have an influence on stock prices and returns. Traditional financial models such as Capital Asset Pricing Model (CAPM), Arbitrage Pricing Model (APT) or Markowitz Model, were previously believed to predict stock prices and returns but so far, they have not explained future cash flows that deviate from fundamentals (Boehmer et al., 2021). Further, traditional models tend to be rather complex, consequently, investors resort to biased criteria such as relying on sentiments, which are simply feelings that determine how an investor will make their investment decision. Investor irrationality is therefore, defended by behavioural finance theories which propose that sentiments drive asset prices (Musembi, Simiyu, & Njoka, 2020). Sentiment is an unstable phenomenon, that fluctuates and sometimes could affect risk investment.

Risk is a key aspect of decision making and therefore, determining the level of tolerance an investor can bear is an important step in selecting an investment (Fang et al. 2021). In other words, the risk appetite of an investor determines which type of asset they will select. Sentiment and risk interact in such a way that the investor tends to go for risky assets when the mood is high and vice versa. The process of determining risk appetite also involves identifying demographic factors that may affect the investor's tolerance level. Demographic characteristics determine the risk appetite that an investor manifests while trading such that male and female investors are known to reflect varied behaviour in the market (Onsomu, Kajiage, Aduda, & Iraya, 2017).

The study is anchored on prospect theory which is a behavioural finance argument that supports the case for investor irrationality. Investors in the market are seen to follow criteria that is different from what is proposed by traditional finance. Further, the inability of traditional models to explain future cash flows that deviate from the objective trend led to behavioural models being formulated which support irrationality of investors. Prospect theory explains that investors manifest irrationality by holding onto losing stocks and selling the ones that are rising (Sreenu & Naik, 2021). This therefore, shows that investors may not estimate risk in the way traditional finance posits. Further in the theory investors, are guided in making decisions by sentiments such as fear of making losses. Hence, in the likelihood of a loss the investor has an attitude of risk aversion.

Heuristics theory suggests that investors prefer relying on guesswork in making decisions rather than ploughing through complicated financial statements. Heuristics thus underlines the irrational and subjective nature of investors while trading stocks (Parveen et al., 2021). Noise trader theory argues that the behaviour of overactive irrational investors affects stock prices and returns. The three theories demonstrate the risk that investors are exposed to due to irrational behaviour and which could also affect returns. The preceding theories support irrationality by proposing that returns are influenced by investor sentiments. In contrast, traditional finance propositions such as the Efficient Market Hypothesis (EMH) support investor rationality. The theory postulates that the market is efficient in making information readily available to all participants and it assumes that investors strive to maximize wealth and avoid risk. Thus, EMH proposals are founded on the rationality of investors and objective information for decision making (Nyamute, 2016).

Individual investors constitute the largest group of traders at the Nairobi Securities Exchange (NSE). Therefore, investor trading behaviour at the market is an important factor of consideration because of the effect it can have on asset prices. Investor behaviour has not been sufficiently investigated at the NSE hence more insights can be gained through further research being conducted on individual traders in the market. In addition, in the last few years the number of individual investors at the NSE has increased because of lowering the investment threshold. Individual investors have grown after the introduction of a variety of equity investment avenues by the regulatory bodies (Nairobi Securities Exchange, 2022). The NSE has also made some technological advancements such as online and mobile investment platforms which gives individual traders easier access to the market. Thus, the increased participation of individual investors could increase the level of speculation in the market and as a result affect returns. Investors seem to overactive in the market resulting from speculation and be motivated by sentiment. Thus insight into the role of investor sentiment would benefit all market players at NSE.

1.1.1 Investor Sentiment

Shefrin (2008) defines investor sentiment as the subjective beliefs which investors hold about a stock that is objectively valued or priced. This implies that investors make decisions on stocks according to how they feel and thus ignore fundamental data. The result of investor subjectivity is instability of asset prices and increased uncertainty in the market. Baker and Wurgler (2007) define investor sentiment as the expectation of future cash flow that is unsupported by facts and figures. In other words, investors make predictions about objectively priced assets which lead to fluctuations away from the fundamental value.

According to Zhang (2008) sentiments are the subjective beliefs and expectations of investors about assets that replace fundamental data. This behaviour can explain the sudden perplexing fluctuations in prices that puzzle the market. Accordingly, by not considering objective information, investors risk having suboptimal returns from their investments. Hu and Wang (2013) define sentiment as the interpretation of objective information in a biased way. This means that investor expectations about future asset prices may not be rationally based but founded on instinct and sentiment.

Sentiment is an important concept in investment as it is believed to be able to forecast future cashflows. Sentiment is useful in unstable periods like during the COVID-19 pandemic where traditional models cannot (Yang, 2022). Sentiment is an intangible and unobservable reality that is difficult to measure and hence it should be estimated using appropriately chosen proxies. Sentiment estimates if well selected have the potential of predicting returns and future cashflows (D'Hondt & Roger, 2017). Baker and Wurgler (2007) developed a six-point measurement index which includes the annual share trade volume at New York Stock Exchange, the dividend premium, closed end fund discount, the number of IPOS, the first day returns of IPOs and equity share in new issues. However, this index is difficult to apply locally because the required inputs such as IPO returns and closed fund discount are not available (Nairobi Securities Exchange, 2022).

Hu and Wang (2013) used the Buy-Sell-Imbalance Index (BSI) as a proxy of investor sentiment which in other words the difference between the purchase and sale of stocks. The inputs of this method are the purchases and sale of assets by individual investors which

would not be easily available as this information is confidential. The American Association of Individual Investors (AAII) index is computed from a survey conducted among its members which consists of a list of questions asking how investors feel about the market and then derive an estimate from the responses. The AAII is the method that this study has adopted to measure investor sentiment at the NSE in order to meet the objective of the current study because it is easily applicable as it involves developing an appropriate survey instrument. The requirements of the other methods make them more complicated for the level of the market we have locally (American Association of Individual Investors, 2019).

The measurement of investor sentiment is not simple since a readily available index is yet to be developed at NSE in addition, the concept is still relatively new at the local market. The method of estimating investor sentiment within the local context of the NSE should include data that is readily accessible. Hence in this study the investor sentiment index was computed using data collected from the survey participants. This trend of following sentiment and instinct instead of objective data is manifest also at the NSE. The result of relying on investor sentiments means that assets prices can suddenly be pushed away from the objective value either due to the increased or decreased demand of a stock. This occurrence suggests that the fluctuation of asset prices in the market may be influenced by investor sentiment and consequently appropriate proxies and estimation is essential to support research.

Sentiment can be divided into three categories which depend on the outlook of the investor the returns are on an upward trend; they are stable or they are going down (Yang, 2022).

Proxies should be identified that reflect and measure investor sentiment in order to ensure appropriate investigation is done on its influence on fluctuating prices. The investigation of whether sentiment has any relationship with abnormal returns, price fluctuations, increased risk and instability can only be done with an appropriate index. Thus, proper estimation of investor sentiment is needed for a proper investigation to be conducted. In this study investor sentiment was divided into joy-optimism, neutral-objective and sad-pessimism these three divisions are representative of investors who are overactive and confident, those who are rational and the other group of the cautious and inactive. Research on sentiment can contribute to understanding the phenomena of price volatility and increased risk appetite among investors in the market (Sreenu & Naik, 2021).

1.1.2 Risk Appetite

Gai and Vause (2006) define risk appetite as the investors' willingness to tolerate the likelihood of a loss. This refers to the amount of risk an investor is willing to bear because of the impossibility of totally eliminating uncertainty in investment. In other words, risk appetite is the tolerance of the uncertainty associated with investing in stocks for a future return. In an investment, the level of tolerance depends on two things; first on the quantity of risk and second on how much uncertainty the investor is willing to bear. Rajararan (2003) defines risk appetite as the decision the investor makes regarding the level of uncertainty, he is willing to undertake. Thus, an investor should carefully determine their tolerance level since riskless investments do not exist.

Risk appetite refers to two aspects one is the subjective level of an investor's willingness to bear a degree of uncertainty and the other is the objective risk brought about by external factors that affect asset prices (Gonzalez-Hermosillo, 2008). Thus, the level of uncertainty that an investor perceives in an asset can determine whether the person is risk seeking or risk averse. In other words, the expectation is that the more uncertain an asset is the lower the risk appetite since the investor will demand a greater reward for higher risk. This implies that there is an inverse relationship between risk appetite and the price of risk. Risk is a key factor in any investment decision since it is priced and therefore, an investor's tolerance of it should be well estimated. An investor while making an investment can manifest tendencies of being risk seeking or as being averse to uncertainty.

Therefore, investors can be risk seeking or risk averse towards an asset depending on how they perceive the likelihood of losses. Hence, risk appetite in the current study is operationalised into risk seeking and risk aversion (Chang & Fang, 2020). Thus, risk seekers are investors who tend to go for risky securities and trade actively while the risk averse ones have a preference for more secure assets. Risk neutral investors are considered to be indifferent to risk related to an investment meaning that they consider other factors like returns in their decisions. In other words, they are not interested in advantageous information about assets and are unwilling to pay for signals on investments Nevertheless the risk neutral concept is opposed to the real world as it is more an argument that is used in financial models to compute price equilibrium especially in derivatives (Martin & Nagel, 2022). Consequently, the concept of risk neutrality was not included in the current study since risk seeking and risk aversion are more representative of the real world.

Risk seeking is more common among investors who are stable financially and have a good level of financial knowledge. The risk averse investors tend to have fewer financial means so they cannot afford losing the little they have so they avoid risky investments. In addition, a risk averse investor usually has less financial knowledge thus they invest in what they know and they avoid what they are familiar with (Kasoga, 2021). On the other hand, investors with fewer family and financial obligations prefer for risky assets since they have more disposable income and can afford to venture into less secure assets. It can be deduced that investors decisions are affected by risk attitude however, this is opposed to the rationality argument of objective data. Thus, to establish the true position proper measurement of risk attitude is needed to estimate impact on returns (Fang et al., 2021). Hence to measure the impact of risk appetite on returns, this study developed an index using data from questionnaires filled by from NSE investors.

Risk followed a varied trend during the pandemic and other measures to estimate risk that could capture the rapid changes in the investment scene were necessary (Jian et al, 2021). The questionnaire was developed based on RBS Morgan Emerging Market Risk Tolerance Index (RBS EM RTI). This model considers the prevailing market circumstances and how the individual investor determines the risk level they can take in an investment. An investor can be classified as risk seeking or as risk averse depending on what their attitude is towards the likelihood of a loss related to asset trading. Hence an investor can be placed at any point between the two extremes of being risk seeking and being risk averse (Chang & Fang, 2020). Risk appetite therefore, determines how an investor perceives the likelihood that investing in an asset will result in a gain or a loss. Investors become risk seeking if they

perceive that an asset will result in a gain and if they sense the likelihood of a loss, they can manifest aversion to the investment.

The attitude towards risk has an impact on investment decisions that the investor makes since they must determine whether they prefer risky or secure assets. Thus, risk is a key factor in investment and an investor must decide the level of uncertainty that they are willing to bear as a result of selecting an asset (Dickason & Ferreira, 2018). This is because risk cannot be eliminated from assets as it is inherent in any type of investment resulting in the positive probability that the investor may make a loss. Risk appetite may also be affected by investor sentiments such as overconfidence or fear. Thus, risk seeking investors manifest sentiments of optimism and overconfidence and due to this they may find risky investments thrilling because of the possibility of high returns. Risk seeking investors tend to increase the riskiness of assets and thus overtrading could create market bubbles and crashes (Onsomu et al., 2017). On the contrary, risk averse investors hold on to losing stocks and sell rising ones which reflects irrationality in financial decisions (Lippi & Rossi, 2020). The levels of risk appetite varies among investors of different demographic profiles.

1.1.3 Demographic Characteristics

Jackson et al. (2011) define demographics as aspects that differentiate the persons who are members of a unit under investigation. These demographic aspects include age, gender, income or education and they are manifested differently in people. Due to the fact that demographic characteristics exist in different levels in people it makes it possible to distinguish one person from the next one. Hence demographic characteristics can be used

to distinguish the members of a sample or a population in research. Kim and Kim (2014) refer to demographic characteristics as personal data such as age, gender or marital status which can be used to identify different individuals in a population. Therefore, these features occur in different people in varied quantities and they determine how they respond to stimuli in the environment. Demographics can also be defined as the vital, physical or social data about a human population like age, gender, residence, marital status and occupation (Shinde & Zanvar, 2015). Since these characteristics are varied in each individual, they can affect how investors perceive investment options. For example, male and female investors may have varied views of the same financial asset. Demographic features are aspects identified in members of a population that are then applied to statistical analysis. This means that each factor takes on a unique value for different individuals and this may have an impact on decisions and returns (Lan et al., 2018).

Demographics characteristics influence the way an investor perceives reality and the decisions they make as a consequence of the opinion they hold. The outlook of investors with different characteristics is not uniform for example a young person views matters differently from an older person and subsequently this features can influence investment decisions. This means that characteristics like age or gender can determine the type of sentiments and risk appetite an investor manifests (Brooks et al., 2020). For example, men tend to be optimistic and risk seeking compared to women who are more cautious while trading. Similarly, age can have a varied effect in trading such that the younger investors may tend to be overactive compared to the older ones. Experienced investors tend to be more risk seeking than their newer counterparts. Experience in the securities market is

varied among investors and therefore it distinguishes how they trade. Family and marital obligations limit the amount of risk a person can take (Onsomu, 2018). This is because a committed person usually has more demands to attend to than a person who has no family. Consequently, the returns of investors with varied demographic characteristics tend to be different because of the influence of personal features on sentiments and risk appetite (Bayar, Sezgin, & Ozturk, 2020). Thus a younger person because of risky ventures may get lower returns than the more cautious older counterpart who invest only after much thought and scrutiny.

Demographic features cannot be separated from an individual because they are part and parcel of each investor. An individual investor is a combination of different demographic characteristics. Investors may not realise that personal characteristics influence how they perceive risk and sentiments which may not contribute positively to the returns. Investors do not have similar investment outcomes because they have different demographic characteristics which affect how they take their decisions (Kannadhasan, 2015). It is therefore important to establish to what extent these characteristics affect sentiment and risk appetite since this may impact performance. Therefore, establishing the impact of demographic characteristics on the relationship between investor sentiment and risk appetite would be beneficial to improving financial decisions and market participation (Alber & Gamal, 2019). Demographics characteristics in this research were operationalized according to Lan et al. (2018) into age, gender, marital status, children and education. Thus, it would be useful to investigate whether the interaction of investor sentiment and demographic characteristics have an effect on performance in stock returns.

1.1.4 Stock Returns

Markowitz (1952) defines stock returns as the mean of the random earnings from a portfolio within a holding period. The Markowitz model assumes that an investor sets up a portfolio subject to a certain level of risk with the aim of maximizing returns. Risk is explained as the variance of the portfolio's returns. Sharpe (1964) defines return as the linear function of the covariance of a risky asset with the market return. The covariance between the market and risky asset portfolio is the undiversifiable systematic risk. Therefore, an investor demands a return for bearing undiversifiable risk. Litner (1965) defines the return of a stock as the total of the paid dividends and price changes in the period or the sum of the cash dividend received plus market price change during the holding period. Returns, therefore, are the sum of capital gains or losses plus distribution of dividends. Sharpe ratio may also be defined as the difference between portfolio return and the risk free rate for each unit of portfolio risk borne during a certain holding period. The computation of excess returns of an asset in Sharpe ratio is based on CAPM but the difference is that an adjustment is made to include risk or the portfolio standard deviation (Biktimirov & Thomas, 2003). In other words, return is the compensation rewarded to an investor for risk borne in an investment. The excess returns of a portfolio are equal to the multiplication of the portfolio standard deviation by market returns and then deducting the product from daily stock returns (Bijl et al., 2016). This means that excess returns are the net of gains after deducting the risk component.

Returns from a certain period of trading and investment can be measured using a variety of measurement models. The models that are most commonly used are Treynor (1965)'s

ratio, Jensen (1968)'s alpha and Sharpe (1994)'s ratio. Treynor (1965)'s ratio assumes that assets do not have diversifiable risk and therefore used beta coefficient to measure risk. Jensen (1968)'s alpha is computed by subtracting asset returns from a benchmark market index. Sharpe (1994)'s ratio estimates whether all the total risk which include the market and portfolio risk that an asset is exposed to have been compensated. In view of the preceding, the performance of individual investors in this study was measured using Sharpe ratio. This is because it is a versatile tool that allows for the inclusion of the total sum of risk that is the diversifiable and systematic risk. In Sharpe ratio, the risk free rate is not fixed so as to allow for the variation over the period of investment (Bijl et al., 2016). Therefore, the model captures the fluctuation in the economic environment that affects investments. In addition, Sharpe ratio unlike the other two models considers the portfolio risk and not only the systematic risk from the market. Sharpe ratio is therefore an investment performance measurement model that shows whether the return of an investment compensates all the total risk borne. This model is a good measure for comparing two funds or portfolios since the higher the Sharpe ratio the better the performance of the investment (Biktimirov & Thomas, 2003). In comparison to Treynor (1965)'s ratio, which uses only the beta coefficient or the systematic risk, Sharpe ratio is stronger because of using total risk. Treynor's ratio assumes that assets have no diversifiable risk which however, contradicts the reality that there are no riskless assets. Sharpe ratio allows for changes in the risk free rate whereas Treynor's ratio assumes that it is fixed (Bijl et al., 2016). This means that Sharpe's ratio allows for analysis of the same investment to be done under different risk levels. Jensen (1965) alpha is an indication of performance of a stock in comparison to the risk level that it is subjected to. Since it is

difficult to define the benchmark risk index, Sharpe ratio seems to be a better measure because it can be computed over a period with changing risk-free rates and it includes the portfolio risk or standard deviation (Nyamute, Lishenga, & Oloko, 2015).

Stock price is an expression of the beliefs investors have about a particular asset. These beliefs may not be founded on the fundamental value of the asset but on subjectivity and sentiments (Aduda, Odera, & Onwonga, 2012). Nevertheless, the beliefs become important because they determine the price at which a stock will be bought or disposed of in the market (Onsomu et al., 2017). Thus, how the investor feels about a stock will soon be reflected in the asset prices and eventually in the returns. This is so because the behaviour of investors at the market tends to deviate prices from their objective value. This therefore shows a link between investor sentiments and stock returns. For this reason, stock prices have gained more importance than fundamentals because they are an expression of the market expectation of the future cash flows of a company. This implies that an investor led by beliefs and sentiment may set up an inefficient portfolio that may yield poor returns. It is therefore important to understand how irrationality impacts the formation of an investment portfolio and performance.

1.1.5 Individual Investors at the Nairobi Securities Exchange

Barber and Odean (2013) define individual investors as persons who buy relatively small quantities of stock of about 100 to 700 for their own personal account. Thus stock investment is a way of accumulating wealth and saving for the future. This is unlike retail investors who buy stock in large quantities in order to dispose them at a profit. It can be

deduced from this definition that individual investors do not buy stocks in bulk for trading but for growing their wealth or to get consumable income. Aduda, Odera and Onwonga (2012) suggest that the individual investors at the NSE behave differently from each other and due to this, they obtain different returns. In other words, investor behaviour did not follow an objective uniform trend which thus revealed irrationality in decision making that seemed to affect performance. Onsomu (2018) observes that individual investors at NSE are speculative and they seem to influence asset prices. This behaviour can be explained by the subjectivity of the individual investor which, depending on the prevailing mood whether positive or negative could lead to active or reduced trading respectively.

The individual investor in the market reflects irrational behaviour because they do not make decisions based on facts but on other criteria such as rumours, beliefs and emotions. The effect of relying on subjective information could lead to prices moving away from their true value (Chang & Fang, 2020). Nevertheless, the irrational behaviour seen in the increased demand of a certain stock could be an indicator that there is some information that is not yet available publicly. This could lead to building up of optimistic or pessimistic sentiments to levels of euphoria or depression respectively (Boehmer et al., 2021). Hence, individual investors are an important factor since they form the largest group of market participants at the NSE.

The NSE has been in operation since 1954 and it was formally licenced in 1989 by Capital Markets Authority (CMA). CMA is a regulatory body of the government of Kenya that that oversees the operations of capital markets in the country. The NSE has developed

through different stages of trading from the out-cry system of 1994 to automated trading system (ATS) in 1996. In 2001 the NSE was divided into four; the Main Investments Market Segment (MIMS) which is where most individual investors participate, there is an Alternative Investments Market Segment (AIMS), Fixed Income Securities Market Segment (FISMS), Growth Enterprises Market Segment (GEMS) and the Futures and Options Market Segment (FOMS).

In 2006 NSE developed to the computerized delivery and settlement system (DASS) in conjunction with Central Depository and Settlement Corporation (CDSC), this was a move to more efficient operations which included live trading. Later, mobile applications and online trading have made it unnecessary to be on the floor with the outcome of increased market accessibility to individual investors. Furthermore, the threshold of investing at the NSE with the also reduced from Kenya shillings 50,000 to 1,000. The combination of digital trading and lower investment threshold opened the market to a larger number of individual investors (Nairobi Securities Exchange, 2022).

The individual investor is an aspect in the market that has not been sufficiently investigated as many studies examine the performance of corporations (Nyamute, 2021). This implies that more can be know about individual investors at NSE. The NSE has not been spared from fluctuations which are characteristics of inefficient market (Cherono, Effect of investor behaviour on stock market reaction in Kenya, 2018). The number of individual investors registered at NSE is believed to be 1.1 million (Capital Markets Authority, 2021). This number is quite large and therefore speculations by the group can easily push prices

upwards or downwards and destabilize the market. Individual investors form the largest group of participants at the NSE. A further justification for investigating the individual investor at NSE is the largeness of the group and the impact of their behaviour can impact the entire market which makes them an interesting feature for investigation. The average daily trading volume at the NSE is estimated to be 100 million shares (Nairobi Securities Exchange, 2022). Thus, this trade volume reflects a high level of activity at NSE which could translate into price volatility and affect the returns both of the individual investor and the market in general.

The individual investors are persons who are defined by certain demographic characteristics. These characteristics are not indifferent as they play a role in the perception of risk in assets and in making investment decisions (Brooks et al., 2020). According to the CMA statistical bulletin (2021) the female investors were half the number of male investors thus showing that gender affects the decision of whether to invest in stocks or not. In addition, the individual investor has an interior world of sentiments which influences how they will create a portfolio. The demographics of the investor can be observed physically while emotions and sentiment are only seen by proxy for example, overtrading shows overconfidence. Thus, these features lead them to being speculative in the market leading to price fluctuations and instability. Therefore, this study examined whether investor sentiment affects the stock returns of individual investors at NSE; the findings of the investigation are critical to knowledge and performance in the market.

1.2 Research Problem

Investor sentiment is a phenomenon that is gaining importance in the field of finance since it is believed to have the potential to explain anomalies such as market bubbles and bursts which have puzzled traditional finance (Musembi, Simiyu, & Njoka, 2020). Thus, the role of investor sentiment as a driver of asset prices has captured the interest of researchers because it is not clear whether it has any impact on investment returns. Traditional finance argues that investor sentiment has no influence on stocks since they are priced based on objective information about the asset. Whereas, the irrationality argument contends that investors in the market are seen to follow a criterion that is guided by rumours and sentiment and not by facts and figures.

Classical finance on the other hand, advances that the activities of individual investors in the market have no effect since asset prices adjust to information as soon as it becomes available. Traditional and behavioural finance have not reached an agreement on the impact of investor sentiment on stock returns. Investor sentiment is a relatively new field of research and more is yet to be known about its role on stock prices in the market; a fact that would contribute to resolving the lack of consensus between the traditional and behavioural finance arguments (Rashid, Fayyaz, & Karim, 2019). Behavioural finance puts forward the argument that since individual investors tend to rely on rumours and sentiment for decision making, their behaviour in the market leans towards being speculative (Barber & Odean, 2013). This implies that, the trading activity of individual investors may impact asset prices in response to demand or lack of it for certain stocks.

The number of individual investors in most stock markets is large and NSE is not an exception to this occurrence. Bias in decision making is exhibited when the individual investors rush to buy stocks from companies because they have issued profit or dividend pay-out warnings. Further the NSE investor has manifested irrationality by buying shares from well-known companies like Safaricom, Equity, Absa, KCB and other banks (Musembi, Simiyu, & Njoka, 2020). Additionally, circumstances like the COVID-19 pandemic created a climate of fear and insecurity among investors about the present and the future such that trading drastically reduced and bourses around the world were closed to avoid market crashes. Speculative behaviour among investors when compounded can be drastic for the market (Haritha & Abdul, 2020). Therefore, investigating individual investors could contribute to explaining the anomalies in the market that do not follow the trend forecasted by objective data (Nairobi Securities Exchange, 2022).

The sentiments that manifest while trading vary from one investor to the next and this could affect the outcome obtained in terms of stock returns. Risk is a key factor in investment because it is inherent in every asset and an investor must determine the level, they are willing to tolerate. Similar to sentiment, the level of risk an individual is willing to bear in an investment varies among investors. Demographic characteristics are believed to explain the variations in investor sentiment, risk appetite and outcome in returns. For instance, a personal feature like gender can make an individual optimistic, risk seeking and aggressive or alternatively pessimistic, risk averse and cautious which may impact investors returns (Baker, Kumar, & Goyal, 2019). In other words, demographic characteristic seems to determine the sentiment and risk appetite reflected by an investor while trading.

Nevertheless, further investigation is necessary to establish this relationship. Stock returns are a good measure of outcome since it is market based and several studies have used this measure for research. CMA (2022) shows that one of the trends in the market is the increase in the last five years of the number of individual investors at the NSE. Nevertheless, there has been a downward trend in the stock returns over the same period which can be explained by the instability in the political climate due to elections and campaigns (Koskei, 2021). In addition, the country has also not been stable economically due to changing monetary policy and high inflation and interest rates these have affected the returns individual investors obtain (NSE, 2022).

A number of empirical studies have examined the relationship between investor sentiment and stock returns but a consensus of the interaction of these variables is yet to be achieved. Empirical review revealed a methodological gap since studies were not unified in the estimation of investor sentiment which could contribute to the conflicting outcomes in the relationship between the two variables. Hu and Wang (2013) found that noise trading and stock returns had a negative and significant relationship in China. The study used Buy-Sell-Imbalance Index (BSI) to measure investor sentiment but one of the inputs of the method such as details of stocks sold and bought by an investor, are not readily accessible in all markets.

Smales (2017) investigated the role of fear on investment in Chicago, USA. Investor sentiment was estimated using VIX, however, this index is only applicable to the USA and consequently it cannot be used in Kenya. Qadan (2019) found that risk appetite

significantly influenced the relationship between idiosyncratic volatility and returns in Cairo and Giza in Egypt. Idiosyncratic volatility which measured sentiment was computed using Fama and French (2015)'s five factor model. However, the Fama and French model includes some rationality assumptions which contradict irrationality arguments.

Wenzhao, Su and Duxbury (2021) carried out a study on sentiment and stock returns in 50 global markets from both developed and developing countries. The study used Consumer Confidence Index (CCI) to measure sentiment however, CCI is an index that used to estimate the consumer's income expectations. A proxy that measured how investors feel about financial investment would have been more appropriate. Fang et al. (2021) used internet text mining and Web crawler to estimate investor sentiment index which are methods that are inaccessible due to cost and specialization. The current study developed an investor sentiment index based on the responses given in the survey responses by the individual investors and is hence more representative of the local situation.

Further another methodological gap was found in the analysis of the relationship between sentiment and stock returns in the various studies that were reviewed. Olweny, Namusonge and Onyago (2013) used ANOVA and logistic regression to study the influence of financial attributes on risk tolerance. ANOVA is used in the analysis of continuous distribution while logistic regression is used for discrete data. Omnibus tests that are used for categorical data would have given consistency to the study more than ANOVA. Islam, Mumtaz and Hanif (2020) used Structural Equation Modelling (SEM) and partial regression to analyze how investor behaviour affected market anomalies. SEM is a complex analytical tool that

assumes that linear links exist among variables which is not always the case. Hence it would be difficult to apply SEM when the relationship among variables is not linear. Albert and Gamal (2019) used Fuzzy Analytic Hierarchical Regression (FAHR) in analysing the relationship between demographic characteristics and risk tolerance. However, the number of steps to be covered in FAHR increases with the number of variables in the study. The larger the number of steps to be carried out the larger the likelihood of errors in the analysis and thus the method is not appropriate for studies with many variables.

A contextual gap was exhibited in the reviewed studies conducted on the relationship between investor sentiment and stock returns since most have been done in the more advanced markets with only a few done in Kenya. The varied cultural and technological settings of the developed markets in comparison to the local one, reveal the contextual gap. Smales (2017) studied fear using VIX in Chicago, America while Dickason and Ferreira (2018) investigated sentiment in South Africa, Fang et al. (2021) examined risk and sentiment in Taiwan, Wenzhao, Su and Duxbury (2021) studied sentiment among university staff in the UK and Blake, Cannon and Wright (2021) behaviour and returns in the UK. Blake, Cannon and Wright (2021) in the UK found a significant relationship between demographic characteristics and the attitude investors had towards loss. The outcomes of the above studies would be difficult to generalize to the local market because of the differences in levels of development.

The studies done in Kenya are limited in number and to add on, they date a few years back. Nyamute et al. (2015) investigated investor behaviour and performance but the study was

done when the technological advancements at NSE had not yet been made and the pandemic had not struck the country. Onsomu et al. (2017) established that demographic characteristics had no moderating effect in the relationship between risk tolerance and performance. Nevertheless, this study was carried out a number of years ago and newer research may be necessary. In addition, the studies done in Kenya were more on behavioural biases and not on investor sentiment.

Lan et al. (2018) found that demographic characteristics were correlated to investment decisions however, the limitation is that this study was conducted in China which is quite an advanced market. Studies that have been conducted so far have not established a clear relationship between investor sentiment and stock returns hence revealing a conceptual gap that calls for further research. Most of these studies focussed on investor behaviour and performance for example, Aduda et al. (2012), Nyamute (2015) and Lansing, LeRoy and Ma (2022) found that overconfidence, which was more prevalent among men, was negatively related to returns. On the contrary Bayar, Sezgin and Oztuk (2020), Kasoga (2021) and Parveen et al. (2021) found that relying on past performance and heuristics had a positive relationship with returns. Thus, the studies reviewed do not offer a clear influence of investor sentiment on returns since the results are conflicting.

The reason for the conflicting results among the studies could be because the relationship between investor sentiment and returns is not direct but influenced by other factors like risk appetite and demographics. Therefore, in an attempt to try to resolve this conflict the current study investigated the combined impact of the four variables; investor sentiment,

risk appetite, demographic characteristics and stock returns of individual investors. In the local market, investor sentiment is still a new topic and hence an investigation is called for to establish its role on returns at the NSE. This study answered the question; "what is the relationship among investor sentiment, risk appetite, demographic characteristics and stock returns of individual investors at NSE?"

1.3 Research Objectives

The general objective of this study was to investigate the relationship among investor sentiment, demographic characteristics, risk appetite and stock returns of individual investors at the Nairobi Securities Exchange. The specific objectives were as follows:

i. To establish the relationship between investor sentiment and stock returns of individual investors at the Nairobi Securities Exchange.
ii. To examine the effect of risk appetite on the relationship between investor sentiment and stock returns of individual investors at the Nairobi Securities Exchange.
iii. To determine the influence of demographic characteristics on the relationship between investor sentiment and risk appetite at the Nairobi Securities Exchange.
iv. To examine the joint and sum influence of the independent effects of investor sentiment, risk appetite and demographic characteristics on stock returns of individuals at Nairobi Securities Exchange.

1.4 Value of the Study

The findings of this study contribute to the existing body of theory and knowledge in the field of behavioural finance. Traditional finance theories have held that investment

decisions are rationally made, but in time this has come into question. This research fills the gap on the relationship among investor sentiment, risk attitude, demographic characteristics and individual stock returns. The findings of this study are more applicable to the local situation in comparison to the ones done overseas since it has been conducted within the same market.

Knowledge from this study can be used in policy formulation and in the development and improvement of regulations. The findings here can give guidance while designing policies and regulations so as to help give stability to the market and reduce chances for price fluctuations. The policy makers can learn from the findings of this study the effect of high and low sentiments and try to develop guidelines that can curb adverse effects such as market collapse. The knowledge from this study on the effects of investor sentiment can facilitate the improvement of monitoring systems of companies and boards that misinform the market in order to cause either euphoria or depression.

The findings of this study, are useful in coming up with appropriate regulations for investors to prevent them from contributing further to the fluctuation of prices which come about from unstable sentiments. The NSE is still growing and going through different experiences like the pandemic, since the current research was done during this period the outcomes of the study that are related to that time would be beneficial to the market. Knowledge from this study can be used to improve the operations and communication at the market by the different regulatory bodies in order to ensure symmetric distribution of information.

This investigation adds to practice because it gives insights to market participants about the role of sentiments in asset pricing and the impact it has on returns. The different market players can make more informed investment decisions when they have knowledge on investor sentiments which can be acquired from this study. From this investigation, participants will better understand price volatility and its positive and negative effects. This study also gives an insight into the trading habits of investors which can contribute to better portfolio decisions by avoiding relying on instinct alone.

Investors can obtain better outcomes from knowledge that this study provides about factoring in the effect of irrationality in their decisions. Investors will be better advised by this study about how their own behaviour at the market can either positively or negatively impact their portfolio. In addition, from this research, investors will be made aware of the effects of euphoria and pessimism and can therefore avoid pitfalls. The knowledge gained from this research is useful in guiding investors when they are forming a portfolio so that they do not only rely only on sentiment and instinct. Investment managers can benefit from this by learning that irrationality of investors can affect portfolios, so they will be better placed when guiding their clients.

1.5 Organization of the Thesis

This Thesis is divided into six chapters the first one is the introduction. The second chapter presented the literature review which sought to establish what is already known. The third chapter was on the research methodology and it explains the way the investigation was

conducted. The fourth chapter tackles descriptive statistics and correlation analysis. The fifth one dealt with the testing of relationships and inferential statistics. The sixth is a summary of the findings, drawing conclusions and recommendations.

Chapter one gives the background of the study and the motivation for undertaking the research. This chapter defines and explains the importance of the key variables of the study which were investor sentiment, risk appetite, demographic characteristics and stock returns of individual investors. The individual investor at the NSE as the context of the study is also discussed in the chapter. The interaction of the variables within this context brings about the research problem which is presented in this chapter. The objectives that the research focusses on achieving are explained together with the justification of the study.

The second chapter deals with the theoretical framework that guided the study in the formulation of hypotheses. The empirical work done by other studies is also discussed in the second chapter. The summary of the reviewed literature and the knowledge gaps identified is covered in another section of the chapter. The conceptual framework reflecting how the study variables interact is also presented in the chapter. The last section of the second chapter covers the hypotheses that were tested to measure relationships among the variables.

The third chapter covers the research methodology which was applied in conducting the investigation. The chapter includes the research philosophy which was positivism this was determined by the phenomena being investigated. The details of the reasons for selecting this orientation are contained in this chapter. The research design and data collection

method are dealt with in this chapter. A section on the population and how the sample was selected is explained in some sections of this chapter. The chapter includes a discussion about how the study variables were operationalized and this is explained in one of the sections. A preliminary data analysis showing the models and equations that are applied in the study are provided at the end of this chapter.

The fourth chapter discusses the descriptive statistics and correlational analysis. The descriptive statistics included central tendency measures, estimates of variation and symmetrical in this chapter. Some frequency and percentage tables are also included for categorical measures. The regression diagnostic tests are included data. Chapter four also includes the correlation analysis performed among the variables. This was done in some cases using Pearson's correlation coefficient and in others Spearman's rank correlation. A summary capturing main outcomes of all the tests conducted is included at the end of the chapter

The fifth chapter includes the inferential statistics conducted on the study hypotheses. The tests conducted include the measurement of the relationship between investor and stock returns, the estimation of the effect of demographic characteristics on investor sentiment and risk appetite, the investigation of the influence of risk appetite on investor sentiment and returns and the examination of the joint effect of all the variables. The summary of the findings was included at the end of the chapter. Finally, the sixth chapter covered the summary of findings, conclusions, recommendations to knowledge, practice, management and policy makers, limitations of the study and suggestions for future research.

1.6 The Scope of the Study

The content scope of the study was sentiment among individual investors at the NSE therefore the investigation excluded institutions and groups. The population scope was 1.1 million investors who have active CDSC accounts and who participate at the Nairobi Securities Exchange. A sample of 270 individual investors at the Nairobi Securities Exchange was selected since the study could not examine the entire population. The period scope ranged between 2016 to 2020 which amounts to five years. That period of 2016 to 2020 was rich with major events such political elections, cancelation of election results, campaigns and the COVID-19 pandemic that reflect the challenges that investors and the market are exposed to. Hence the period scope was ideal for research on investor sentiment.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter covers the theories that form the bedrock of this investigation. It is also a review of empirical work done by other scholars in the area of irrationality of investors and the influence of investor sentiment and stock returns. The chapter further presents the gaps identified in the reviewed literature. The conceptual framework and the hypotheses of the study conclude this second chapter.

2.2 Theoretical Literature Review

Investor sentiment is an intangible phenomenon that could have the potential to explain price volatility, euphoria and depression, anomalies that have baffled classical theories. Price volatility does not follow the forecasted trend and seems to be influenced by factors outside the fundamental argument. Behavioural finance was developed to try to understand these occurrences in the market that seem not to rely on objective information about stocks and securities. Behavioural finance theories argue that investors in the market are irrational because they seem to follow rumours, instinct, sentiments and beliefs in decision making. Investor psychology is a field of finance that is investigating how the emotional and sentimental aspects of individuals influence investment decisions. Hence, investor sentiment is one of the factors that has been an object of research as it seems to have the capacity to demystify the fluctuations of asset prices. In addition, sentiments are manifested by the behaviour of investors through overconfidence or fear of locking losses. In addition, irrationality is something that can be seen in the tendency to rely on subjective criteria such as rumours, instinct or sentiment in arriving at an investment decision.

Prospect theory is the anchoring theory for this study since it argues the case for and provides a link between irrationality and returns. This theory holds that investors act irrationally in circumstances of risk and uncertainty and in such a situation avoiding losses is paramount. The investor in this case may hold on to a dropping stock instead of selling it to avoid further losses and thus manifest a lack of objectivity. The theory argues that investor irrationality such as fear has a relationship with returns of an individual. Thus it provides a justification for investigating the relationship between investor sentiment and returns. Nevertheless, in spite of arguing for irrationality, prospect theory still relies on the utility assumption of risk aversion and maximisation of wealth. Therefore, some complementary theories like Noise trader and Heuristics theory were needed to support the investigation of investor sentiment and stock returns.

Noise trader theory complements prospect theory by arguing that irrational traders tend to increase risk because they are overconfident which is due to relying on rumours, sentiment and instinct. The theory therefore, introduces the aspect of risk appetite in irrational traders. Hence noise trader theory provides the basis for the current study to investigate the relationship between investor sentiment, risk appetite and stock returns of individual investors. Heuristics posits that investors rely on guesswork and instinct as a quick way to make investment decisions as they find statements and other facts too complex hence it further supports the irrationality argument. Thus, these theories justify investigation on the relationship among investor sentiment, risk appetite and returns of individuals. Heuristics and noise trader theory are criticised for relying more on guesswork for decisions rather than being concrete and methodical similar to classical arguments like EMH.

Efficient Market Hypothesis (EMH) is a rationality argument that attests that investors rely on objective information to make decisions in the market and it posits that prices are based on information about assets and that investors seek to maximize profit and minimize risk. Moreover, the theory argues that prices have a mean reverting tendency and therefore it is difficult to beat the market as they always go back to their true value. Nevertheless, the theory is critiqued for not being a reflection of reality since its projection do not coincide with actual future market outcomes. The context of this study is the individual investors at the NSE. These investors have complex combination of demographic characteristics that trigger a variety of sentiments that determine risk appetite. Accordingly, the theories that will be examined hereafter form the foundation for investigating the relationship among investor sentiment, risk appetite and returns.

2.2.1 Prospect Theory

Prospect theory by Kahneman and Tversky (1979) states that decision makers prefer certainty in outcomes to probable gains; a tendency called the certainty effect. Prospect theory was developed as an alternative to expected utility theory. The certainty effect causes the investor to be more risk averse when there is a prospect of gain and to be risk seeking in view of a loss. This implies that, investors resort to irrational behaviour in an effort to mitigate the risk of either losing a gain or locking a loss. This theory has three components, a framework of making decisions, misinterpretation of probabilities and a structure of risk. It can be deduced from this that in prospect theory investors assign decision weights to losses and gains instead of the true value of the asset. This is because the investor feels a greater emotional impact in a loss than in an equal amount of gain. In

this theory, the value function for gains is concave while the one for losses is convex. Prospect theory explains how investors make decisions about risky assets in situations of uncertainty (Barberis, Mukherjee, & Wang, 2016).

Prospect theory argues that investors are risk averse in the face of a gain and risk seeking in the face of a loss which reveals irrationality in decision making. In other words, investors feel more sorrow for a certain amount of loss than joy for an equal quantity of gain. Thus, it highlights a relationship between investor sentiment and stock prices meaning that, in circumstances of uncertainty, an investor would rather avoid a loss since they feel it more than when they make a gain. In this scenario the estimation of uncertainty of an asset is done using emotions called decision weights (Onsomu, 2018). In other words, it is how strongly one feels about a loss related to an investment and which also estimates the level of risk that the investor can take. Therefore, prospect theory shows a possible relationship among three variables; investor sentiment, risk appetite and stock returns. This model supports the interaction between cognitive bias and stock prices (Barberis, Mukherjee, & Wang, 2016).

Prospect theory is the anchoring theory because of the causal link between investor sentiment and stock returns and which coincides with the general objective of this research. The theory explains that the subjectivity of the investor is reflected when they are guided by emotions while making investment decisions. Specifically, prospect theory demonstrates how the emotion of fear can lead an investor to make bigger losses through holding on to losing assets. Nonetheless, prospect is critiqued for being one sided in its

argument since it only focuses on risk aversion and fear and how they affect decisions in uncertainty. The theory should also tackle the other aspect of risk seeking and overconfidence and how decisions are affected.

Prospect theory argues that investors prefer to hold on to declining stocks instead of selling them and realizing the loss. Subsequently, the investor is more risk seeking when faced with losses and risk averse in the possibility of making a gain. Due to this behaviour, the investor could suffer bigger losses since the declining stocks could go lower. The investor also loses the chance of getting higher gains because of selling rising assets. The individual investor is shown as measuring risk in an investment based on how they feel about it (Nyamute, 2016). Hence, for a study on behavioural finance the theory can explain why the outcomes are lower than expected for investors.

The theory is criticised for relying on psychology and not acknowledging the sources (Rossiter, 2019). The theory uses psychological arguments for measurement of feelings resulting from losses or gains which are intangible and interior aspects that relate to other fields of knowledge. Theory should state the sources of their argument. For the individual investor this is important as they become aware of the biases that affect them when they are making decisions. This awareness enables them to avoid suboptimal decisions related to relying on feelings of fear of losses or of losing gains. Further the calculations proposed by prospect theory for measuring decision weights are quite complicated for ordinary investors and thus difficult to apply. The theory thus does not solve the problem of decision making under risk by relying on feelings and not on calculations (Rossiter, 2019).

Prospect theory has been critiqued for relying on a utility assumption that attests that investors are risk averse and they seek to maximize gains from investments. This means that that Prospect theory employs a rationality model to explain the existence of irrationality in the market, which is a contradiction. Prospect theory arguing against rationality, supports irrationality of investors because of the suboptimal decisions they make due to fear. Since the investor is afraid of locking losses, they exhibit behaviour that leads to fluctuation in prices. For example, the investor could sell rising stocks in order to make gains and hold declining assets to avoid losses. On the contrary, a rational investor would sell losing stocks and would buy rising stocks. Irrational traders, decide based on subjective emotional weights attached to a gain or a loss furthermore, they make these decisions based on rumours and noise. Hence, from prospect theory, the following variables were identified investor sentiment, risk aversion, risk seeking and stock returns (Blake, Cannon, & Wright, 2021).

2.2.2 Noise Trader Theory

Trueman (1988) developed the noise trader theory which states that limited arbitrage and investor sentiments have a role to play in the determination of asset prices. The theory assumes that investors rely on sentiments and rumours to make investment decisions. Therefore, investment decisions are not based on fundamental information but on noise. The theory argues that arbitrage is limited by the presence of noise traders and that rationality cannot eliminate the impact of overtrading based on rumours (Shleifer & Summers, 1990). Thus, the activity of rational arbitrageurs is not enough to maintain market equilibrium and noise traders' activity can actually result in price volatility due to

overconfidence and over trading. Noise trader theory argues that the valuation of risky assets usually includes some noise because it is impossible to include all the information in the price. This implies that it would be an omission to value securities based only on fundamentals hence, noise traders act on the notion that asset prices include an aspect of irrationality (Rashid, Fayyaz, & Karim, 2019).

This theory goes on to propose that the profits of both rational arbitrageurs and noise traders are affected by noise trading (Shleifer & Summers, 1990). It can be deduced that the behaviour of noise traders tends to increase asset risk and therefore could leave the investor in a worse off position. Furthermore, the presence of both irrational and rational investors makes it difficult to beat the market since asset price predictions may not be certain as one cannot forecast the behaviour of noise traders. The theory implies a relationship between investor sentiment, risk and returns this is because relying on bias an investor can become risk seeking and overconfident and either make gains or losses. In terms of returns as a variable in this study, the theory explains how abnormal gains can be obtained due to overactivity from noise traders (Chang & Fang, 2020).

Generally, markets do not allow investors to earn abnormal returns without also bearing a higher level of risk. Hence, the trade-off between return and risk argues the case for rationality in that higher risk may not as a necessary consequence, lead to greater gains. For the current study this theory supports risk appetite as an important component of the relationship between investor sentiment and returns. Noise trading increased asset risk and fosters mispricing of assets (Verma & Verma, 2021). This is because the investors manifest

a risk seeking attitude due to relying on noise and rumours that leads to overtrading and increased prices. Due to overtrading and risky investments, noise traders who rely mainly on rumours and instinct may end up making negative returns. In addition, abnormal profits are nullified by the tendency in markets to corrects any asset mispricing as new information becomes available.

The noise trader theory is critiqued because the effect of rumours is corrected with new information reaches the market and so prices automatically adjust to it and thus eliminating the impact or irrational activity. The mean reverting tendency of asset prices therefore opposes the influence of sentiments on asset prices especially in the long run (Smales, 2017). Nevertheless, investors at the market seem to use their own instincts and beliefs to make predictions about future cash flows. Noise traders tend to give weight to their subjective beliefs more than objective information (Rashid, Fayyaz, & Karim, 2019). Therefore, this compromises investment decisions and asset selection as they end up with suboptimal returns because of overtrading and could lead to bullish markets. Thus, the theory supports irrationality as a variable of the study since it argues that investors decisions are informed by rumours, instincts, opinions, feelings and sentiments.

Noise trader activities can create trends and fluctuation which are fuelled by rumours and which can limit the arbitrage of rational investors. Since noise traders rely on rumours and private information, it is easy for them to be overconfident and thus push up prices through overtrading (Peress & Schmidt, 2021). Thus, for the individual investor which is the unit of investigation of this study this theory introduces the effect of irrationality which tends

to push prices away from their fundamental value and the ripple effect it has on stock returns. The theory is critiqued for being one sided since it only focuses on the euphoria and inflation of prices due to noise trading but does not consider the effect of fear and caution. The theory hence does not capture what happens in the market nut only explains a part of the exchange. Thus, other supporting theories are needed like prospect theory and EMH to explain what is not included in noise trader theory.

Noise traders nevertheless are known to make abnormal returns due to the inflated prices in the short run but eventually they may suffer losses resulting from the tendency to overtrade (Chiu-Lan & Fang, 2020). Therefore, as earlier attested, this theory suggests that stock returns could be influenced by investor sentiment with a possible mediation effect of risk appetite. This is because irrational noise trading investors destabilize prices due to overconfidence and risk seeking which results in overtrading and euphoria. However, the classical theories like EMH argue that asset prices revert to their objective value with the dissemination of information.

2.2.3 Efficient Market Hypothesis

Efficient Market Hypothesis by Fama (1970) is a fair game theory which assumes that asset prices reflect all the information that is available about a stock. The theory argues that as soon as new information is known about an asset, the prices adjust accordingly. This implies that, the market prices fully reflect all available information about a security. This argument is called the random walk where prices adjust to new information without following a set pattern (Fama, 1998). Accordingly, classical finance argue that it is difficult

for irrational investors to make abnormal profits since information about an asset is soon reflected in the prices. The theory assumes that information is symmetrically distributed among all market participants (Malkiel, 2003). In other words, that all the players spontaneously receive all the information about an asset as soon as it becomes available. Other assumptions state that there are many investors in the market and there are many investment options to select from. Additionally, since EMH exists in a perfect market the transaction fees are nil as it costs nothing to acquire information or to change from one investment to the next. This implies that no market player would have a bigger advantage over another since they all have the same information at the same time. Further, the theory assumes that investors are risk averse and they seek to maximise wealth.

EMH posits that returns are commensurate to the risk that is borne such that to make higher profits, higher uncertainty must be tolerated. This suggests that risk and returns in EMH have a direct relationship moreover, the two terms increase together (Singh, Babshetti, & Shivaprasad, 2021). In EMH, the market can exist in three forms which are determined by the amount of information that is available in the market about securities. The first is the weak form, which states that the available information in the market is about the past. In such a market the dissemination of information is not efficient and thus, it is not symmetrical. In the semi-strong form of the market all public information is available to all and is incorporated in the stocks. Hence, such information cannot be used to make bigger gains. The person who has information about forecasts of a stock can therefore, take advantage of it in such a market.

The strong form of EMH asserts that all information about a stock both public and private is captured in the prices. Furthermore, information is efficiently and symmetrically disseminated among the investors and because of this, it is difficult to make abnormal gains. In addition, in the strong form market, there are many investors and investment options and there are no efficiency costs related to transfer of assets (Naseer & Tariq, 2015). In the theory there is no consideration of the role of investor sentiment or risk appetite the decisions are purely made from information on assets. Further EMH is faulted because investors tend to react either with euphoria or depression with stock new but the model is not able to predict that behaviour and prices resulting (Cherono, Olweny, & Nasieku, 2019).

EMH is challenged on the basis of the behaviour of investors in the market who are seen to make decisions that are not based on objective data. Therefore, investor subjectivity and sentiments make it difficult for this theory to predict future cash flows since the behaviour of investors is believed to affect decisions and prices (Chiu-Lan & Fang, 2020). Another challenge is that the EMH model cannot explain why prices do not match the true value of an asset. Investors by relying on subjective feelings and rumours tend to overtrade and thus destabilise the market. Hence, the assumption that asset prices adjust quickly to new information is challenged by irrationality. Investors do not always have the necessary technical know-how to interpret statements and reports about assets. Due to this, they tend to turn to instinct and sentiment to guide them in decision making (Barber & Odean, 2013).

The EMH argument about dissemination of information may not apply in developing markets because the infrastructure inefficiency. Nevertheless, to counter investor bias, EMH argues that asset prices have a mean reverting tendency. Consequently, the prices eventually return back to their objective value. Thus, for the current research EMH which relies on the rationality of the investor could be an important guide to act as a benchmark for asset pricing. (Naseer & Tariq, 2015). EMH provides formular for estimating returns using objective information about assets. Thus, for a study on behaviour EMH provides the objective basis of comparing the performance of rational and irrational investors. The difference in the outcomes of rational and irrational investors demonstrates the role played by bias in investments which gives insights into the influence of behaviour on returns.

The efficient market line on an investment reflects a relationship between two variables; information and asset price. This implies that when information becomes available about an asset the price adjusts itself either upwards or downwards. Subsequently this theory is useful in forecasting the value of assets and guiding investors in the formation of a portfolio. The irrationality argument is that the role of information has been taken over by bias such as sentiment. Thus, the current study investigates the reality of this assertion that irrationality has more influence on price that the rational EMH argument of information driving asset value. The forecast of future cash flows based on EMH would provide a basis for comparing the outcome of irrationality argument. Therefore, fundamental information has the effect of reverting prices back to their objective value and thus eliminating any form of noise or rumours. Nevertheless, applying EMH is not easy for the ordinary investor hence they easily turn to easier methods like heuristics and guesswork.

2.2.4 Heuristics Theory

Tversky and Kahneman (1974) developed the heuristics theory which asserts that investors in decision making use the rule of thumb without applying logic. The heuristic process relies more on instinct and does not consider fundamentals which are complicated. The idea behind heuristics is to take mental shortcuts or put less effort in decision making. The heuristic theory is a fast decision-making criteria because it relies on instinct which does not follow any procedure. The common forms of heuristics include anchoring and adjusting (adjusting an anchoring price), availability (what is familiar, easy to reach or close), representativeness (similarity to something that is already known) and status quo (resistance to new things or change). The theory posits that investors tend to manifest sentiments such as optimism or pessimism depending on their past performance. In this theory investors tend to overreact to information about stocks that have a good historical performance. It can be deduced that; investors find it easy to rely on guesswork because it is convenient and quick. Nevertheless, relying on heuristics makes investors overconfident and open to avoidable risk (Islam, Mumtaz, & Hanif, 2020).

Heuristics theory supports the role of sentiments such overconfidence that affect the risk appetite of investors. The risk seeking tendency is seen in overtrading in the market since the theory argues that they make fast decisions. Thus, this fast decision-making process tends to make them optimistic and risk seeking and subsequently overactive. The theory proposes that three factors; investor sentiment of over confidence, risk appetite which is risk seeking and stock returns are seen to be interacting during the decision-making process (Parveen, et al., 2021). Due to overconfidence and high-risk appetite the investors

overtrade which pushes up prices without any objective basis and consequently they suddenly drop leading to a crash. Moreover, the investor following past trends tends to buy when they should sell or to sell when they should hold which does not contribute to an optimal portfolio (Comlekci & Ozer, 2018). In addition, since the investors make quick decisions to buy or sell, they easily overlook factors that could improve selection and performance. Investors end up relying on instincts and guesswork because they feel ill-equipped to analyse financial information (Nyamute, Lishenga & Oloko, 2015). Thus, this theory support investor sentiment as having an impact on risk appetite and returns.

Heuristics theory nevertheless has been critiqued for not being a decision-making tool but guess work because relying on feelings is not a very strong basis for selecting investments. Investors are therefore misled in assuming that if a company has been performing well in the past it is an indication that the trend will continue in the future. Others in support of heuristics say that investors have no know-how of interpreting financial jargon and data so they resort to instinct. Still others argue that investors have been known to have made abnormal gains after relying on heuristics so they feel the theory can guide portfolio formation (Onsomu, 2018). In addition, being familiar with irrational sentiments and knowing how they affect investments supports good decisions. Irrationality cannot be wished away ignoring have negative consequences on a portfolio (Haritha & Abdul, An empirical examination of investor sentiment and stock market volatility: evidence from India, 2020).

The rational critics posit that abnormal gains are a matter of luck since there is no logical argument behind such returns. Heuristics is also criticised for undermining the analytical capacity of investors who are intelligent and can collect data about an asset and analyse it. This means that the investors should be equipped to think since they have the potential to critique objective information. Proponents of heuristics argue that investors are irrational and that this theory is useful in bringing some understanding of the bursts and bubbles that are witnessed in the markets (Kasoga, 2021). Heuristics is also faulted for being a developed as a criticism of traditional models and not as a result of psychoanalysis of human behaviour (Peress & Schmidt, 2021). For the current research the theory supports irrationality and its influence on risk appetite and returns.

2.3 Empirical Review

The section presents empirical research on the relationship among investor sentiment, risk appetite, demographic characteristics and stock returns is discussed in this section. It summarises the main findings from the reviewed studies.

2.3.1 Investor Sentiment and Stock Returns

Investor sentiment is a phenomenon that is evidenced in the market by the trading behaviour of individuals at the bourse, and since it is a new concept especially at NSE, it is still being investigated. Hence, it is a subject that researchers have been examining to establish whether it can resolve the unanswered questions of market anomalies (Baker & Wurgler, 2007). Therefore, the question arises on how to measure the impact that investor

sentiment has on stock returns especially in an emerging market like NSE where indices are not easily available.

Aroni et al. (2014) investigated the influence of dividend pay-out on investment in shares at the NSE which was done by collecting data from 311 investors in 2013. The study found that dividends had a significant impact on the decision of whether or not to invest in a certain share. This showed that investors were influenced to invest in shares that were known to pay out dividends. The study therefore, reveals a possible relationship between investor irrationality and investment decision making. The gap in this study is that, it focussed on the way the investor makes decisions but it did not go further to show the impact of the said decisions on returns. Thus, the study only examined the irrationality process of decision making but not the impact it had on returns.

Nyamute (2015) investigated the effect of investor behaviour on the portfolio performance at the NSE. Data was collected from 385 individual investors at the NSE and it was analysed using regression. The conclusion of the study was that, at the NSE, investor confidence had a significant relationship with portfolio performance. Therefore, a relationship was revealed between irrationality and stock returns. However, a gap in the study was that since 2015 advancements have been made at the NSE such as online platforms for trading. In addition, recent digital networks and mobile technology developments have made information more accessible. Due to technology the minimum amount needed to invest in stocks at the NSE is lower than previous years hence the number of participants in the market have increased. Thus, with these changes, the relationships

among the study variables may be different if the research was to be replicated. In addition, the study was on behavioural biases the current study will introduce a new nuance to the research on irrationality at the NSE by investigating investor sentiment.

Haritha and Abdul (2020) conducted an empirical examination of investor sentiment and stock market volatility using data from India. The objective of the study was to establish the role of irrational sentiments on volatility. The study relying on monthly data on implicit indices from the market developed a sentiment index using principal component analysis. The relationship between irrationality and market volatility was tested using GARCH and Granger causality framework. The outcome showed that irrationality is positively related to excess market volatility. Further the study established that the inefficiencies of a weak market contribute to market volatility. The use of principal component analysis to develop a sentiment index results in the loss of some information due to combining different data to come up with one factor. The interpretation of principal component factor is not straightforward and therefore it can be misleading.

Islam, Mumtaz and Hanif (2020) investigated how market anomalies were affected by investor behaviour in a developing country. The research relied on heuristics theory to develop the hypotheses and conceptual framework. Data was collected from individual investors at Pakistan Stock Market who numbered 324. The study applied SEM and Partial Least Squares. The results of the study were that heuristics of mental accounting and decision framework were significantly associated with technical and fundamental anomalies. Anchoring was found not to be significantly related to technical anomalies while overconfidence was found to be positively and significantly associated with

anomalies in the calendar. This study was done in Pakistan which is a different set up from NSE. Therefore, it would be difficult to generalize the results to the local market.

Wenzhao, Su and Duxbury (2021) examined how stock returns in 50 international markets were affected by investor sentiment which was measured using Consumer Confidence Index (CCI) as a proxy. The study established that returns were negatively related to sentiment. The study separated the developed markets from the developing markets although this did not alter the negative impact of the two variables. After the separation of the two types of markets, the emerging ones were found to be more affected by investor sentiment than their more developed counterparts. The study suggests that investors can get negative returns as a result of relying on sentiments. However, the study uses an index that is not readily available in all markets especially the emerging ones thus making it difficult to replicate the research. The outcome could have been impacted by moderating or intervening variables and factors which would have added value if they were considered. The context of this study was 50 global markets it would be difficult to generalize the findings of such research to a particular market.

Fang et al. (2021) used fintech technologies to investigate the influence of optimism and pessimism on stock returns in Taiwan. Web crawler and distributed architecture were used to select messages from the internet. Investor sentiment variables were created using a dictionary-based linguistic text mining programme. There was more precision in the variables created from these technologies than those from ordinary messages. The study found that firms with optimistic investor sentiments have high returns while organisations with pessimistic investor sentiment had low outcomes. Further, negative sentiments had a

larger influence on stock returns than the same level of optimistic emotions. High optimism is more significantly related to stock return volatility than ordinary sentiments. Furthermore, pessimism is also more significantly related to volatility than general emotions. The use of fintech methods in creating sentiment variables proxies allows for simultaneous analysis of the effects of optimism and pessimism on stock returns and volatility. However, the research only includes the individuals who are connected to social media platforms while in a country like Kenya many may not be as connected as in Taiwan where the study was done.

Lansing, LeRoy and Ma (2022) undertook research to show that the cause of abnormal returns was either the random volatility of key variables or because of investor irrationality. The study employed a consumption pricing model and the Federal Reserve Bank Treasury bill curve data from 1990 to 2017 to measure irrationality. The study found that controlling of key variables like macroeconomic factors, irrationality of investors could predict abnormal returns. However, the predictability was dependent on the period because the significance of the relationship ceased when the COVID pandemic struck the market. The study showed that the relationship between irrationality and abnormal low returns only existed before the pandemic. The limitation of this study is that the Treasury yield index is a complex way of estimating investor sentiment and is not easily applicable. Further, the study is localized to San Francisco where it was conducted and so generalization to other markets like NSE would be difficult because of the difference in financial development.

2.3.2 Investor Sentiment, Demographic Characteristics and Risk Appetite

Kannadhasan (2015) investigated the role of demographic characteristics in determining financial risk tolerance and risk-taking behaviour. A cross-sectional descriptive survey was adopted for the research. Questionnaires were completed by 778 investors who had a variety of experience, investment levels and demographic features. The study found that four demographic characteristics determined whether an investor has risk tolerance or risk taking behaviour. The number of demographic characteristics was small for the study to be comprehensive. The study was conducted in the Middle East which has a very different cultural set up and therefore the results cannot be generalized to NSE.

Onsomu et al. (2017) investigated the relationship between demographics of (gender, age, experience, education) risk tolerance and portfolio returns in Mombasa, Kenya. Data was collected from 279 investors at the NSE. Regression and ANOVA were applied in analyzing the data. The study established that the risk tolerant investors were older, experienced, female and educated. The direct influence of risk on portfolio returns was significant and positive. Further, demographics did not have a moderating effect in the relationship between risk and portfolio returns. Perhaps another model like FAHP could have been more appropriate so as to test the influence of demographic characteristics one by one and then in pairs.

D'Hondt and Roger (2017) studied investor sentiment, the power of ignorance and stock returns among 25,000 individual investors in France. The investors were divided into two groups based on how they viewed investment information and professional consultation.

The study was conducted between January 2008 and March 2012. The study found that sentiments of investors who ignored information and professional guidance had prediction power. The study considered the effects of ability to speak a French and Dutch language and financial literacy and found that sentiments of ignorant investors still influenced future returns and if they consist a large group, they can cause mispricing and affect arbitrage. Sentiment was estimated as narrow framing and under-diversification. The study was done in France a highly developed market and economy it is difficult to generalize the findings of this study to the local scenario due to this difference. Another weakness is that sentiment was measured using mental bias and not feelings of the investor.

Lan et al. (2018) investigated the preference of investors regarding investment in the Chinese stock market. The study examined whether demographics could be used to predict investment selection. In addition, the study developed a model to predict investor trading behaviour. The study collected data from 20,000 investors in the Chinese market but only 9,000 questionnaires were analyzable. The study used Pearson's Chi square and Spearman's correlation for statistical analysis since it had categorical data. Findings from the analysis were that demographic characteristics were highly correlated to trading behaviour and decision making. The study conducted a correlational analysis among the variables but did not do any further inferential statistics which would have given more insights into the study in the causal relationship.

Alber and Gamal (2019) investigated the effect of demographics on investor risk tolerance. The study also undertook to establish the difference in investor approximation of risk

appetite and the one calculated using Fuzzy Analytic Hierarchy Process(FAHP). Surveys were conducted in Cairo and Giza among a group of 73 investment consultants and another among 40 individual investors. The study found that age, education, wealth, occupation, experience and the number of dependents influenced risk tolerance. In addition, the study established that the estimation of risk using FAHP and the investors approximation were similar. FAHP is a specialized method of analysis and when the factors being analysed are many the hierarchical steps increase as well as the complexity of the model.

Baker, Kumar and Goyal (2019) evaluated the effect of Big 5 personality traits (extrovertness, openness, agreeableness, conscientiousness and neuroticism) and investor biases (anchoring, emotional bias, representativeness, disposition effect, herding, overconfidence, mental accounting) on investment decisions made by Indian investors. Data from August 2016 to January 2017 was collected and the survey instrument was completed by 515 Indian investors. Components were identified through factor analysis and SEM was applied to measure the causal interaction in the variables. Openness and mental accounting were found to be significantly related while agreeableness was not associated with any investor bias. The other three traits extrovertness, conscientiousness and neuroticism were found to be significantly related to all the biases. The study did not consider any mediating variable which may give more insights into the relationship. The outcome of the study may have been different if the indirect relationship including the mediating variable was considered.

Bayar, Sezgin and Oztuk (2020), investigated whether risk tolerance is determined by demographics and the level of financial literacy. A survey was conducted among the employees of the University of Usak in Turkey. The study used multinomial logistic regression to analyse the relationships among the variables. The study established that gender, education, age, income and education level had an influence on risk tolerance. The study was limited to a specific group of people in Turkey who may not even be representative of the nation's population. This is because they are university staff and it is expected that their social and educational level is higher than the rest of the population. Therefore, the result of this study cannot be generalized to other countries.

Brooks et al. (2020) examined the relationship of emotions and investments including how feelings about life impact attitude towards risk. Data was collected from a survey carried out among 970 individual investors in the UK. The study established that high emotions were related to increased risk appetite and negative feelings also decreased tolerance to uncertainty in investments. Moreover, high emotions were found to have a greater influence on risk appetite than low moods. The study found that high emotions had a stronger explanatory power for risk appetite variation than demographic characteristics. These findings contradict what is proposed by prospect theory that lower moods were more influential in investment than higher emotions. The conflict among the findings of different studies is clear, therefore, further research is needed to reach a consensus on the influence of emotions on investment decisions.

Parveen et al. (2021) sought to establish the influence of the Pandemic on sentiment, investor bias and decisions. The study collected data from 401 individual investors at the Pakistan Stock Exchange using questionnaires. The study established that the pandemic had an effect on the sentiments of the investors since it caused a sense of fear among them. The feelings of fear led to heuristic biases to mitigate risk such that investor trading was reduced and there was more selling than buying. Thus, a significant and negative relationship was found between heuristic biases and investment decisions. The research was done during the pandemic implying that the findings were limited to a specific time. Consequently, the study outcomes may not be applicable outside the pandemic times.

Blake, Cannon and Wright (2021) sought to estimate the sentiments towards loss that are manifested by people of varied demographic characteristics, socio-economic status and personal traits. A digital survey was conducted among 4,000 people who reside in the UK. The study developed a model to measure loss aversion that was robust and comprehensive. The study was based on prospect theory. The findings were that the responses from the national population differed a lot from those of other researchers whose sample consisted mainly of students. The study found that loss aversion of a certain amount was related to demographic factors and personality traits. Further, when all the demographics and traits were measured together, gender was found to be not significant and the difference in sentiments towards loss was due to variation in income. This study did not include a mediation effect thus the indirect effect of demographics on loss sentiment was not considered. Furthermore; it was conducted in the UK which is a much more advanced country than Kenya.

2.3.3 Investor Sentiment, Risk Appetite and Stock Returns

Dickason and Ferreira (2018) investigated the relationship among risk tolerance, investor biases and personality. An online survey was carried out among 1,171 clientele of South African Financial Services Group. The study established that the investors who were risk averse and cautious in the market manifested mental accounting bias in trading and aversion to losses. On the other hand, the investors who were risk seeking were affected by self- control bias. The limitation in this study is that it was conducted in South Africa which is more developed than Kenya. The participants were from one organisation only, meaning that the results could be biased to the company and not the whole country.

Gai and Vause (2018) developed a model for estimating risk appetite based on the criteria used by objective investors and the subjectivity of irrational traders in forecasting future cash flows from an asset. The study used an estimation that differentiated risk seeking from risk aversion and the output of the model was in quantities not just in categories. Risk neutral investors' attitude was measured using publicly available option prices. The model demonstrated a capacity to project returns during periods of instability like macroeconomic crises. The study investigated the Asian financial crisis of the late 90s when borrowing money was very costly due to loss of value of the Thai Baht. The study found that the varying risk attitudes led to correlation among asset prices. Fundamentals alone were found to be incapable of explaining the rise in cost of borrowing and so risk appetite was revealed as a better reason for volatility. The flaw in this study was that risk appetite is treated as an indicator of investor sentiment. However, in other literature, investor sentiment is handled

as a separate variable from risk appetite. The inconsistency in the model could be because of reliance on the utility function which is founded on rationality assumptions.

Qadan (2019) evaluates the effect of unexplained volatility of stock returns and risk appetite on expected returns. The study used data for the period 1980–2016 from the Center for Research in Security Prices (CRSP) in Chicago. The Five Factor model by Fama and French (2015) was applied in the estimation of unexplained fluctuation in stock returns also known as idiosyncratic volatility. Risk appetite was found to have a significant and positive role in explaining the power of idiosyncratic volatility in predicting expected stock returns. Further, the study concluded that when risk appetite was high investors traded speculatively and vice versa. Thus, the study found a significant and positive effect of risk appetite on the relationship between idiosyncratic volatility and returns. The gap however is that, risk appetite was estimated using investor sentiment proxies that were based on; a survey, paper media and the market. Therefore, the distinction between risk appetite and sentiment is unclear in the study.

Rashid, Fayyaz and Karim (2019) examined the impact of sentiment, momentum and risk factors on returns in the Pakistan asset market. The study was done using returns of companies listed at the Pakistan stock exchange for the period 2000 to 2013. The study established that sentiment and momentum have a significant and positive relationship with returns. The Three-Factor model by Fama and French (1992) showed that the two variables increased the prediction power of the equation. Thus, the role of sentiment and risk in the prediction of future cash flows is revealed. Investor sentiment is also noted as having a

negative impact on risk, size and value. Therefore, investor sentiment was found to be a key factor in performance in the market. The limitation of the study was that it used a rationality equation, the Three-Factor model by Fama and French (1992) to test irrationality

Kasoga (2021) investigated the relationship between investment decisions and mental accounting, overconfidence, anchoring and decision framework (heuristics). The study was conducted among 316 individual equity investors at the stock market of Tanzania. The study tested the mediation influence of risk tolerance together with financial literacy using SEM. Financial literacy was found to have no influence in the relationship among heuristics of overconfidence, availability, anchoring, representativeness and investor decisions. On the other hand, risk tolerance was positively influenced by the interaction of heuristics and investment decisions. The order of power of driving investment decisions was overconfidence first then availability, followed by representativeness, then risk tolerance, anchoring and finally financial literacy. The study in trying to encourage investors to take part in the research avoided confidential questions. Therefore, the research may not have covered all the dimensions related to investor sentiment and decision making.

Jiang et al. (2021) examined the relationship between investor sentiment and stock returns during the COVID-19 pandemic. The estimated sentiment using Baidu index which is an internet search engine that is used in China since Google is not available there. The investment searches done via Baidu were reviewed to determine sentiment among investors. GARCH was used to estimate the relationship between investor sentiment information from Baidu and stock returns. The study established that investors were

affected by the information received from the search and that the Baidu index for sentiment made better predictions of volatility than the traditional benchmark model. The limitation of this study is that it was carried out in China a highly developed country with good infrastructure and technology which is not the case locally. GARCH does not work well with unstable data it could make incorrect predictions this weakens the study since it was conducted during the pandemic which was turbulent.

Asad, Toqeer and Mahmood (2022) designed a theoretical framework to explore how different levels of social moods affected individual investor's financial risk tolerance in Pakistan. Qualitative phenomenology was used to interview 22 investors who had trading experience of more than 10 years. Thematic analysis was performed to interpret the data. Validity and reliability were tested using triangulation, audio records, member checking and bracketing. A theoretical model was developed which was based on the themes identified in the thematic analysis. The determinants and levels of social mood were revealed through applying the model. The study found that the interaction of social mood and risk tolerance were moderated by experience, financial literacy and reason for investment. The paper concluded that risk was a key aspect of each investment decision and therefore, it is important that investors understand its effects well. Further, risk appetite can only be understood in the light of social mood since it has an impact on the investor's tolerance level. A limitation of the study is that phenomenology involves the opinion of the researcher accordingly, it would be difficult to avoid interviewer bias.

(Yang, 2022) examined the researches conducted locally on investor sentiment on stock returns and how big data has affected the outcome of the studies. The study using context analysis, found that big data had an important role in driving the different outcomes of the researches reviewed. They also found that big data also determined factors such risk attitude, personal characteristics that influenced the relationship between sentiment and stock returns. Finally, the study established that investor sentiment had a significant relationship with stock returns. The context of the study was China which is advanced and in addition

2.3.4 Investor Sentiment, Risk Appetite, Demographic Characteristics and Stock Returns

Onsomu (2014) studied the effect of age on investor decisions at the NSE. The study was conducted on 57 investors located in Mombasa, Kenya between January and March 2014. The study used a cross-sectional research design. The data collected was analyzed using descriptive statistics and ordinary regression. The participants of the study had been divided into four age groups for comparison and analysis purposes. The findings were that there was no significant relationship between the four age groups and representativeness and confirmation biases. In addition, the study found that overconfidence varies with age such that older investors are less optimistic and so they are more cautious in trading. The limitation of this study is that the sample was small and the participants were selected from only one county therefore, the results are not representative of the country.

Cherono (2018) investigated the effect of investor behaviour on stock market reaction in Kenya. The study had a sample size of 48 listed companies at the NSE only companies that had in the exchange for more than three years were included. Secondary data for the period 2004 to 2016 was analysed. The study established that over confidence and loss aversion had a negative and significant relationship with stock market reaction. Heard behaviour has a negative relationship with stock market reaction. Mental accounting had an insignificant relationship with market reaction. Herd behaviour, loss aversion and overconfidence were found to be significant are related to market reaction. Mental accounting to not be significantly related to market reactions. The study used company stock returns to measure a sentiment index however a good estimate should be developed using direct data from the participants.

Haritha and Uchil (2020) studied the influence of investor sentiment and its antecedent on investment decision making. The study investigated the impact of investor sentiment and the factors triggering it on decision making and it was carried in the Indian stock market. The argued that investor sentiment and its features such as herding, media, advocate recommendation and social interaction play a role in decision making. The study used a structured questionnaire to collect data among Indian investors. Partial least square analysed the relationship among the variables and found that there was a significant and positive relationship among herding, media factor, advocate recommendation and social interaction which are the antecedent and investor sentiment. Further the study established that investor sentiment was positively related to investment decision- making. The study

measured investor sentiment as a moderator in the current study it is the dependent variable. This implies that it is the cause of the outcome and not just a catalyst as the cited research. Investor biases in this study are taken to be triggers of investor sentiment while in other literature they are seen as ways subjective ways of making decisions and thus further research is needed to establish the role of investor sentiment and bias.

Garay and Pulga (2021) investigated the transactions carried out by individual investors of the Columbian stock Exchange. There were 42,211 individual investors who completed 5,380,810 transactions. If the measure used to compute performance was CAPM or Fama-French or Carhart model the investors got negative returns. The study found the returns of overactive investors were poorer than those of cautious traders. Notwithstanding the fact that the poor returns were as a result of a collapse of a large brokerage firm, experienced traders who were active in the market were found to have had better results. Hence, trading experience was found to have an effect on risk appetite and returns. However, one limitation in the study was that the risk factor in traditional models does not allow for variation. Another gap is that the study used rationality models to investigate irrationality.

Verma and Verma (2021) studied the impact of investor sentiment on asset mispricing. The study computed the price errors in S & P 500 index using the Dolan et al. (2009) valuation model. The study investigated the influence of individual investor and institutional sentiment on S&P 500 index and established pricing errors are always present in the market. The study also found that investor and institutional sentiment is formed by risk and noise but institutions seem to be more rational. Further the study argues that small

individual investors are not as powerful in affecting asset prices as institutions. The study established that noise and irrationality is related to mispricing and that rationality improves market efficiency. The study is weekend by the combination of the attempt to study two different unit with varied circumstances. This is because some information from both contexts is likely to be left out and adjustments made to make them comparable.

2.4 Summary of Literature Review and Knowledge Gaps

The review of empirical work done in the area of irrationality revealed that there is no consensus among researchers on the relationship between investor sentiment and stock returns. Most of the studies reviewed found a significant but negative relationship between investor sentiment and stock returns while others found no relationship. The mediating role of risk appetite in the relationship between investor sentiment and stock returns was confirmed in some literature while it was disputed in others. In the case of demographic characteristics having a moderating effect, literature showed only some of the factors as having an influence but other papers found no relationship. It can be deduced from the foregoing that the conflict in the relationship between investor sentiment and stock returns is yet to be resolved.

This part of the chapter therefore, summarises the contextual, conceptual and methodological gaps which were identified during the review. The gaps have arisen due to various reasons such as the subject of irrationality being relatively new or cultural, differences in estimating proxies of investor sentiment and developmental differences. Thus, since behavioural finance is still new, a lot is yet to be known especially locally at the NSE. It can be deduced that, majority of the research that has been conducted so far

has been done in the developed markets. The emerging markets are now developing an interest in the subject since most studies cannot be generalized to the local set up. Therefore, a study on investor sentiment at NSE is needed since it is an area that has not been investigated a lot and the security market is still at a growth stage when compared to the advanced markets.

This study was conducted during a difficult time in history, when the world was struck by the COVID pandemic. The study period extends from 2015 to 2020 hence it includes the pandemic period and the period when the NSE experienced closure of the market. The pandemic period impacted all aspects of society including financial investments. During this period investors behaviour was characterised by fear and, bourses around the world had to close. Therefore, the field of behavioural finance research during this period of the pandemic presents insights into irrationality and how it impacts performance and markets. The studies done on the pandemic are still going on and the current one adds to the knowledge of the impact of the pandemic in the NSE context.

The theories and models used to guide studies in the field of investor behaviour still rely on the rationality assumption of wealth maximisation and risk aversion. However, the investor behaviour manifested in the market does not fit into this mould. Hence, a conceptual gap arises in the studies already conducted. The current study did not make any assumptions about the investor and how they make investment decisions. The current study relied on irrationality theories which acknowledge that the investor can be guided by factors like feelings, past experience or instinct which do not follow logic.

The introduction of moderating and mediating variables brings deeper knowledge of irrationality of investors. Most of the literature reviewed only dealt with two of the variables included in the current study. Risk is an integral part of every investment decision therefore; it should be considered in a study on returns. Hence, it was studied in the current paper as a mediating variable. Demographic characteristics define the investor and also affect the attitude and emotions held towards an investment. Many papers reviewed did not consider the impact of demographics on investor sentiment and risk appetite.

The current study identified various indicators of investor sentiment, risk appetite and demographic characteristics. This is unlike many of the reviewed papers which had few indicators of similar variables and hence this presented another conceptual gap. This study brings a comprehensive analysis of the interaction of indicators of investor sentiment, risk appetite and demographic characteristics. Thus, the study fills the conceptual gap of the relationship among these variables. A methodological gap identified in the review of literature was in estimation of the investor sentiment proxies some of the models which were used in the existing studies were rather complex and difficult to replicate at the NSE. The current study used the responses from the participants to come up with a proxy for investor sentiment.

Table 2.1 below highlights the gaps identified in the review of the empirical work done on the relationship among investor sentiment, risk appetite, demographic characteristics and stock returns of individual investors.

Table 2.1: Summary of Knowledge Gaps

STUDY	STUDY TITLE	RESULTS	KNOWLEDGE GAPS	FOCUS OF CURRENT STUDY
Aduda et al.(2012)	The Behaviour and Financial Performance of Individual Investors in Trading Shares of Companies Listed at the NSE, Kenya.	The researchers established that there was irrationality among investors in Kenya evidenced by herding.	The study employed a descriptive survey method among 43 respondents at the NSE. These were too few to draw a general conclusion about Kenyan investors.	The current study will conduct a survey on a sample of 384 investors at NSE to fill the gap of sample size.
Hu and Wang (2013)	Noise trading and stock returns: evidence from China	Sentiment was found to be significantly and negatively related to returns. The study used the BSI index to measure sentiment.	This study was conducted in China which is a developed market. The study used stocks to compute sentiment index. Stocks are a key input not the equation. Therefore, issues of collinearity may arise.	Survey among investors was used to estimate investor sentiment among NSE investors. This is more accessible than using BSI.
Olweny, Namusonge and Onyango (2013)	Financial attributes and investor risk tolerance at the Nairobi Securities Exchange-A Kenyan Perspective.	Using ANOVA and logistic regression the study established that home ownership and risk tolerance were not related.	The study used ANOVA to assess the model of the study and measure relationships using logistic regression. The study would have more consistent if it had used Omnibus Chi-square test	The current study consistently used statistically recommended models guided by the distribution of the variables.
Nyamute et al. (2015)	The Relationship between investor behaviour and portfolio performance at the Nairobi securities exchange	The study found that herding and disposition effect had the biggest influence on portfolio performance	This study was done 5 years ago when technology had not developed as much as it has today.	This research is current and has been conducted when the technological advancements of NSE are in place and in use.

Smales (2017)	The role of fear in investor sentiment and stock returns.	Fear was found to have an impact on a cross section of stocks of firms of different sizes, industry and value.	Only the sentiment of fear sentiment was investigated which is limited because there are many other sentiments that affect the market. VIX was used as a proxy for fear which is done by Chicago Board Options Exchange CBOE and is applicable only in the USA.	The current study developed its own questionnaire on sentiment which is directly related to the investors at NSE as they are the source of the information.
D'Hondt & Roger (2017)	Investor sentiment predictability: The power of ignorance.	The study found that investor sentiment who were ignorant of stock information influenced prices and if they are many, they can cause mispricing.	The study was conducted in France a highly developed country. The sample size was too large to get deep insights into the sentiments of individual investors.	The current study was conducted locally among investors at NSE. The sample size was small enough to get in depth insights of the individual investor.
Cherono (2018)	The effect of investor behaviour on stock market reactions in Kenya	The study found that mental accounting was not related to stock market reactions. The study also established that overconfidence and loss aversion were negatively related to stock market reaction while herding was positively related.	The used fluctuations of stock returns of companies to estimate behaviour. This measure is not representative because it comes from the company.	The current study used a direct investor sentiment index.
Onsomu (2018)	Behavioural biases, demographics, investment strategy and portfolio performance of individual	The study established that investor biases of representativeness and confirmation are not relate	The study was conducted five years ago when there was more peace in the country and there was no threat of a pandemic.	This study is current and it is conducted during the period of major crisis in public health and political campaigns.

	investors at the Nairobi Securities Exchange.	to demographic characteristics. Further it established that overconfidence varied among age groups.	The sample size was small and it was all from Mombasa County hence, it is difficult to generalize the results to all counties.	The study was conducted at the NSE where there is a representation of investors from all over the country.
Lan et al. (2018)	Individual investment decision behaviours based on demographic characteristics: Case from China	Demographic characteristics were found to be highly correlated to trading behaviour and investment decisions.	The study was conducted in China which is a highly developed market. In addition, the sample size was too large for depth to be achieved in the study.	The current study was conducted locally and the sample size was not too large to achieve an in-depth analysis
Cherono, Olweny & Nasieku (2019)	Investor behaviour biases and stock market reaction in Kenya	The study found that the heard effect did not have a significant effect on stock market reactions.	The study used data from a company instead of developing its own index.	The current study used a direct index from the respondents of the participants.
Alber & Gamal (2019)	The effect of demographic factors on investor's risk tolerance using Fuzzy Analytic Hierarchy Process.	The study was done in Cairo and Giza and found that age, education, social status and children affected risk tolerance.	The study used FAHP (Fuzzy Analytical Hierarchical Process) to assess the relationship. This method is quite complex especially when the variables are many.	This research used a survey to collect data and to develop and index on investor sentiment.
Baker, Kumar, & Goyal (2019)	Personality traits and investor sentiment	The study established that in India the three traits extrovertness, conscientiousness and neuroticism significantly influence all the biases while openness was only related to mental accounting	The period of investigation was too short for a study on human behaviour and how it affects decisions. The impact of biases on performance would have added value to the study	The period of study for the current research is over several years and the financial implication of demographic characteristics is tackled in the research.

		and agreeableness was not associated to any bias		
Qadan (2019)	Risk Appetite, idiosyncratic volatility and expected returns	The study found that risk appetite makes a significant difference in the relationship between idiosyncratic volatility and expected returns.	The study was done in Chicago. This study used investor sentiment proxies as indicators of risk appetite which brings confusion in the study. In addition, the study uses data from the Federal Reserve Bank to measure investor related volatility.	This study distinguished the two variables risk appetite and investor sentiment. The proxies used are survey based and not institutional, which means that they are more related to the investors.
Islam, Mumtaz and Hanif (2020)	The Role of Heuristics Toward Stock Market Anomalies (Individual Investors)	The study was done in Pakistan and it established that heuristics were related to market anomalies, especially the technical and fundamental ones. Anchoring was found to be related to technical anomalies while overconfidence was related to anomalies related to the calendar.	This study only considered four components of investor bias which is not comprehensive.	The current study covered a wide range of irrationality and bias indicators that gives the investigation more insights.
Bayar, Sezgin and Oztuk (2020)	Financial literacy and financial risk tolerance of individual investors: Multinomial logistic regression approach	The study found a significant relationship among gender, educational level, income, age, gender and financial risk tolerance.	The variables in the investigation are not well defined since financial literacy is a demographic characteristic but it is distinguished from the others. In addition, the study is localized to the University of Usak in Turkey.	The current research dealt with demographic characteristics in one category such that there is clarity in the outcome. Further, the context of this study is the individuals at the NSE who come from all walks of life

				so the outcomes of this research is more generalizable to the population.
Haritha & Abdul (2020)	An empirical examination of investor sentiment and stock market volatility: evidence from India.	A positive and significant and relationship was established between irrationality and market volatility and market inefficiency was found to increase volatility.	A sentiment index was developed using principal component analysis. However, this is difficult to interpret and some information is lost. GARCH and Granger causality framework lose accuracy with unstable data and periods.	The current study developed a direct investor sentiment index from the responses of the participants. The current study use stepwise regression and Haye's (2009) method which are stable in turbulence.
Blake, Cannon and Wright (2021)	Quantifying loss aversion: Evidence from a UK population survey	The study developed a loss aversion model. They found that demographics factors affected loss aversion	The study did not consider the mediation effect that would have added insights to the research.	The study included the mediation effect of risk appetite.
Fang et al. (2021)	The impact of investors' sentiments on stock returns using fintech approaches.	The study found that high optimism had a bigger influence than general positive feelings. Pessimism was more influential on returns those usual negative feelings	The study used Internet text mining programme and web crawler which are complicated ways of measuring the sentiment index	A survey was conducted to establish the sentiments investors have which is an accessible way of making the assessment.
Kasoga (2021)	Heuristic biases and investment decisions: multiple mediation mechanisms of risk tolerance and financial literacy—a	The study found that financial literacy has no mediating effect on heuristics and decisions on investment while risk tolerance had a positive influence. The study also	The limitation of this study is that it did not ask confidential questions which could have led to more comprehensive research. The study was conducted in the Tanzanian stock exchange.	The current study asked all the necessary questions in the survey which made the outcome comprehensive. In addition the study was done in Tanzania which is a less developed

	survey at the Tanzania stock market	established an order of strength of effect of heuristics on investment decisions.		market than NSE and so the outcomes may be applicable.
Parveen et al. (2021)	Examining investors' sentiments, behavioural biases and investment decisions during COVID-19 in the emerging stock market: a case of Pakistan stock market	The study established that the pandemic created fear among investor who manifested biases which were negatively related to investment decisions that led them to make decision	The study is limited in scope of time since it covered only a period of six months. The period of study was during covid so its impact is still going on so the timing only gives the effects during not after the pandemic.	The current study is over a period of which covers the time before, during and after the pandemic so the results are more objective and balanced.
Wenzhao, Su and Duxbury (2021)	Investor sentiment and stock returns: Some International evidence	Sentiment was revealed as having a negative relationship with stock returns. The study also suggested that the impact of sentiment was greater in emerging markets.	The study was conducted from the UK on 50 global markets. CCI was used in the research but it is a general economic index to measure sentiment which can impact the outcome of the study. The study combined both developed and under developed markets as the two have different features. It is difficult to generalize the findings of this study to other markets.	The current study used a questionnaire to identify the specific sentiments that the investors had about investment at the NSE. This study was on NSE individual investors so, it will be possible to generalize the outcome to the entire population of investors.
Lansing, LeRoy and Ma (2022)	Examining the sources of excess return predictability: Stochastic volatility or market inefficiency?	The study, using data from 1990 to 2020, while controlling for volatility in fundamental parameters established that the irrationality of investors could predict abnormal	The study does not identify the specific ways in which the investor is irrational. This makes the findings of the study difficult to apply in a practical way. The study is limited in that the University of Michigan index is a localized measure of	The current study specifies irrationality of the investor in terms of the sentiment that is manifest in the market and how it affects investment returns.

		returns of risky assets. Specifically, the study found a negative relationship between sentiment and returns. However, the predictability was only present within a certain period since the forecast power changed during the period of COVID.	sentiment index therefore, it cannot be applied to other markets especially in developing countries	This study included all willing investors at the NSE and therefore the outcomes are more applicable to the entire population.

2.5 The Conceptual Framework

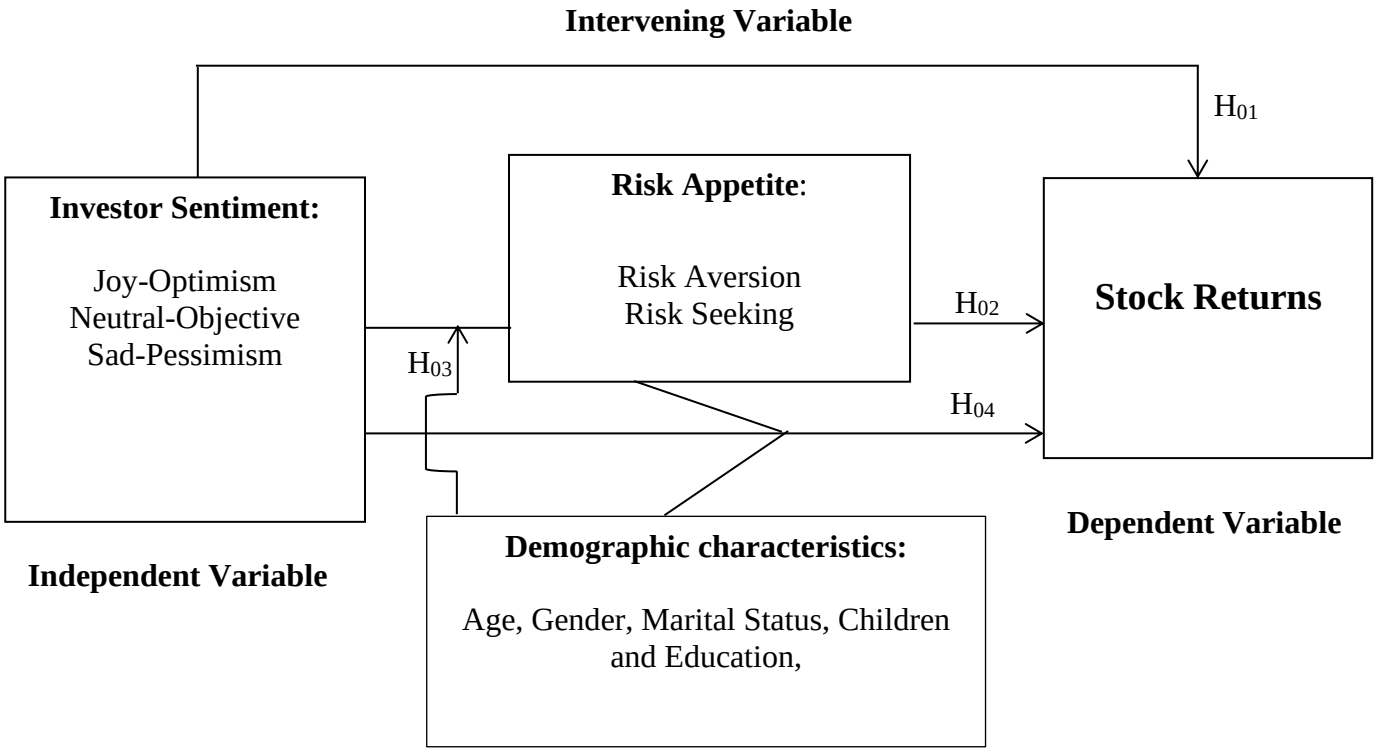
This section covers the discussion on the conceptual framework and the hypotheses of the research which are based on the theories identified in the literature review. The relationships are diagrammatically reflected in the framework below and are based on the research objectives of the research. This study is anchored on prospect theory; an irrationality model which argues that investors show more sadness in the face of a loss than joy in front of the same amount of gain. The variables of this study were identified according to (Blake, Cannon & Wright 2021; Boehmer et al., 2021). Therefore, the independent variable was investor sentiment while stock returns was the dependent variable. Demographic characteristics moderated the relationship between investor sentiment and risk appetite following the study by Fairchild and Mackinnon (2009) and the mediating variable in the study was risk appetite relying on (Brooks et al., 2020).

The relationship between investor sentiment and individual stock returns is shown in H_1 below and is similar to (Smales, 2017). The dependent variable; stock returns was measured using Sharpe ratio. The indicators of the independent variables were divided into three groups: joy-optimism, neutral-objective and sad-pessimism. The categories of the variable were created depending on the intensity of the emotion with joy being the highest and sad being the lowest. The indicators of investor sentiment were; sources of investment information, view of financial statements, frequency of AGM attendance, stock expectation, frequency of trading at the exchange, handling declining and rising stock, stock market performance, sufficiency of stock information provision at NSE, stability of macroeconomic environment and stability of political environment (Sun et al.,2021).

H_2 reflects the mediation of risk appetite in the relationship between investor sentiment and stock returns which was based on (Dickason & Ferreira, 2018). Further, Brooks et al. (2020) argues that moods affect the attitude of the investor towards risk such that high sentiment lead to a risk seeking tendency and low emotions cause aversion to uncertainty. Risk appetite was divided into two categories; risk seeking and risk aversion. Low risk appetite showed risk aversion while a high appetite represented risk seeking. The indicators of risk appetite which follow the study by Qadan (2019) and Kasoga (2021) were; Stability of income, likelihood of taking a loan to buy assets, level of knowledge of stock trading, maximum period one can invest a large sum of money before needing it for expenses, rating of asset risk (high risk and high income assets, balanced portfolio and low risk assets) and reasons for investment.

Demographic characteristics were represented in H_3 as having a moderating influence in the relationship between investor sentiment and risk appetite following the argument by (Fairchild & Mackinnon, 2009). The study proposes that the influence of investor sentiment on risk appetite may be affected by demographic characteristics. The indicators of demographic characteristics indicators were age, gender, marital status, children and education (Nyamute et al., 2015). H_4 in the model shows the joint effect of all the variables followed the argument by (Parveen et al., 2021) which attested that investor sentiment, risk appetite and demographic characteristics influence returns. Demographic characteristics impact investor sentiment and risk attitude and thus, determine the decision-making process and the stock returns obtained (Asad, Toqeer, & Mahmood, 2022).

Figure 2.1 The Conceptual Model



Source: Author, 2022

2.6 Research Hypotheses

The objective of this study is to establish the relationship among investor sentiment, demographic characteristics, risk appetite and returns of individual at the NSE. The hypotheses formulated for this study are listed below:

H_{01}: There is no significant relationship between investor sentiment and stock returns of individual investors at the NSE.

H_{02}: There is no significant intervening effect of risk appetite on the relationship between investor sentiment and stock returns of individual investors at NSE.

H_{03}: There is no significant moderating effect of demographic characteristics on the relationship between investor sentiment and risk appetite of individual investors at NSE.

H_{031}: There is no significant moderating effect of age on the relationship between investor sentiment and risk appetite of individual investors at NSE.

H_{032}: There is no significant moderating effect of gender on the relationship between investor sentiment and risk appetite of individual investors at NSE.

H_{033}: There is no significant moderating effect of marital status on the relationship between investor sentiment and risk appetite of individual investors at NSE.

H_{034}: There is no significant moderating effect of children on the relationship between investor sentiment and risk appetite of individual investors at NSE.

H_{035}: There is no significant moderating effect of education on the relationship between investor sentiment and risk appetite of individual investors at NSE.

H_{04}: There is no significant joint effect of investor sentiment, demographic characteristics and risk appetite on stock returns of individual investors at NSE.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains the procedures and steps undertaken to carry out the research. The first section covers the research philosophy which shows the orientation of the study. The chapter also includes the blueprint or research design of the investigation. The target population and sample size of the study are also presented in this chapter. Finally, the chapter outlines the operationalization of the variables and it explains how data analysis was carried out.

3.2 Research Philosophy

The philosophy of scientific research forms the approach which guides a study to determine the design of the investigation and how data is collected and analysed. In other words, the philosophy of a research is the ideology that a study will follow in order to come up with new knowledge. Research approaches can either be epistemological (what we know objectively) e.g. positivism or ontological (what we believe) e.g. phenomenology. Positivism includes the collection of objective data about a phenomenon, analyzing the data and drawing conclusions from it. Thus, the approach ensures objectivity of the data and interpretation of findings. Positivism tests whether existing theories about phenomena still hold or should be reformulated. This approach argues that knowledge must be scientifically tested to be confirmed as true or rejected as false (Sekaran & Bougie, 2016).

Phenomenology is another approach to research whereby, the role of the researcher is to draw conclusions from the observations and experiences gained from the world. In other words, the researcher gets personally involved in the study as their opinion about the observations and

experiences is needed. The conclusions that are drawn from the observations are dependent on the experience of the researcher therefore interaction with the phenomenon being investigated is important for this approach. Phenomenology is largely concerned with understanding behaviour thus it may consist of observing or interviewing members of a population. Phenomenology attempts to draw patterns from the observations made, experiences and data collected. This approach is appropriate for developing theories about how different variables are expected to relate and then later testing the model using the positivism (Blumberg, Cooper, & Schindler, 2005).

The current study adopted the positive approach since the research, as proposed by the orientation, involved testing hypotheses that were formulated about the relationship among variables. To be able to draw unbiased conclusions, objectivity of data collection is required together with the independence of the researcher which is only achievable through positivism. Since the study objective aimed at drawing conclusions on the relationship between investor sentiment and stock returns, the positive approach was the most appropriate. Further, the positive approach is oriented towards quantitative analysis of data to test hypothesis and generalizing the findings to the population under study. Hence, positivism was suitable to enable the current research draw generalizable conclusions after conducting the requisite statistical analysis on the collected data.

3.3 Research Design

Research design refers to the game plan or blueprint of an investigative study. There are three types of research designs. The first design is exploratory research which involves looking for new ideas and getting initial knowledge about an area of interest for future investigation. This

design is useful in a new field of research when it is necessary to establish what is known in that particular topic. A causal design estimates the cause-and-effect relationship among study variables. An investigation of this type is usually done under a controlled environment which involves comparing the effect of stimuli when it is applied and when it is not given to different samples. In this design, there are two distinct samples; one where the experiment is to be carried out and another one which acts as the control group and which will not have anything done to it.

The third design is the descriptive survey which aims at explaining a phenomenon in a population through collection of data and hypotheses testing. The descriptive survey follows a positivistic approach in order to get knowledge about a phenomenon since it involves collecting objective data. Therefore, this study employed descriptive survey design since it aimed at arriving at an unbiased conclusion of the relationship between the research variables. To achieve the objectives of the current study, the descriptive design was appropriate because it consists of the collection of data using a suitable survey instrument that ensures that researcher's opinion is not involved. The conclusions in a descriptive design have to be solely from the responses obtained from participants. Thus, the results of the analysis conducted following a descriptive design are the basis for drawing conclusions about the relationship of the study variables, which makes it suitable for testing the research hypotheses (Sekaran & Bougie, 2016).

Descriptive studies begin by depicting the features such as the frequencies and central tendency measures and estimates of variation of the phenomenon being investigated from the sample data. The description of the features of the data give an initial idea of the

representative sample. The next step involves checking the correlation between the variables of the study in order to check for evidence of existence of a relationship. Inferential statistics are then conducted such as the analysis of variance, the coefficient of determination and the testing of the significance of the relationships of the variables. Finally, the conclusions are drawn from the results of the analysis and projections made which may result in refuting, affirming or reformulating existing theory.

This research was geared towards establishing the relationship among variables thus it applied a descriptive design. In this design, variables are defined, operationalized, analyzed and compared to formulated hypotheses. The descriptive design examines whether a change in one variable causes any variation in another one which would reflect that they are related to each other. A cross sectional study involves the collection of data at a point in time to analyse it for relationships among variables. Applying the cross-sectional design in this research included conducting a survey among individual investors at NSE and then subjecting it to analysis following the requisite steps (Sekaran & Bougie, 2016).

3.4 Population of the Study

The population of the study consisted of 1,173,747 individual NSE investors who have active CDSC accounts (Capital Markets Authority, 2021). Since the number of individual investors is quite large and due to the limitations of time and budget, a sample from this population was selected for the purposes of analysis. Most of the investors acquire assets through brokers, hence a sampling frame was drawn based on the firms that are licensed by the NSE.

3.5 Sample Design

Sample design refers to the determination of the size of a representative group. It also involves the selection of an appropriate sampling method. Randomization as a sampling technique ensures lack of bias, assures objectivity and generalizability of the results of the study. The questionnaires were distributed to the participants through the brokerage firms. The brokerage firms were requested through writing, telephone calls and visits to ask their clients to participate in the study. After that the brokerage firms that accepted the request, shared the questionnaires via email with the clients who were willing to take part in the study.

The sample size computation is shown below which applies the generally recommended confidence level of 95% and 5% for the margin of error (Sekaran & Bougie, 2016).

$$n = \frac{\chi^2 * N * P * (1-P)}{(ME^2 * (N-1)) + (\chi^2 * P * (1-P))}$$

n=sample size

χ^2= Chi-square for 95% confidence level at 1 degree of freedom

N= Population Size

P=Proportion of the population= 0.5

ME= desired Margin of Error 5%

When applied to the population of 1.1 million investors the sample size is 384 and in order to take care of non-response and spoilt questionnaires, the sample was, however, increased to 400. The Sampling frame was made up of the 24 stock brokerage firms (Appendix II) which

appear in the NSE website. The selection was based on willingness to participate since most firms were reluctant to allow their clients to be involved in the study. Hence, the questionnaire was given to willing brokerage firms to distribute among their clients had agreed to take part in the study.

3.6 Data Collection

An appropriate data collection instrument was needed to get primary data that would make it possible to achieve the objective of the study which was to draw unbiased conclusions about the relationship among variables. Consequently, a structured questionnaire was considered appropriate since it allows for data to be gathered without the researcher introducing personal biases to the investigation. Additionally, a questionnaire is beneficial because it allows for a large amount of data to be collected which is necessary for generalizable conclusions and future predictions. Thus, a structured questionnaire (Appendix I) was developed and distributed among respondents between July and September 2022. The questions in the survey instrument were developed by the researcher based on the review of literature. The questions on sentiments were adapted for the study from the questionnaire by the American Associations of Individual Investors (American Association of Individual Investors, 2019).

The risk appetite questions were formulated from the Royal Bank of Scotland Morgan (RBS) investor risk profile (RBS Morgan, 2019). The questions on demographics were developed by the researcher following Onsomu (2018). The questionnaire required stocks for the period 2016 to 2020 the chart was structured based on Nyamute (2016) which appears in (Appendix III). The inputs for computing Sharpe ratio included stock market prices which were sourced from NSE and the 91-day Treasury Bill rates (Appendix V). The 91-day rates for 2016 to

2020 were sourced from the Central Bank of Kenya website (CBK, 2022) and were preferred to others because they were considered to be more secure than the ones of a longer period. The questionnaire was divided into four sections which covered the variables of the study. The first section was on demographic characteristics, the second on sentiment, the third on risk appetite and the last section was on stocks data.

To achieve the objectives of the research, estimates of sentiment and risk appetite were made using the responses from the participants of the survey. The respondents of the questionnaire were individual investors at the NSE who were to be contacted through the listed brokerage firms (Appendix II). Brokerage firms were contacted through hand delivered letters, telephone calls and emails. In the communication they were requested to allow the research to be conducted among their clientele. The questionnaire was distributed via emails to the clients of the agreeable brokerage firms. Most respondents opted to fill in the stocks data rather than upload their CDSC statements. Stock prices and dividends obtained from NSE were used to compute the returns for each investor.

3.7 Reliability and Validity of Measurement Instruments

Reliability refers to the dependability and consistency of a study while validity is about the research being true to what it set out to do (Blumberg, Cooper & Schindler, 2005). Therefore, a study is reliable if the responses obtained from the collection instrument are consistent and replicable. Hence, reliability refers to the results remaining the same even when the survey is done repeatedly. Furthermore, reliability is also the extent to which the outcome is consistent over time. The measurement should be stable within a given period, such that the results obtained if the survey were to be repeated should not vary. Cronbach's alpha was used

to test for reliability which estimates how much variation in the variables is attributable to chance. For reliability to exist, the value of Cronbach's alpha should be greater than 0.7 (Sekaran & Bougie, 2016).

A study is valid if a given indicator actually measures the concept it was set out to evaluate. Validity tests evaluate how well research reflects the reality of a phenomenon under investigation. A pilot study involving 20 investors was conducted to test the content of the questionnaire before it was released to the entire sample group. The purpose of this was to improve the instrument either by adding useful questions and or removing irrelevant ones. The questionnaire was also discussed with the supervisors to ensure appropriateness of the instrument.

3.8 Operationalization of Research Variables

This section deals with how the variables were operationalized to make them measurable. The current research borrows from other studies identified in the literature review. The definition of variables to make them measurable is indispensable especially when dealing with intangible phenomena like sentiment or risk appetite. Therefore, this study identified indicators which made it possible to estimate and analyze the intangible variables.

3.8.1 Operationalization of Investor Sentiment

Investor sentiment is an intangible reality and therefore, it can only be measured through proxies. The observable pattern of behaviour is the key to operationalizing intangible beliefs (Baker & Wurgler, 2007). Therefore, sentiment can be seen from what the investors either attest to or manifest while trading. Investor sentiment was operationalized into joy-optimism,

neutral-objectivity or sad-pessimism following the study of Fang et al. (2021). The determination of whether sentiment among investors is high or low is dependent on objectivity or neutrality about the indicator in question which then acts as the benchmark. The rational investor, unlike noise traders, relies on objective information from sources such as financial statements and reports. The irrational trader goes by how they feel about an asset notably these emotions are not stable and so they impact the decision-making process.

The measurement of sentiment was based on a survey carried out among NSE individual investors. The responses were categorized into three groups depending on the rating assigned by the respondent. High ratings were assigned to joy-optimism, average ratings to neutral-objective and the low ratings to sad-pessimism. Neutral-objective represents the type of investor who relies on unbiased sources of information such as financial reports, consults market experts, is not overactive in trading and does not hold onto losing stocks nor sell rising assets. Sentiment indicators were as follows: sources of investment information, view of financial statements, frequency of AGM attendance, stock expectation, frequency of trading at the exchange, handling declining and rising stock, stock market performance, sufficiency of stock information provision at NSE, stability of the macroeconomic environment and of the political environment (Sun, et al., 2021).

Table 3.1: Operationalization of Investor Sentiment

Sentiment	**Indicator**	**Operational Definition**	**Scale**	**Questionnaire**
High (Joy, Optimism)	Positive beliefs about stocks, the economy, market and political environment. They get information from friends and	Happy about the future Increased frequency in trading	Interval	Part B,Q11-Q21

	rumours, relies on past experience,			
Neutral (Objective)	Maximize profits, rely on logic by consulting financial consultants, analyzes financial reports, review of annual reports, attending AGM	Not influenced by feelings but figures and facts	Interval	Part B Q11-Q21
Low (Sadness, pessimism)	Negative about stocks market, economy and politics. Source of information is rumours and family, follows experienced investors	Sad and low about the future Reduced trading activity in the market Fear of losses	Interval	Part B Q11-Q21

Source: Author, 2022

3.8.2 Operationalization of Risk Appetite

Risk appetite has been operationalized into two categories; risk seeking and risk aversion (Qadan, 2019). This is because the investor has to decide what level of risk, they are willing to take. Risk neutral was not considered in the study as the concept is mainly used in financial models for estimating price equilibrium. This means that it is not representative of the real world where investors have a risk orientation (Martin & Nagel, 2022). Thus, risk appetite had the following indicators; stability of income, likelihood of taking a loan to buy assets, level of knowledge of stock trading, maximum period one can invest a large sum of money before needing it for expenses, rating of asset risk (high risk and high income assets, balanced portfolio and low risk assets) and reasons for investment. The investors were categorized as risk seeking or risk averse, depending on the rating they assigned to these indicators. The risk seeking investor gave high ratings to the indicators while the risk averse investor assigned low ratings (Lippi & Rossi, 2020).

Table 3.2: Operationalization of Risk Appetite

Risk Appetite	Indicator	Operational Definition	Scale	Questionnaire
Risk Seeking	High stable income, no loans, financial literacy, invests for capital gain so long term investment	Secure financial position, Few financial and family commitments, Risky assets preference	Interval	Part C Q 22 to 27
Risk Averse	Low unstable income, invests to supplement income, not knowledgeable, long term investments	Insecure financially, Family and financial commitments, Low risk assets Invests for income	Interval	Part C Q 22 to 27

Source: Author, 2022

3.8.3 Operationalization of Demographic Characteristics

Demographic factors were operationalized in Table 3.3 below to include age, gender, marital status, children and education (Alber & Gamal, 2019). Gender was operationalized into two main groups male and female, while age was represented by how many years an investor had lived. Marital status was operationalized into married, single and widowed. The number of children an investor had was divided into three categories ranging from none to one, the second group was two to three and the last one was four and above. The level of education had the following categories; doctorate, masters, degree or certificate (Bayar, Sezgin, & Ozturk, 2020).

Table 3.3: Operationalization of Demographic Characteristics

Demographic Characteristics	Indicator	Operational Definition	Scale	Questionnaire
Gender	Male or Female	Gender affects reflects certain trading behavior	Nominal	Part A, Q1
Age	Years of life	Life experience behaviour and risk tolerance	Interval	Part A, Q2
Marital Status	Married, Single, Widowed	Family commitments could impact sentiments and risk appetite	Nominal	Part A, Q3
Children	Number of children	Number of children shows obligations	Ratio	Part A, Q4
Education	Academic Level	Qualifications	Nominal	Part A, Q5

Source: Author, 2022

3.8.4 Operationalization of Stock Returns

Stock returns which was the dependent variable was estimated using Sharpe ratio. The advantage of this measure is that Sharpe ratio uses the total risk that affects a portfolio. In addition, Sharpe ratio adjusts for varying risk free rates occurring during the period of investment. Stock returns was the dependent variable it was estimated using Sharpe ratio which is the difference between portfolio return and the risk free rate for each unit of portfolio risk borne during a certain holding period (Biktimirov & Thomas, 2003).

Sharpe ratio has the following inputs; the portfolio returns, standard deviation and the risk free rate. The portfolio returns were computed using stocks data, market price and dividends. The 91-day Treasury bill rate was used as the risk free rate because it has the lowest probability of default compared to the option of 182 or 364 day bills. The difference between portfolio returns and 91-day risk free rate was divided by the standard deviation to get the Sharpe ratio. The standard deviation is the risk of the portfolio, which means that Sharpe ratio does not make the assumption that a portfolio is diversified. The ratio allows for diversifiable risk to be included in the computation which makes it a good tool for measuring performance. An investor may experience more risk because of relying on sentiment to form a portfolio (Nyamute et al., 2015).

Table 3.4: Operationalization of Stock Returns

Sharpe Ratio	Indicator	Operational Definition	Scale	Questionnaire/ Secondary Data
Risk free rate	Minimum return, undiversifiable risk	Rate of return of a risk free asset	Ratio	Secondary data
Portfolio Return	Compensation for risk borne	Gain or loss of a portfolio	Ratio	Secondary data and Part D

Standard deviation of the Portfolio	Total Risk of Portfolio	The is the deviation from expected returns	Ratio	Part D

Source: Author, 2022

3.9 Diagnostic Tests

Diagnostics tests are conducted in order to assess whether the assumptions required to carry out a regression analysis are met. If these assumptions are not met by the data, then errors may occur in the conclusion or in the over or under estimation of the effect (Onsomu, 2018). The diagnostic tests that are necessary for this study include normality, homoscedasticity, linearity, lack of multicollinearity and absence of autocorrelation. Therefore, Shapiro-Wilk test was carried to test whether the data is normally distributed. If the results of Shapiro-Wilk turn out to be significant, it would imply that the data is skewed and not normally distributed. Histogram graphs can also be used to test normality by plotting the data and checking whether a bell-shape is formed when a line is drawn to join the bar mid-points. If the distribution of the data is not bell shaped, Spearman's rho should be used to conduct the correlation analysis and not Pearson's correlation test which makes the assumption that data is normally distributed.

Homoscedasticity occurs when the variance of the residual is constant for any value of the independent variable X. When plotted on a graph the error term or residual should not be related to Y in other words it should not predict the dependent variable. For homoscedasticity to occur the plot should be scattered i.e. not clustered together and Heteroscedasticity exists if the residual has predicting power. Breusch-Pagan and White tests were used to test homoscedasticity. The two tests are necessary since Breusch-Pagan test is influenced by small data and non-normal data therefore, the outcomes of the tests are compared in case there is a

difference (Wooldridge, 2010). Autocorrelation occurs when a variable is correlated to itself in consequent intervals meaning that the error term can predict itself in a series. Durbin-Watson was applied to measure autocorrelation in the study variables; investor sentiment, risk appetite and demographic characteristics. The value of Durbin-Watson usually lies between 0 and 4 such that when that it is close to zero or four, it would mean that autocorrelation exists. In contrast, autocorrelation does not exist if the value lies between 1.5 to 3.0.

Collinearity occurs when two variables are highly correlated to each other and this feature is usually measured using Variance Inflation Factor (VIF). Multicollinearity occurs when the VIF has a value that is larger than 10. When a value higher than 10 is obtained during an analysis, one of the highly correlated variables should be removed. This is so as to avoid the error that could arise about which variable was responsible for an effect (O'Brien, 2007). Linearity can be referred to as the relationship between variables that can be plotted along a line showing that, a change in the dependent variable is related to a variation in the predictor. The study tested linearity using ANOVA whereby a significant F-statistic implies that the predictor and dependent variables are related (Wooldridge, 2010).

3.10 Data Analysis

The statistical analysis started after cleaning the data. Data cleaning entailed four stages which were sorting, editing, checking for completeness and eliminating questionnaires that could not be analysed. Out of the 400 questionnaires that were distributed 130 had to be discarded. The second stage involved carrying out descriptive statistics such as computing the measures of central tendency such as mean, mode, measures of dispersion such as standard deviation and variance and measures of asymmetry such as skewness and peakedness or kurtosis. The

descriptive statistics were helpful in getting an initial idea of the quality of data and the representativeness of the sample collected. This is because some characteristics of the data were observed from the results of descriptive analysis. Descriptive statistics are the foundation for conducting inferential analysis. The third stage involved conducting correlation and goodness of fit tests to establish the direction and strength of the relationship. The final stage involved carrying out an inferential analysis, interpretation, discussions and drawing conclusions in order to make recommendations (Sekaran & Bougie, 2016). The regression model used was determined by whether the dependent variable was continuous or discrete. Sharpe ratio was continuous hence Ordinary Least Squares(OLS) method was applied in the analysis.

Correlation analysis was carried out among the variables of the study to establish the strength and direction of the relationship. The closer the correlation coefficient is to one the stronger the relationship and vice versa. A perfect positive correlation is depicted by +1 while a perfect negative correlation is shown by -1. A perfect positive correlation means that for every unit increase in one variable there is a similar increase in the other one. A negative correlation means that when one variable increases by a unit the other one decreases by a similar amount. The computation of the correlation matrix of Sharpe ratio, investor sentiment and risk appetite showed the significance, strength and direction of the relationship (Wooldridge, 2010).

Stepwise regression was adopted to conduct the test of the hypotheses of the study. Stepwise regression is beneficial to the analysis because it allows for multiple independent variables to be added to the model at once. This model is ideal since it ensures that predictor variables that do not improve the equation are removed. The adjusted coefficient of determination ($\overline{R}^2$)

was also computed and it showed the percentage of the variation of the dependent variable that is predicted by the model. ANOVA was carried out to measure how well the model fits the observed data. The significance of the models was measured using F-test. T-tests were used to measure significance of the coefficients in the regression model. These tests were conducted to measure the significance of the change caused on the dependent variable (Sekaran & Bougie, 2016).

3.10.1 Preliminary Data Analysis

Stock returns were measured using Sharpe ratio which is computed using the following inputs; portfolio return, risk free rate and standard deviation. The computation of the portfolio return for each investor included, the calculation of the Holding Period Return (HPR) based on the number of shares held, the market price at the beginning and ending of the holding period and the dividend paid. The portfolio return is the sum of the weighted HPR for the total number of investment periods for example the total number of months. To obtain standard deviation the average portfolio return was computed and then it was subtracted from the portfolio returns and then divided by the number of holding periods. The risk free rate was obtained from the 91-day Treasury bill rate this is because it has a lower risk since the holding period is shorter. The HPR was computed as follows:

$$(HPR) = \frac{(NAV_1 - NAV_0) + Div}{NAV_0} \quad \text{.....(3.1)}$$

Where;

NAV_0 = No of shares X Price at the beginning of the month,

NAV_1 = No of shares X Price at the end of the month, and

Div. = Dividend paid during the month.

The next step was to compute the portfolio return which meant first calculating the weight of each asset in the portfolio. The weight of the asset in the portfolio was computed by dividing its sum with the total number of shares in the portfolio. The portfolio return was obtained by multiplying HPR by all weights of the assets in the portfolio and then summing the products together as shown below:

$$Rp = \sum_{t=1}^{n} \quad wi(HPR) \quad \text{.....} \quad (3.2)$$

Where;

Rp is portfolio return,

t is time,

n is no of periods the asset was held,

wi is the weight of the asset in the portfolio, and

HPR is the Holding Period Return.

The next step that is shown below was to compute the average portfolio return which is also an input for the calculation of the standard deviation of the portfolio.

$$\bar{R}=\sum_{t-1}^{n} \quad \frac{Rp}{n} \quad \text{.....} \quad (3.3)$$

Where;

Rp is portfolio return,

$\bar{R}$ is the average portfolio return,

t is time, and

n is no of periods the asset was held.

The standard deviation of the portfolio or the portfolio risk was computed as follows:

$$\sigma_p = \sqrt{\sum_{t=1}^{n} \frac{(Rp-\bar{R})^2}{n}} \quad \ldots\ldots (3.4)$$

Where;

σ_p is the standard deviation of the portfolio,

R_p is the portfolio return,

$\bar{R}$ is the average portfolio return and

n is the no of periods the asset was held.

Then Sharpe ratio is finally computed as follows:

$$SR = \frac{R_p - R_f}{\sigma_p} \quad \ldots\ldots (3.5)$$

Where;

SR is the Sharpe Ratio,

σ_p is the standard deviation of the portfolio,

R_p is the portfolio return and

R_f is the risk free rate.

3.10.2 Relationship between Investor Sentiment and Stock Returns

The first hypothesis posited that there was no significant relationship between investor sentiment and stock returns of individual investors at NSE was tested using the model shown below. A composite of investor sentiment (**IS**) was computed using geometric mean and Sharpe ratio (**SR**) was used to measure stock returns.

The above equation is summarized below:

$\mathbf{SR = \beta_0 + \beta_1 IS + \varepsilon}$ ……..…. (3.6)

Where;

SR is Stock returns,

IS is a composite of investor sentiment,

$\boldsymbol{\beta_0}$ is a constant or intercept,

$\boldsymbol{\beta_1}$ is a regression coefficient and

$\boldsymbol{\varepsilon}$ is the error term of unexplained variations.

3.10.3 Relationship among Investor Sentiment, Risk Appetite and Stock Returns

The second hypothesis stated that there was no mediating effect of risk appetite on the relationship between investor sentiment and stock returns. The mediation effect was measured using the Hayes model (2009). This method was chosen because unlike Baron & Kenny (1986), it allows for the indirect effect of an intervener to be tested without relying only on the significance of the other causal paths in order to determine whether mediation exists in a relationship. Hayes Process model (2009) by using the indirect effect makes it easier to test more complex relationships which have several mediating variables or paths. In such a complex scenario Baron and Kenny (1986) would require the measurement of more causal paths risking the possibility of not detecting the effect because of the increased number of tests. Hayes Process model (2009) consists of three steps to test mediation with the last part includes testing the total, direct and indirect effects of the model. The first step involved regressing stock returns (dependent variable) against investor sentiment (independent variable) while ignoring risk appetite (mediating variable). In the second step the effect of the investor sentiment (independent variable) on risk appetite (mediating variable) was measured.

The third step involved testing the combined effect of the independent and mediating variables on stock returns. The fourth step consisted of testing the significance of the indirect effect of investor sentiment on risk appetite and then on stock returns (Hayes, 2009).

The first step below tests the effect of investor sentiment on stock returns.

$\mathbf{SR = \beta_0 + \beta_1 IS + \varepsilon}$ ……………………………………………………………………. (3.7)

Where;

SR, β_0, β_1 and ε are as defined in section 3.10.2 above.

The second step involved testing the relationship between risk appetite (mediating variable) and investor sentiment (independent variable).

$\mathbf{RA = \beta_0 + \beta_1 IS + \varepsilon}$……………………………………………………..............…………. (3.8)

Where;

β_0 is a constant or intercept,

β_1 is a regression coefficient for IS,

IS is a composite of investor sentiment and

RA is a composite of risk appetite.

The third step tested the relationship among investor sentiment (**IS**) (dependent variable), risk appetite **(RA)** (mediating variable) and stock returns **(SR)** (independent variable)

$\mathbf{IS = \beta_0 + \beta_1 RA + \beta_2 SR + \varepsilon}$ ………………………………………….……………..…. (3.9)

Where;

RA is a composite of risk appetite,

$\boldsymbol{\beta_0}$ is a constant or intercept and

$\boldsymbol{\beta_1}$**, IS, SR** and $\boldsymbol{\varepsilon}$ are as defined in 3.10.2 above

β_2 is a regression coefficient for SR

Finally, the indirect effect is measured to test for the significance of mediation using Hayes process model (2009).

3.10.4 Relationship among Investor Sentiment, Demographic Characteristics and Risk Appetite

The third hypothesis stated that there is no significant moderating effect of demographic characteristics on the relationship between investor sentiment and risk appetite. This was tested using a five-step model as shown below.

First step: $\mathbf{RA = \beta_0 + \alpha_1(IS) + \varepsilon}$…….. (3.10)

Second step: $\mathbf{RA = \beta_0 + \alpha_1(IS) + \alpha_2(DC) + \varepsilon}$……. (3.11)

Third step part one: $\mathbf{RA = \beta_0 + \alpha_1(IS) + \alpha_2(DC) + \alpha_3((JO)*(DC)) + \varepsilon}$……...……. (3.12)

Third step part two: $\mathbf{RA = \beta_0 + \alpha_1(IS) + \alpha_2(DC) + \alpha_4((NO)*(DC)) + \varepsilon}$……..… (3.13)

Third step part three: $\mathbf{RA = \beta_0 + \alpha_1(IS) + \alpha_2(DC) + \alpha_5((SP)*(DC)) + \varepsilon}$…… (3.14)

Fourth step: $\mathbf{RA = \beta_0 + \alpha_1(IS) + \alpha_2(DC) + \alpha_3((JO)*(DC)) + \alpha_4((NO)*(DC)) + \alpha_5((SP)*(DC)) + \varepsilon}$……..…… (3.15)

Fifth step: $\mathbf{Sharpe\ Ratio = \beta_0 + \alpha_1(IS) + \alpha_2(DC) + \alpha_3((JO)*(DC)) + \alpha_4((NO)*(DC)) + \alpha_5((SP)*(DC)) + \varepsilon}$…….. (3.16)

$\mathbf{Sharpe\ Ratio = \beta_0 + \alpha_1(IS) + \alpha_2(DC) + \alpha_3((IS)*(DC)) + \varepsilon}$……..……. … (3.17)

Where;

$\boldsymbol{\beta_0}$ is a constant or intercept,

α_1-α_5 are the regression coefficients,

RA is a composite of risk appetite,

SR is Sharpe Ratio

IS is a composite of investor sentiment,

DC is demographics of age, gender, marital status, number of children and education,

JO*DC are the interactions terms joy-optimism and demographic characteristics,

NO*DC are the interactions terms neutral-objective and demographic characteristics,

SP*DC are the interactions terms sad-pessimism and demographic characteristics,

ε is the random factor that represents the variations that are not explained in the model.

3.10.5 Relationship among Investor Sentiment, Risk Appetite, Demographic Characteristics and Stock Returns

The fourth hypothesis states that there is no significant relationship among investor sentiment, risk appetite, demographic characteristics and stock returns. This was tested using the following equation:

$$SR = \beta_0 + \beta_1 IS + \beta_2 RA + \beta_3 DC + \varepsilon \quad (3.18)$$

Where;

β_0 is a constant or intercept,

$\beta_1 \ldots\ldots \beta_3$ are regression coefficients,

IS is as defined in 3.10.2 above,

RA is a composite of risk appetite

ε is the error term.

CHAPTER FOUR: DESCRIPTIVE DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter covers the descriptive and correlational statistics of the data collected for this study. The descriptive tests include mean, standard deviation, frequencies and percentages. Correlation tests and results are presented in this chapter and they were cross tabulations, Pearson's Chi-square tests and Spearman's coefficients.

4.2 The Study Response Rate

The study had a population of 1.1 million investors who have CDSC accounts. The study established that there were 24 brokerage firms that are listed in the NSE. A total of 400 questionnaires were distributed to individual investors via email through brokerage firms. 307 questionnaires were returned however only 270 were completed without errors. Therefore, the response rate was 70.3% which was similar to other studies like Onsomu (2018) which had a rate of 69.7% of the study sample target.

4.3 Tests of Reliability and Validity

Cronbach's test was conducted to test the reliability of the survey instrument. This test measures the consistency of a questionnaire. An instrument is reliable when the Cronbach alpha is above .70. From Table 4.1 the Cronbach alpha for investor sentiment was .703 which is acceptable and means that the measures were consistent and repeatable. The Table 4.1 also shows the reliability test for risk appetite where Cronbach's alpha was .5. Taber (2018) argues that there is no consensus on the description of different levels of Cronbach's alpha as seen in

the following labels; excellent (.93 - .94), reliable (.84 - .9), high (.73 - .95), relatively high (.70 - .77), moderate (.61 - .65), satisfactory (.58 - .97), acceptable (.45 - .98) and low (.11). In addition, lower levels of alpha may not necessarily indicate that an instrument is inappropriate (Taber, 2018). This is because the alpha measures attitude towards intangible constructs which vary easily. In many of the studies what is desired in research is a high alpha, however, an instrument with a low alpha is still usable so long as the scores obtained from it can be interpreted. In addition, increasing items may raise the alpha but may make the instrument redundant and tiring for respondents if they are tackling the same dimension (Cronbach, 1951). Hence, an instrument with a low level of alpha may still be used in research. In the current study, the alpha may have been affected by the respondents' changing perceptions and expectation due to extreme uncertainty brought about by the pandemic (Himanshu, Mushir, & Suryavanshi, 2021). Thus, the alpha reflects the instability in the respondents due to politics and the pandemic that affected the securities market negatively. Thus, investor may not have been consistent in responding to the questions because of the experience that they were going through at the time of the pandemic which coincided with the survey of this study.

Table 4.1: Reliability Test Analysis of Investor Sentiment and Risk Appetite

Variable	Cronbach's Alpha	Number of Items
Investor Sentiment	.703	10
Risk Appetite	0.5	8

4.4 Pilot Test

To ensure that the survey instrument was effective in collecting data a pilot test was carried out. The questionnaire was presented to the supervisors for review and fine tuning before the

pilot test was conducted. The survey instrument was presented to 20 investors who were requested to not only complete the questions but to also make suggestions of improvement. The participants of the pilot test were specifically asked to assess the clarity of questions, the coverage of content and comprehension of the questionnaire. The respondents of the pilot test did not participate in the main study. This exercise was aimed at ensuring that the questionnaire would be valid in collecting data. The recommendations and adjustments suggested were incorporated into the data collecting instrument. This included rewording some questions, adding some and removing others. The pilot stage ensured that the instrument had content validity such that all the dimensions of investor sentiment and risk appetite were included. The process of review by investors and the supervisors also ensured that irrelevant and unrelated concepts were removed from the questions. The piloting process confirmed that the questions in the instrument were not leading but were open to capture the opinion of the respondent.

4.5 Descriptive Statistics

Descriptive statistics give initial information about data which guides the decision about the type of model to be used for the analysis. Descriptive statistics include measures of central tendencies like mean, mode and median. Measures of dispersion like standard deviation and coefficient of variation, symmetrical measures like skewness and peakedness of data and relation measures like correlation. The following section presents these statistics (Blumberg, Cooper & Schindler, 2005).

4.5.1 Demographic Characteristics

Demographic characteristics were operationalized following the study by (Shinde and Zanvar (2015; Lan et al. (2018) into the following indicators; gender, marital status, age, children, education. This section discusses the descriptive statistics of these indicators. Table 4.2 shows the frequency and percentage of the gender of the investors. From the table male respondents were the majority with 58.9% while female respondents were 41.1% of the group. Therefore, there were more men than women participants. It can be deduced from this that men are more eager to take risks in investment than women. Nevertheless, the difference is not that large, so women are also venturing into equities.

Table 4.2: Frequency Distribution of Gender

Gender		**Frequency**	**Percent**
Valid	Male	159	58.9
	Female	111	41.1
	Total	270	100.0

The respondents belonged to different age groups and their distribution is as reflected in Table 4.3 below. The highest percentage 43.3% went to the group of 36 to 45 years old. The next group which had 22.2% was of 26 to 35 years. The 46 to 55 years old had 15.9% followed by the 15 to 25 years old with 12.6 % then finally the 56 years old and over who constituted 5.9%. The age group of 36 to 45 is characterized by persons who are settling in their career and who may want to invest for more income and for the future.

Table 4.3: Frequency Distribution of Age

Age		Frequency	Percent
Valid	15 - 25 years	34	12.6
	26 - 35 years	60	22.2
	36 - 45 years	117	43.3
	46 - 55 years	43	15.9
	56 and over	16	5.9
	Total	270	100.0

The frequency and percentage of the marital status of the respondents is reflected Table 4.4 below. The married investors formed the largest group with 60% followed by the singles at 38.1% and the widows with 1.9 % were the smallest group. The married respondents formed the majority because they would be interested in investing for future family expenses or to have a secure retirement.

Table 4.4: Frequency Distribution of Marital Status

Marital Status		Frequency	Percent
Valid	Married	162	60.0
	Single	103	38.1
	Widowed	5	1.9
	Total	270	100.0

Table 4.5 below reflects the distribution of the number of children belonging to the respondents. Those who had 0-1 children constituted 43.3% of the respondents, while those who had 2-3 children had a score of 43.7% and they were the biggest group. The smallest group was of those with 4 and above children with 13%. This distribution of the two top groups could indicate people who have some income to spare and opted to invest it.

Table 4.5: Frequency Distribution of Children

Number Of Children Range		Frequency	Percent
Valid	0 - 1 child	117	43.3
	2 - 3 children	118	43.7
	4 and above children	35	13.0
	Total	270	100.0

The distribution of frequencies and percentage of the level of education is shown in table 4.6 below. The Master's degree holders, which was the largest group obtained 44.1% with Bachelor's degree holders being the next with 38.5%. Those how had doctorates had 5.9%, Diplomas had 7% while certificate holders formed the smallest group with 4.4%. Since investing in stocks is complex the frequencies below show that those with higher learning and perhaps better understanding are the ones who mostly venture into stocks investment.

Table 4.6: Frequency Distribution of the Level of Education

Level of Education		Frequency	Percent
Valid	Doctorate	16	5.9
	Master	119	44.1
	Bachelors' Degree	104	38.5
	Diploma	19	7.0
	Certificate	12	4.4
	Total	270	100.0

4.5.2 Investor Sentiment

This study investigated three types of investor sentiment which were; joy_optimism, neural_objective and sad_optimism. Table 4.7 shows that the means of the indicator lay

between 1.51 and 2.59 majority of the means were more than two indicating that the respondents tended to optimism. All the standard deviations of the indicators were more than 1 meaning they fell outside the .68 area under the bell shape which represents one standard deviation implying that the data was dispersed from the mean. Three indicators were positively skewed while the other four were negatively skewed implying that they data was not normally distributed. All the indicators were platykurtic as indicated by the negative figures this is further confirmed by the high standard deviation implying the presence of outliers. The coefficient of variation was below .6 which shows that there was relatively low dispersion and therefore the data could be statistically analysed.

Table 4.7: Descriptive Statistics of Joy-Optimism

Joy Optimism	N	Mean	SD	Skewness	Kurtosis	CV
Information source Family + Friends	270	1.93	1.014	.085	-.53	.525
Information source Financial Consultant	270	2.18	1.114	-.039	-.374	.511
Information source Past Experience	270	2.59	1.11	-.195	-.097	.429
Information source Financial Statement	270	2.36	1.322	-.138	-.646	.560
Information source Experienced Investor	270	2.34	1.202	.099	-.472	.514
Information source Newspapers, Tweeter, Facebook TV News	270	2.24	1.213	-.063	-.087	.542
Information source Investment Report	270	2.07	1.345	.118	-.835	.650
Information source AGM	270	1.51	1.278	.535	-.371	.846
Valid N	270					

N = Number of observations, SD = Standard Deviation, CV = Coefficient of variation

Table 4.8 shows that the means of the indicators ranged from 2.85 to 4.85 and majority of the means were close to three implying that they were neither optimistic nor pessimistic but neutral and objective. The standard deviations were between .99 and 1.467 with a majority of them above one meaning that they were outside the .68 area under the bell shape which

represents one standard deviation. This means that the data was spread away from the mean. Nevertheless, the indicators coefficients of variation which shows the dispersion relative to the mean were all below .5 the implication being that the data was good for statistical analysis. Three indicators were negatively skewed while the other three were positively skewed implying that the distribution of the data was not normal. The indicators were all platykurtic as indicators by the negative figures and confirmed by the high standard deviation meaning that data was dispersed from the mean.

Table 4.8: Descriptive Statistics of Neutral-Objective

Neutral-Objective	N	Mean	SD	Skewness	Kurtosis	CV
Complication of financial statements	270	2.85	1.389	.207	-1.277	.487
AGM attendance	270	3.94	1.127	-.957	-.007	.286
High stock performance expectation	270	3.05	1.271	-.222	-1.045	.417
Moderate stock performance expectation	270	3.27	0.99	-.596	-.246	.303
Low stock performance expectation	270	2.93	1.223	.277	-.896	.417
Negative stock performance expectation	270	2.94	1.467	.174	-1.378	.499
Frequency of trading at NSE	270	4.85	1.276	-1.136	.785	.263
Valid N	270					

N = Number of observations, SD = Standard Deviation, CV = Coefficient of variation

Table 4.9 shows that the highest mean went to Stock market performance is average with 3.17 and the lowest was Stock information provision at NSE with .71. Most the means were more than two indicating that respondents were pessimistic. The standard deviation spread from .773 to 1.283. Three indicators had a standard deviation that was greater than one meaning they fall outside the .68 area under the bell shape of a normal curve. This area represents one standard deviation since the outcome was greater than one, that data was more dispersed from the mean. The coefficient of variation ranged from 1.052 to .327 further six indicators had

outcomes that were lest than .1 which means that the data could be subjected to statistical analysis since the level of dispersion was relatively low. The indicators were all platykurtic implying that the standard deviation was high and indicating the presence of outliers in the data. Three indicators were negatively skewed while the other four were positively skewed meaning that the data was not normally distributed.

Table 4.9: Descriptive Statistics of Sad-Pessimism

Sad-Pessimism	N	Mean	SD	Skewness	Kurtosis	CV
Stock prices are declining	270	1.51	.887	-.28	-.707	.587
Stock prices are rising	270	1.56	.773	-.114	-.348	.496
Stock market performance is declining	270	2.89	1.264	.037	-1.117	.437
Stock market performance is average	270	3.17	1.037	-.319	-.632	.327
Stock market performance is good	270	3.09	1.283	.028	-1.085	.415
Stock information provision at NSE	270	.71	.847	.803	-.526	1.193
Stability of economic environment	270	.94	.888	.606	-.483	.945
Stability of political environment	270	.81	.852	.699	-.453	1.052
Valid N	270					

N= Number of observations, SD = Standard Deviation, CV = Coefficient of variation

4.5.3 Risk Appetite

Table 4.10 shows that the means of all the indicators were ranging between 2.13 and 3.27 which shows that the investors were risk seeking since they had a score of more than two. The standard deviation ranged from .956 for Loan for assets to 1.406 for Maximum time to invest 70% before it is needed for investment. All the indicators except Loan for assets = .956 had a standard deviation that was greater that one meaning that the data was not clustered around the mean but spread out. The coefficient of variation was between .420 for Loan for assets and .539 for Stocks trade knowledge level this means that the dispersion around the mean was relatively low and thus the data can be analysed statistically.

Stability of income had .777 for skewness and stocks trade knowledge got .651 implying that the two indicators were skewed to the left and hence they were not normally distributed. Loan for assets with -.084 and Maximum time for investing 70% income before needing it for investment was -.085 therefore, they were negatively skewed and not normally distributed thus appropriate statistical analysis should be applied. All the indicators were platykurtic since they all had negative outcome which indicates the presence outliers this is confirmed by the standard deviation which is greater than one.

Table 4.10: Descriptive Statistics of Risk Seeking

Risk Seeking	N	Mean	SD	CV	Skewness	Kurtosis
Stability of current income	270	2.13	1.100	.518	.777	-.348
Loan for NSE assets	270	2.27	.956	.420	-.084	-1.087
Stocks trade knowledge level	270	2.24	1.205	.539	.651	-.965
Max time to invest 70% income before it is needed for expenses	270	3.27	1.406	.429	-.085	-1.392
Aggregate score	270	2.48	1.17	.471		

N = Number of observations, SD = Standard Deviation, CV = Coefficient of variation

which was meant that most respondents selected the third option of the item which was to invest for the future. Therefore, the investors would not be ready for risky assets since they are looking for security of income.in the future. The standard deviation of reason for investment was 1.166, the coefficient of variation was .383, the skewness was to the right of .098 and it was platykurtic with a peakedness of -.599. The lowest mean of 1.83 belonged to the indicator high income and high risk assets which showed that most respondents were averse to this type of investment. The standard deviation was .865, coefficient of variation was .472, it was skewed to the right with a value of 1.023 and it was platykurtic with a kurtosis of 1.299.

Table 4.11 presents the descriptive statistics of risk aversion and the means of the indicators were between 1.83 and 3.04 since majority of the indicators were close to 2 it showed that they opted for low risk and avoided risky options. The standard deviation ranged from .825 to 1.166 further two indicators were outside the normal curve range of one standard deviation while the other three were within. The coefficient of variation was below .5 which means that the dispersion was relatively low and the data could be statistically analysed. Two indicators were positively skewed while the other one was negatively skewed thus the data was not normally distributed. Only one indicator leptokurtic and it is confirmed by the low standard deviation showing that the data was clustered around the mean. The other indicators were platykurtic and they had high standard deviations showing that they were dispersed from the mean and therefore the data was not bell shaped.

Table 4.11: Descriptive statistics of Risk Aversion

Risk Aversion	N	Mean	SD	CV	Skewness	Kurtosis
High Income and High-Risk assets	270	1.83	.865	.472	1.023	1.229
Balanced Portfolio	270	2.30	1.096	.476	.467	-.337
Volatile investments	270	2.41	.825	.343	-.601	-.632
Reason For Investment	270	3.04	1.166	.383	.098	-.599
Aggregate score	270	2.40	.99	.412		

N = Number of observations, SD = Standard Deviation, CV = Coefficient of variation

4.5.4 Stock Returns of Individual Investors at the NSE

The descriptive statistics of stock returns which was measured using Sharpe Ratio are shown in Table 4.12 below. Sharpe Ratio was computed using the following inputs; portfolio return, risk free rate and standard deviation of the portfolio. The inputs of portfolio return were stock

data, dividends paid and the beginning and end of month market prices. The asset prices and dividends paid which were needed to derive the portfolio return, were obtained from the NSE library at a fee. The 91-day Treasury bill rates were accessed through the Central Bank of Kenya website and they were the proxy for the risk-free rate.

From Table 4.18 below, Sharpe Ratio had a mean of -2.082 and a standard deviation of 2.008 which was quite high indicating a high level of dispersion. The highest return was .118, the lowest was -24.2447 and the mode was -1.734 implying that the performance of the stocks between 2016 and 2020 was low and therefore majority of the investors got negative returns. The coefficient of variation was high meaning that there were outliers and it is confirmed by the wide range between the highest and lowest mean. The kurtosis was 58.433 which was leptokurtic indicating that the data was very clustered around the mean. The high kurtosis is confirmed by the high range between the highest and lowest mean. The data was skewed to the right with a value of -6.250 indicating that majority of the investors had low returns that pulled the curve to the right implying that the data was not normally distributed. Therefore, stock returns were not normally distributed so non parametric means were used for more statistical analysis.

Table 4.12: Descriptive Statistics of Sharpe Ratio

	Mean	**Mode**	**SD**	**Maximum**	**Minimum**	**CV**	**Kurtosis**	**Skewness**	**N**
Sharpe Ratio	-2.082	-1.734	2.008	.1187	-24.245	4.030	58.433	-6.250	270

N = Number of observations, SD = Standard Deviation, CV = Coefficient of variation

4.6 Regression Diagnostics

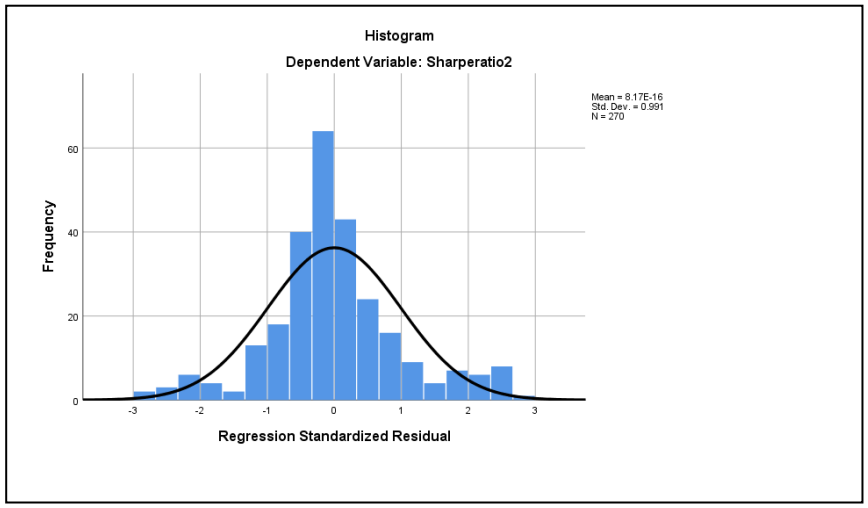
Table 4.13 below shows the outcome of Shapiro-Wilk which was applied to test normality in Sharpe Ratio, investor sentiment and risk appetite. The null hypothesis of the test premises that the data is not significantly different from a normal distribution. The results of the test were as follows; Sharpe ratio (W-stat=.518, $p < .01$), investor sentiment (W-stat=.988, $p < .01$) and risk appetite (W-stat=.985, $p < .01$) which meant that they were significant since the p value was lower than .05. Thus, the null hypothesis that the distribution was not different from normal was rejected. Further, the three variables were not normally distributed but skewed and consequently, Spearman's rank coefficient which does not require the normal distribution of data was applied to conduct the correlational analysis of the variables.

Table 4.13: Shapiro-Wilk Test

	Sharpe Ratio	**Investor Sentiment**	**Risk Appetite**
W-stat	.518	.988	.985
p-value	0	.024	.007
Alpha	.05	.05	.05
Normal	No	No	No

Figure 4.1 below presents the histogram of the regression standardized residual with a line plotted to join the mid-points of the bars. The line shows that the distribution or the regression residual was bell shaped. The histogram below shows that the mean of the error term was $8.174\ e^{-16}$ which is close zero and the standard deviation was .991 which when rounded off to the nearest is one. This implies that the residual was not related to the independent variable. Consequently, the conclusion was that the regression model was suitable for analysis.

Figure 4.1: Histogram of the Regression of Sharpe Ratio Standardized Residual



Homoscedasticity was tested using Breusch-Pagan and White test the results of which are shown below in Table 4.14. Breusch-Pagan had the following outcome (LM stat =.358, p > .05) and (F=.356, p > .05) while White Test had (LM stat =.556, p > .05) and (F =.275, p > .05). The results of both tests were not significant therefore the null hypothesis that the data had heteroscedasticity or that the error term could predict the independent variable was rejected. Thus, the study concluded that homoscedasticity existed in the data.

Table 4.14: Homoscedasticity Test

Sample size	269			
Independent variable	1			
Breusch-Pagan			**White Test**	

LM stat	.358		LM stat	.556
Df	1		Df	2
p-value	.549		p-value	.757
F stat	.356		F stat	.275
df1	1		df1	2
df2	267		df2	266
p-value	.551		p-value	.760

Table 4.15 below shows the ANOVA results which were used to test linearity in the study. The F-statistics were as follows (F = .946, p > .05) this implied that the model was not significant and therefore the change in the predictor was not related to the change in the dependent variable hence that linearity did not exist.

Table 4.15: ANOVA

Model		Sum of Squares	df	Mean Squares	F	Sig.
1	Regression	11.448	3	3.816	0.946	.419[b]
	Residual	1072.712	266	4.033		
	Total	1084.160	269			

a. Dependent Variable: Sharpe Ratio

b. Predictors: (Constant), Joy_Optimism, Neutral_Objective , Sad_Pessimism.

Durbin-Watson was applied to measure autocorrelation which occurs when a variable is related to itself such that it can predict the following intervals. It also means that the error term can project itself in a series. The values of Durbin-Watson lie between 0 and 4 Table 4.16 below shows that the D-statistic as 1.522 and since it is between 1.5 and 3.0 it can be deduced that there was no autocorrelation in the variables.

Table 4.16: Durbin-Watson

Alpha	0.05
D-stat	1.522
D-lower	1.792668
D-upper	1.807578
Sig	No

Collinearity was tested using Variance Inflation Factor (VIF) which is an inverse of Tolerance, the result of this analysis are reflected in Table 4.17 below. O'Brien (2007) recommends that VIF should not be more than 10 because beyond that value multicollinearity would exist and one of the highly correlated variables would have to be dropped. From the results below all the VIF values were below 2 therefore multicollinearity was not present.

Table 4.17: Collinearity Statistics

	Tolerance	**VIF**
(Constant)		
Joy_Optimism	0.638	1.566
Neutral_Objective	0.870	1.149
sad_optimism	0.687	1.455
Gender	0.929	1.077
risk_seeking_appetite	0.810	1.234
risk_aversion_appetite	0.876	1.142

4.7 Correlation Analysis of the Variables

This section presents the correlation analysis performed among the indicators. The independent variables in this study were categorical since sentiment was grouped into three; joy-optimism, neutral-objective and sad-optimism and risk appetite also had two categories which are risk averse and risk seeking. Sharpe ratio was the dependent variable and it was found to be skewed as it was not normally distributed. Spearman's coefficient (r_s) was used when in the correlation analysis Sharpe ratio was one of the variables. Spearman's correlation does not make any assumptions about the data and so it can reliably be used for non-normal distribution. The value of Spearman's correlation coefficient lies within the following limits $-1 \leq r_s \leq +1$. The closer the value is to -1 the stronger the negative correlation and the closer it is to +1 the stronger the positive relationship. This means that in the case where the Spearman's coefficient is 1 otherwise known as perfect correlation, an increase in one variable leads to an equal increase in the other term. In the case of perfect and negative correlation where the value of the coefficient is -1, an increase in one variable leads to an equal decrease in the other term (Sekaran & Bougie, 2016).

4.7.1 Correlation between Investor Sentiment and Sharpe Ratio

Table 4.18 below presents the correlation between Sharpe ratio and investor sentiment (joy_ optimism, neutral-objective, sad-pessimism) was conducted using Spearman's rank correlation. Sharpe ratio had a positive and significant relationship with sad-pessimism ($r=.142$, $p < .05$). Joy-optimism had a negative and significant relationship with neutral-objective ($r=-.347$, $p < .01$) and a positive and significant relationship with sad-pessimism ($r=.457$, $p < .01$). Neutral-objective had a negative and significant relationship with sad-pessimism ($r=-.256$, $p < .01$).

Table 4.18: Correlation between Investor Sentiment and Sharpe Ratio

Spearman's rho	Sharpe Ratio	Joy_Optimism	Neutral_Objective	Sad_Pessimism
Sharpe Ratio	1.000	0.001	-0.078	.142*
Joy_Optimism		1.000	-.347**	.457**
Neutral_Objective			1.000	-.256**
Sad_Pessimism				1.000

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed). N=270

4.7.2 Correlation between Investor Sentiment and Risk Appetite

The correlation matrix between investor sentiment (joy_optimism, neutral-objective, sad-pessimism) and risk appetite (risk-seeking and risk-aversion) is shown below in Table 4.19. The table shows that joy-optimism had a negative and significant relationship with neutral-objective ($r=-.347$, $p < .01$). In addition, joy-optimism had a positive and significant relationship with sad-optimism ($r=.457$, $p < .01$), risk-seeking ($r=.411$, $p < .01$) and risk aversion ($r=-.265$, $p < .01$). Neutral-objective had a negative and significant relationship with sad-optimism ($r=.256$, $p < .01$), risk-seeking ($r=-.149$, $p < .05$) and risk aversion ($r=-.126$, $p < .05$). Sad-pessimism had a positive and significant relationship with risk-seeking ($r=.303$, $p < .01$) and risk aversion ($r=.246$, $p < .01$). The relationship between risk seeking and risk-aversion was not significant.

Table 4.19: Correlation between Investor Sentiment and Risk Appetite

Spearman's rho	Joy_Optimism	Neutral_Objective	Sad-Pessimism	Risk_Seeking	Risk_Aversion
Joy_Optimism	1.000	-.347**	.457**	.411**	.265**
Neutral_Objective		1.000	-.256**	-.149*	-.126*
Sad_Pessimism			1.000	.303**	.246**
Risk_Seeking				1.000	0.118
Risk_Aversion					1.000

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed). N=270

4.7.3 Correlation between Risk Appetite and Sharpe Ratio

Table 4.20 below reflects the correlation between risk seeking, risk aversion and Sharpe Ratio. The results show that the indicators were not significantly related to Sharpe Ratio. The reason for this could be because of the uncertainty experienced by investors due to the political climate in the country. During periods of intense campaigns, investors tend to panic and withdraw from the market as was established by (Kabiru, Ochieng', & Kinyua, 2015). Therefore, the outcome below reflected the crisis that was there in the market whereby it was difficult to establish trends and relationships. In addition, the pandemic also impacted the NSE intensifying the already volatile climate in the market (Koskei, 2021).Thus, the two circumstances led to a situation in the market that was unprecedented and so it confused investors. Risk appetite is an important variable in a study on investor sentiment therefore even though it does not have a significant relationship with Sharpe ratio it cannot be dropped from the study (Gai & Vause, 2018). In addition, when the indicators are interacted with the other variables in the study the outcome is significant.

Table 4.20: Correlation between Risk Appetite and Sharpe Ratio

Spearman's rho	Sharpe Ratio	Risk_ Seeking	Risk_ Aversion
Sharpe Ratio	1.000	-0.057	0.102
Risk_Seeking		1.000	0.118
Risk_Aversion			1.000

N=270

4.7.4 Correlation among Investor Sentiment and Risk Appetite and Sharpe Ratio

The correlation between investor sentiment (joy-optimism, neutral-objective and sad-pessimism) and risk appetite (risk-seeking and risk aversion) is shown in Table 4.21 below.

The results show that Sharpe Ratio had a positive and significant relationship with sad-pessimism (r=.142, p < .05). Risk seeking had a positive and significant relationship with joy-optimism (r= .411, p < .01) and sad-pessimism (r= .303, p < .01). On the other hand, risk seeking had a negative and significant relationship with neutral-objective (r= -.149, p < .05). The relationship between risk aversion and joy-optimism was positive and significant (r=.265, p < .01) and also with sad-pessimism (r=.246, p < .01). However, risk aversion had a negative and significant relationship with neutral-objective (r= -.126, p < .05). Joy-optimism had a negative and significant relationship with neutral-objective (r= -.347, p < .01) and positive and significant relationship with sad-pessimism (r= .457, p < .01). Neutral-objective had a negative and significant relationship with sad-pessimism (r= -.256, p < .01).

Table 4.21: Correlation of Investor Sentiment, Risk Appetite and Sharpe Ratio

Spearman's rho	Sharpe Ratio	Risk_ Seeking	Risk_ Aversion	Joy_ Optimism	Neutral_ Objective	Sad Pessimism
Sharpe Ratio	1.000	-0.057	0.102	0.001	-0.078	.142*
Risk_Seeking		1.000	0.118	.411**	-.149*	.303**
Risk_Aversion			1.000	.265**	-.126*	.246**
Joy_Optimism				1.000	-.347**	.457**
Neutral_Objective					1.000	-.256**
Sad_Pessimism						1.000

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

N=270

4.8 Chapter Summary

The content of this chapter included details of the descriptive statistics, the response rate, the regression diagnostics and the correlation of the study variables. Correlation was done using Spearman's rho since the data was not normally distributed. The study was targeted at the

individual investors at the NSE. The rate of response was 70.3 % representing 270 completed questionnaires out of a possible 400 which were distributed. The tests of reliability showed that Cronbach for investors sentiment was .703 and for risk appetite was .50 which lies within the acceptable level.

The descriptive characteristics of the investors showed that out of the 270 respondents, majority of the investors were male 58.9% while the female counterparts were 41.1% of the entire group, this is expected to be so since men tend to be more risk seeking than women. The biggest age group was between 37 to 45 years old with 43.3% and the 56 year olds and over were the fewest respondents and they got 5.9%. This meets the expectation that people within 37 to 45 years old are usually settled in their career and so they have some extra money to invest and are likely to be married with some children. Most of the participants were married and they were 60% of the group with the fewest investors being widowed and they got 1.9%.

Respondents with 2-3 children got the highest percentage of 43.7% which was closely followed by the participants with either none or one child who had 43.3%. These two categories formed 87% of the entire group while the other 13% represented those with four and above children. In terms of education most participants had at least one degree, the Bachelors' degree holders had 38.5% while the Masters holders got 44.7% and were the largest group. Doctorate holders were 5.9% of the group and thus the total percentage of respondents who held at least one degree constituted 88.5% of the participants. Higher education could translate into increased pay with some extra for investment which would

explain why the Masters holders were the most participants at the NSE compared to the ones with lower qualifications.

Respondents were asked questions related to investor sentiment which were categorized into joy-optimism, neutral-objective and sad-pessimism. The descriptive statistics of joy-optimism showed that the most popular source of investment information was past experience with the highest mean of 2.59 and a standard deviation of 1.1. Information from the AGM had a mean of 1.51 and a standard deviation of 1.278 which made it the least frequented source of investing information. The descriptive statistics of neutral-objective showed that most respondents were not overactive traders as the mean for trading annually was the highest at 4.85 with a standard deviation of 1.276. The opinion about financial statements being complicated had the lowest mean of 2.85 with a standard deviation of 1.389 implying that respondents were neutral about the financial statements.

The means of most the items under the neutral-objective category were close to 3 which implied that the respondents were neutral about the questions asked. The standard deviation and coefficient of variation of all indicators were low indicating that there was consistency of data. The third indicator of investor sentiment was sad-pessimism had 8 items of enquiry under it. The expectations about the market performance being average and not being good had the highest mean of 3.17 and a standard deviation of 1.037. Stability of political environment got the lowest mean of .81 and a standard deviation was .852. This revealed that the respondents were pessimistic about the market and stability of the political environment.

The descriptive statistics of risk seeking appetite showed that the respondents had some risk seeking tendency since the option of investing 70% of one's wealth for 3-4 years before it was needed for expenses had the highest mean of 3.27 and a standard deviation 1.406. Hence the respondents could risk the money in investment without needing it for 3 to 4 years. Stability of current income got the least mean of 2.13 with a standard deviation of 1.1 implying that income was somehow stable. The mean of most of the indicators was more than three which meant that the investors could handle risk. Risk aversion statistics showed that reason for investment got the highest mean of 3.04 and the standard deviation was 1.166 which implied that the respondents invested for the future so they were not ready for risky assets. High income and high-risk assets had the lowest mean of 1.83 and a standard deviation of .865 which revealed that the respondents preferred more balanced investments.

Stock returns were approximated using Sharpe (1964)'s ratio, because it is a versatile tool for measuring performance compared to Treynor (1965)'s ratio and Jensen (1968)'s alpha. The measurement power of Sharpe ratio is derived from including the total risk of an asset in the model. The inputs of Sharpe ratio are portfolio return, the standard deviation of the portfolio and the risk-free rate. The inputs of portfolio return were stocks data, dividends paid and the beginning and end of month market prices which were obtained from the NSE library. The mean of Sharpe ratio was -2.082, the standard deviation was 2.002 and a mode of -1.734, the highest return was .118 while the lowest was -24.2447. These statistics revealed that the performance of the stocks during the study was low and majority of the participants got negative returns. The NSE was negatively affected by the events that were taking place in the political arena between 2016 to 2020 and the effects of Corona-Virus Pandemic.

The regression diagnostics considered necessary for the study were tests of normality, homoscedasticity, collinearity, autocorrelation, linearity and normality of the error term. Shapiro-Wilk was applied to test normality and the outcome was Sharpe ratio (W-stat=.518, $p < .01$), investor sentiment (W-stat= .988, $p < .05$) and risk appetite (W-stat= 985, $p < .01$) which meant that the variables were significant and therefore they were not normally distributed thus Spearman's rho was used for correlation analysis. The histogram below shows that the mean of the error term was 8.174e-16 which is close zero and the standard deviation was .991 which is almost amounted to one meaning there was normality in the data.

Homoscedasticity was tested using Breusch-Pagan and White test. Breusch-Pagan results were (LM stat=.358, $p > .05$) and (F=.356, $p > .05$) and White Test (LM stat=.556, $p > .05$) and (F=.275, $p > .05$). Since the outcome was significant, the null hypothesis that the data has heteroscedasticity was rejected. ANOVA was used to test linearity between the independent and dependent variables but the results of the analysis were not significant (F=.946, $p > .05$) which meant that they were not significantly related thus, linearity did not exist. The value of Durbin-Watson was 1.522 indicating that there was no autocorrelation since this value was between 1.5 and 3.0. The values of VIF for all the variables of the study were below 2 which meant that multicollinearity was not significant since they did not reach the benchmark of 10.

Correlation analysis was conducted between investor sentiment (joy_optimism, neutral-objective, sad-pessimism) and Sharpe ratio. The results showed that Sharpe ratio only had a positive and significant relationship with sad-pessimism ($r=.142$, $p < .05$). The correlation between investor sentiment (joy_optimism, neutral-objective, sad-pessimism) and risk appetite (risk-seeking and risk-aversion) revealed that joy-optimism had a positive and

significant relationship with sad-pessimism (r=.457, $p < .01$), risk-seeking (r=.411, $p < .01$) and risk aversion (r=.265, $p < .01$).

Neutral-objective had a negative and significant relationship with sad-pessimism (r=-.256, $p < .01$), risk-seeking (r=-.149, $p < .05$) and risk aversion (r=-.126, $p < .05$). Sad-pessimism had a positive and significant relationship with risk-seeking (r=.303, $p < .01$) and risk aversion (r=.246, $p < .01$). The correlation between risk appetite (risk seeking and risk aversion) and Sharpe ratio showed that they were not significantly related. The reason for this outcome could be because of the uncertainty experienced by investors due to the unstable political climate in the country and the pandemic which complicated the risk attitude of the market participants. The economic crisis brought about by the pandemic also led to the closure of the bourse for 11 months in the year 2020 which contributed to further confusion among investors. Risk appetite was maintained in the study because of its importance in studying investor behaviour in addition it became significant when it was interacted with other variables.

CHAPTER FIVE: HYPOTHESIS TESTING AND DISCUSSION OF THE FINDINGS

5.1 Introduction

This chapter covered the tests conducted on the hypotheses of this study and the interpretation of the statistics. Goodness of fit tests like, coefficient of determination (R^2) and t-tests were discussed here. ANOVA was included to test the significance of the model. The regression models were also included in the chapter. The null hypotheses tested and discussed were on the relationships among investor sentiment, demographic characteristics, risk appetite and stock returns. The first hypothesis states that there is no significant relationship between sentiment and stock return, the second premises that risk appetite does not have a significant mediating effect on the relationship between investor sentiment and stock returns. The third null hypothesis stated that demographic characteristics do not have a significant moderating influence on the relationship between investor sentiment and risk appetite. The fourth hypothesis premised that there was no joint relationship of sentiment, risk appetite, demographic characteristics on stock returns and it was also tackled in this chapter. The last part of the chapter includes a discussion of the findings from testing the hypotheses.

5.2 Relationship between Investor Sentiment and Stock Returns

The first objective of the study was to establish the relationship between sentiment and stock returns of individual investors at the NSE. The prediction of the study was that there was no significant relationship between sentiment and stock returns. The indicators of sentiment (independent variable) were joy-optimism, neutral-objective and sad-pessimism while stock

returns (dependent variable) were measured using Sharpe ratio. The null hypothesis for testing this relationship was as shown below:

H_1: There is no significant relationship between sentiment and stock returns of individual investors at the NSE.

The hypothesis was tested using the following equation:

$$\mathbf{SR = \beta_0 + \beta_1 IS + \varepsilon}$$

Where;

β_0, β_1, SR and IS and ε are as explained in 3.10.2

Stepwise regression is a method of establishing how the variance in a dependent variable is affected by the addition and removal of variables. This method was adopted by the study to establish which variables make a difference in the relationship between investor sentiment and Sharpe ratio. The statistical programme R was used to conduct this analysis. Table 5.1 shows $\overline{R}^2 = .001$ meaning that investor sentiment could only explain 0.1% of the change in Sharpe Ratio other factors not included in the model such as the panic resulting from the pandemic may have impacted the model. The outcome of ANOVA shows that ($F=.946$, $p > .05$) which means that the model was not significant therefore it cannot be used to predict stock returns of individual investors. Table 5.1 further shows that the outcome of the coefficient tests were as follows; constant ($\beta_0=1.819$, $p > .05$) and investor sentiment ($\beta_1=-.296$, $p > .05$). None of the coefficients was significant since all had $p > .05$, hence, the study failed to reject the null hypothesis that there is no relationship between investor sentiment and Sharpe Ratio.

Table 5.1: Regression between Investor Sentiment and Sharpe Ratio

Variable	Model[a]
Constant	-1.819(.126)
Joy_Optimism	-.296(.150)
Neutral_Objective	.007(.979)
Sad_Pessimism	.301(.159)
F	.946(.419)
$\overline{R}^2$	-.001

p-value in (parenthesis)
a. Predictors: (Constant), Joy_Optimism, Neutral_Objective , Sad_Pessimism.
b. Dependent Variable: Sharpe Ratio

5.3 Relationship among Investor Sentiment, Risk Appetite and Stock Returns

The second hypothesis of the study had predicted that the mediation effect of risk appetite was not significant in the relationship between sentiment and stock returns. The study analysed the mediation effect using the method proposed by Hayes (2009). Stock returns, which was the dependent variable, was measured by Sharpe Ratio. The null hypothesis was as shown below:

H_2: There is no significant mediation effect of risk appetite on the relationship between investor sentiment and stock returns of individual investors at NSE.

The hypothesis was tested using the following equation:

$$\mathbf{SR = \beta_0 + \beta_1 IS + \beta_2 RA + \varepsilon}$$

The explanation of the variables of the equation is the same as section 3.10.3

Table 5.2 shows the results of the steps undertaken in the regression. The first model reflects the results of the first step which involved the regressing risk seeking against investor sentiment (joy-optimism, neutral-objective and sad-pessimism). The outcome of the first model was as follows; R^2 =.184 which implied that the model could explain 18.4% of the variation in risk seeking. The F-statistic of the model was (F= 19.994, $p < .01$) meaning that the model was significant and thus investor sentiment had an influence on risk seeking. The coefficients tests had the following output; joy-optimism, (β_1=.3121, $p < .01$) and sad-pessimism (β_1=.1468, $p < .01$). Thus, the coefficients of joy-optimism and sad-pessimism were significant in predicting risk seeking. Consequently, the study rejected the null hypothesis that investor sentiment had no significant influence on Sharpe ratio.

Model two regressed risk aversion against investor sentiment (joy-optimism, neutral-objective and sad-pessimism). The results of the analysis showed that R^2= .114 which means that the model can only explain 11.4% of the variation in risk aversion. The F-statistic of the model was (F= 11.454, $p < .01$) which implied that the model was significant and thus it could be adopted in predicting risk aversion subject to coefficient test results. The outcome of the coefficient tests for the second model were; sad-pessimism (β_1=.121, $p < .01$). Hence, the coefficient of sad-pessimism was significant and it had an influence on risk aversion. Accordingly, the study rejected the null hypothesis that investor sentiment had no effect on risk appetite.

The third step involved regressing Sharpe Ratio against investor sentiment (joy-optimism, neutral-objective and sad-pessimism) and risk appetite (risk seeking and risk aversion). The model had the following outcome R^2= .017 thus it could only explain 1.7% of the change in

Sharpe Ratio. The F- statistic of the model was not significant and therefore, it could not be used to predict Sharpe. Further the coefficient tests were also not significant and thus the study failed to reject the hypothesis that there is no significant mediating effect of risk appetite in the relationship between investor sentiment and stock returns.

Table 5.2: Regression Model of Investor Sentiment, Risk Appetite and Sharpe Ratio

Variable	**Model 1[a]**	**Model 2[b]**	**Model 3[c]**
Outcome	**Risk Seeking**	**Risk Aversion**	**Sharpe Ratio**
Equation	$RS = \beta_0 + \beta_1 JO + \beta_2 NO + \beta_3 SP + \varepsilon$	$RA = \beta_0 + \beta_1 JO + \beta_2 NO + \beta_3 SP + \varepsilon$	$SR = \beta_0 + \beta_1 JO + \beta_2 NE + \beta_3 SP + \beta_4 RS + \beta_5 RA + \varepsilon$
Constant	1.218(.000)	1.778(.000)	-2.13(.116)
Joy_Optimism	.3121(.000)	.106(.0053)	-.267(.222)
Neutral_Objective	-.009(-.157)	.009(.846)	.002(.993)
Sad_Pessimism	.1468(.021)	.121(.002)	.293(.183)
Risk Seeking			-.199(.336)
Risk Aversion			.312(-.349)
F	19.994(.000)	11.454(.000)	.931(.461)
R^2	0.184	0.114	0.017

p-value in (parenthesis)
a. Predictors: (Constant), Joy_Optimism, Neutral_Objective , Sad_Pessimism. Dependent Variable: Risk Seeking
b. Predictors: (Constant), Joy_Optimism, Neutral_Objective , Sad_Pessimism. Dependent Variable: Risk Aversion
c. Predictors: (Constant), Joy_Optimism, Neutral_Objective , Sad_Pessimism, Risk Seeking, Risk Aversion, Dependent Variable: Sharpe Ratio

Table 5.3 below shows the total, direct and indirect effects. The results of the total effect of investor sentiment on Sharpe Ratio (X on Y) was (B=-.2428, p >.05) implying that it was not significant. The direct effect of investor sentiment on Sharpe Ratio (X on Y) was (B= -2161, p > .05) hence it was not significant. The indirect effect of investor sentiment via risk appetite on Sharpe ratio (IS, RA on SR) was (B= -.0267, p > .05). The outcome of Bootstrap was BootLLCI=-.2551 and BootULCI-.1454 which means that the effect was no significant. The indirect effect is the one that tests the existence of mediation influence in a relationship. Thus,

when the effect is not significant it means that there is no mediation. Accordingly, then the second null hypothesis was not rejected by the study since there was no significant mediating influence of risk appetite in the relationship between investor sentiment and Sharpe ratio.

Table 5.3: The Effects of Investor Sentiment, Risk Appetite and Sharpe Ratio

Effects	**Effect**	**se**	**t**	**p**	**LLCI**	**ULCI**
Total effect (IS-SR)	-.2428	.3618	-.6710	.5028	-.9551	.4696
Direct effect (IS-SR)	-.2161	.3806	-.5678	.5706	-.9654	.5332
	Effect	**BootSE**			**Boot LLCI**	**Boot ULCI**
Indirect effect(s) (IS-RA-SR)	-.0267	.1013			-.2551	.1454

Notes:
LLCI-Lower Limit Confidence Interval,
ULCI-Upper Limit Confidence Interval
Level of confidence for all confidence intervals in output: 95%
Number of bootstrap samples for percentile bootstrap confidence intervals: 5000

5.4 Relationship among Investor Sentiment, Demographic Characteristics and Risk Appetite

The third objective of this study was to establish the moderating effect of demographic characteristics in the relationship between investor sentiment and risk appetite of individual investors at NSE. The premise of the study was that there was no significant moderating effect of demographic characteristics in the relationship between sentiment and stock returns. The indicators of sentiment were joy-optimism, neutral-objective and sad-pessimism and the indicators of risk appetite were risk seeking and risk aversion. The indicators of demographics were age, gender, marital status, children and education. The null hypothesis is as shown below:

H_3: There is no significant moderating effect of demographic characteristics in the relationship between investor sentiment and risk appetite of individual investors at NSE.

The hypothesis was tested using the following equation:

$$\mathbf{RA = \beta_0 + \alpha_1(IS) + \alpha_2(DC) + \alpha_3((IS)*(DC)) + \varepsilon}$$

The explanation of the variables of the above equation are similar to section 3.10.4

The analysis of the moderated mediation involved five steps. The first two steps involved estimating the moderation effect of demographic characteristics in the relationship between investor sentiment and risk appetite. Such that the first step consisted of regressing risk appetite against investor sentiment indicators. Then the second step involved regressing risk appetite against investor sentiment indicators and demographic characteristics. The third step had three sections for each of the investor sentiment indicators. In order to forecast risk appetite, the interaction terms were computed for each of the three investor sentiment indicators with the demographic characteristics (**IS*DC**) and then added to the model together with investor sentiment indicators and demographic characteristics. The fourth step estimated the effect on risk appetite resulting from all investor sentiment indicators, demographic characteristics and the interaction terms. The fifth step estimated the moderated mediation effect of risk appetite on Sharpe ratio.

Table 5.4 below shows the outcome of all the steps undertaken to measure the moderated mediation effect of risk appetite. The outcome of the first step which involved the regression of risk appetite and investor sentiment (joy-optimism, neutral-objective and sad-pessimism) was $\overline{R}^2 = .175$ and it meant that the model could explain 17.5% of the variation in risk appetite. The F-statistic of the model was ($F=19.99$, $p < .001$) and it implied that the model was

significant and thus it could be used to predict risk appetite depending on coefficient test results. The coefficients of the first model were; constant (β_0=1.218, $p < .001$), joy-optimism (β_1=.312, $p < .001$) and sad-pessimism (β_3=.147, $p < .01$) consequently they were significant and they made a difference on risk appetite.

In the second step the demographic characteristics (gender, age-group, marital status, children and education) were added to investor sentiment (joy-optimism, neutral-objective and sad-pessimism) and used to estimate risk appetite. The model test results were $\overline{R}^2$ =.187 meaning that it could explain 18.7 % of the variation in risk appetite which was an improvement of 1.2% from the first step. The F-statistic (F=8.713, $p < .001$) was also significant in forecasting risk appetite however, it was a reduction of 11.277 from the model of the first step. The outcome of the coefficient tests of the second model were; constant (β_0= 1.143, $p < .001$), joy-optimism (β_1=.320, $p < .001$), sad-pessimism (β_3=.134, $p < .01$), JO*gender (β_4=.155, $p < .01$) and JO*marital-status (β_5=-.205, $p < .01$) and hence these variables were significant and thus the model could be used to predict risk appetite.

In the first section of the third step the interaction terms (JO*DC) of investor sentiment (joy-optimism (JO)) and demographic characteristics (DC) were computed. Then risk appetite was estimated by regressing the interaction terms (JO*gender, JO*age-group, JO*marital status, JO*children and JO*education), investor sentiment (joy-optimism, neutral-objective and sad-pessimism) and demographic characteristics (gender, age-group, marital status, children and education). $\overline{R}2$ =.186 which implied that 18.6 % of the variation in risk appetite was due to the model however, it was reduction of .1% from the model in step two. F-statistic of was (F=5.737, $p < .001$) which meant that it was significant and could project risk appetite.

However, after adding the interaction terms (JO*DC) the model dropped in strength by 2.976 from the second step. The outcomes of the coefficient's tests were as follows; joy-optimism (β_1= .382, $p < .05$) and sad-pessimism (β_3=.119, $p < .05$).

The second section of the third step involved computing the interaction terms (NO*DC) of investor sentiment (neutral-objective (NO)) and demographic characteristics (DC). The approximation of risk appetite was done by the regression of the interaction terms (NO*gender, NO*age-group, NO*marital status, NO*children and NO*education), investor sentiment (joy-optimism, neutral-objective and sad-pessimism) and demographic characteristics (gender, age-group, marital status, children and education). Tests showed that $\overline{R}^2$ = .181 which meant that 18.1% of the variation in risk appetite was due to the model. Compared to the second step $\overline{R}^2$ reduced by .6 %. The F-statistic was (F=5.569, $p < .001$) hence the model was significant and could be used to estimate risk appetite. This was however a reduction from the second model of 3.144 which was the result of including the interaction terms of neutral-objective and demographic characteristics the model was weakened. The coefficient outcome was as follows; joy-optimism (β_1= .306, $p < .001$) sad-pessimism (β_3=.134, $p < .05$) were the significant variables in forecasting risk appetite.

The third section of the third step consisted of computing the interaction terms (SP*DC) of investor sentiment (sad-pessimism (SP)) and demographic characteristics (DC). Then risk seeking was approximated by the regression of the interaction terms (SP*gender, SP*age-group, SP*marital status, SP*children and SP*education), investor sentiment (joy-optimism, neutral-objective and sad-pessimism) and demographic characteristics (gender, age-group, marital status, children and education). $\overline{R}^2$ =.18 implying that 18% of the variation in risk

appetite could be explained by the model. In comparison to the second step there was a reduction in $\overline{R}^2$ of .7%. The F test outcome was (F=5.555, $p < .001$) which showed that the model was significant subject to coefficient tests however, it was weakened by 3.158 after the addition of sad-pessimism and demographic characteristics interaction terms. The significant coefficient was joy-optimism (β_1= .330, $p < .001$).

The fourth step involved estimating risk appetite by including investor sentiment (joy-optimism, neutral-objective and sad-pessimism), demographic characteristics (gender, age-group, marital status, children and education) and all the interaction terms ((DC*JO) + (DC*NO) + (DC*SP)). The model had $\overline{R}^2$ =.194 and therefore it could explain 19.4% of the variation in risk appetite which was an increase of .7 % above the model in step two. In addition, there was an improvement in $\overline{R}^2$ of .3% compared to step 3.1, an increase of .4% from step 3.2 and of 1% higher than step 3.3. The F-statistic was (F=3.823, $p < .001$) which was significant in forecasting risk appetite but was a reduction in prediction power from step two of 4.89, it was a reduction of 1.914 compared to section 3.1, a reduction of 1.746 in comparison to section 3.2 and a reduction of 1.732 when compared to section 3.3. The coefficient tests outcomes were significant with joy-optimism (β_1= .780, $p < .001$), JO*children (β_{12}=-.114, $p < .05$) and JO*education (β_{13}= -.482, $p < .01$) and SP*children (β_{22}= .578, $p <.001$ therefore the model could be used to predict risk appetite.

The fifth step estimated Sharpe ratio using investor sentiment (joy-optimism, neutral-objective and sad-pessimism), demographic characteristics (gender, age-group, marital status, children and education), the interaction terms ((DC*JO) + (DC*NO) + (DC*SP)) and risk appetite. The statistical tests showed that $\overline{R}^2$ =.126 which implied that 12.6% of the change

in risk appetite was due to the model but it was a decrease of 6.8% in comparison to the fourth step. F-statistic was ($F=2.615$, $p < .01$) and it was significant however it was a reduction in prediction power of 1.208 from the fourth step. The coefficient tests had the following results; joy-optimism ($\beta_1= -2.718$, $p < .001$), sad-pessimism ($\beta_3= 3.062$, $p < .001$), children ($\beta_7= -6.710$, $p < .001$), JO*education ($\beta_{12}= 2.156$, $p < .001$) and SP*children ($\beta_{22}= -3.453$, $p < .001$) thus, they were significant and could predict Sharpe ratio. However, from Table 5.4 below the outcome of the coefficient tests in the fifth and final step show that risk appetite was not significant with ($\beta_{25}= -.096$, $p > .05$). Hence, though the model was significant ($F=2.615$, $p < .01$) but including the effect of risk appetite lowered the prediction power of the equation. The study therefore failed to reject the null hypothesis that there was no moderated mediation effect of risk appetite in the relationship between investor sentiment and Sharpe ratio.

Table 5.4: Regression of Investor Sentiment, Demographic Characteristics and Risk Appetite

	Step 1	Step 2	Step 3.1	Step 3.2	Step 3.3	Step 4 Overall Model	Step 5 Moderated Mediation
DEPENDENT VARIABLE	**Risk_Appetite**	**Risk_Appetite**	**Risk_Appetite**	**Risk_Appetite**	**Risk_Appetite**	**Risk_Appetite**	**Sharpe Ratio**
Independent variables							
Joy_Optimism	0.312***	0.320***	0.382*	0.306***	0.330***	0.780***	-2.718***
Neutral_Objective	-0.009	-0.005	-0.007	-0.039	0.005	0.044	-0.342
Sad_Pessimism	0.147**	0.134**	0.119*	0.134**	-0.138	-0.442	3.062***
Moderating variables							
Gender		0.155**	-0.185	0.788	0.103	0.162	2.183
Marital Status		-0.205**	-0.061	-0.288	-0.27	-0.052	-3.947
Age_ Group		-0.082	-0.606	-0.126	-0.092	-0.981	2.096
Children		-0.02	0.495	0.408	-0.175	1.292	-6.710**
Education		0.147	0.534	-0.534	-0.499	0.068	1.954
Interaction terms							
Joy_Optimism_Gender			0.121			0.132	0.151
Joy_Optimism_Age_Group			0.177			0.196	-0.22
Joy_Optimism_Children			-0.184			-0.314*	0.305
Joy_Optimism_Education			-0.116			-0.482**	2.156***
Joy_Optimism_Marital Status			-0.05			-0.096	0.549
Neutral_Objective_Gender				-0.195		-0.115	-0.593
Neutral_Objective_Age_Group				0.013		0.166	-0.914
Neutral_Objective_Children				-0.138		-0.252	1.072
Neutral_Objective_Education				0.223		0.075	0.029
Neutral_Objective_Marital Status				0.023		-0.002	0.863
Sad_Pessimism_Gender					0.016	-0.014	-0.275
Sad_Pessimism_Age_Group					-0.004	-0.112	0.656
Sad_Pessimism_Children					0.072	0.188	0.93
Sad_Pessimism_Education					0.257	0.578***	-3.453***
Sad_Pessimism_Marital Status					0.033	0.075	-0.358

Mediating variable								
Risk Appetite								-0.096
Constant		1.218***	1.143***	0.938	1.268	1.775***	0.897	-0.061
Observations		270	270	270	270	270	270	270
R-squared		0.184	0.211	0.226	0.22	0.22	0.263	0.204
Adjusted R-squared		0.175	0.187	0.186	0.181	0.18	0.194	0.126
F		19.99	8.713	5.737	5.569	5.555	3.823	2.615
P value		-	0.000	0.000	0.000	0.000	0.000	0.000
	Root MSE	0.595	0.591	0.591	0.593	0.593	0.588	1.877
	****** p<0.01, ** p<0.05, * p<0.1***							

5.5 Relationship among Investor Sentiment, Risk Appetite, Demographic Characteristics and Stock Returns

The fourth objective of this study was to establish the joint effect of sentiment, risk appetite, demographic characteristics and stock returns of individual investors at the NSE. The premise of this investigation was that there was no significant joint relationship among sentiment, risk appetite, demographic characteristics and stock returns of individual investors at the NSE. The null hypothesis was as follows:

H_4: There is no significant joint and sum influence of the independent effects of sentiment, risk appetite and demographic characteristics on stock returns of individual investors at NSE.

The following equation was used to test the hypothesis:

$$\mathbf{SR= \beta_0+ \beta_1 IS+ \beta_2 RA+ \beta_3 DC+ \varepsilon}$$

The explanation of the above variables is given in 3.10.5

Table 5.5 below shows the regression results of the relationship were as follows; $\overline{R}^2$ =.021 thus the model could only explain 2.1% of the variation in Sharpe Ratio. It can be deduced from this outcome that the model was weak as it explained only a small percentage of the change in the dependent variable. The model statistic was ($F=1.588$, $p > .05$) meaning that, it was not significant and hence it cannot be applied to predict Sharpe ratio. The coefficients tests showed that only education was significant ($\beta =.962$, $p < .05$) all the other variables were not significant accordingly, the study failed to reject the null hypothesis (H_4). Therefore, sentiment, risk appetite, demographic characteristics and stock returns of individual investors at NSE did not have a statistically significant relationship.

Table 5.5: Coefficient Test of Investor Sentiment, Risk Appetite, Demographic Characteristics and Sharpe Ratio

Variables	**Coefficients of Model 1[a]**
Outcome	Sharpe Ratio
(Constant)	-2.646(.057)
Joy_Optimism	-.241(.290)
Neutral_Objective	-.148(.572)
Sad_Pessimism	.377(.093)
Gender	.338(.203)
MaritalStatus	-.101(.756)
Age_group	-.348(0.302)
Children	-.373(.276)
Education	.962(.017)
Risk Seeking	-.247(.236)
Risk Aversion	.377(.258)
F	1.588(.110)
$\overline{R}^2$	.021

p-value in (parenthesis)

a. Predictors: (Constant), Joy_Optimism, Neutral_Objective , Sad_Pessimism, Gender, Marital Status, Age-Group, Children, Education, Risk Seeking, Risk Aversion

b. Dependent Variable: Sharpe Ratio

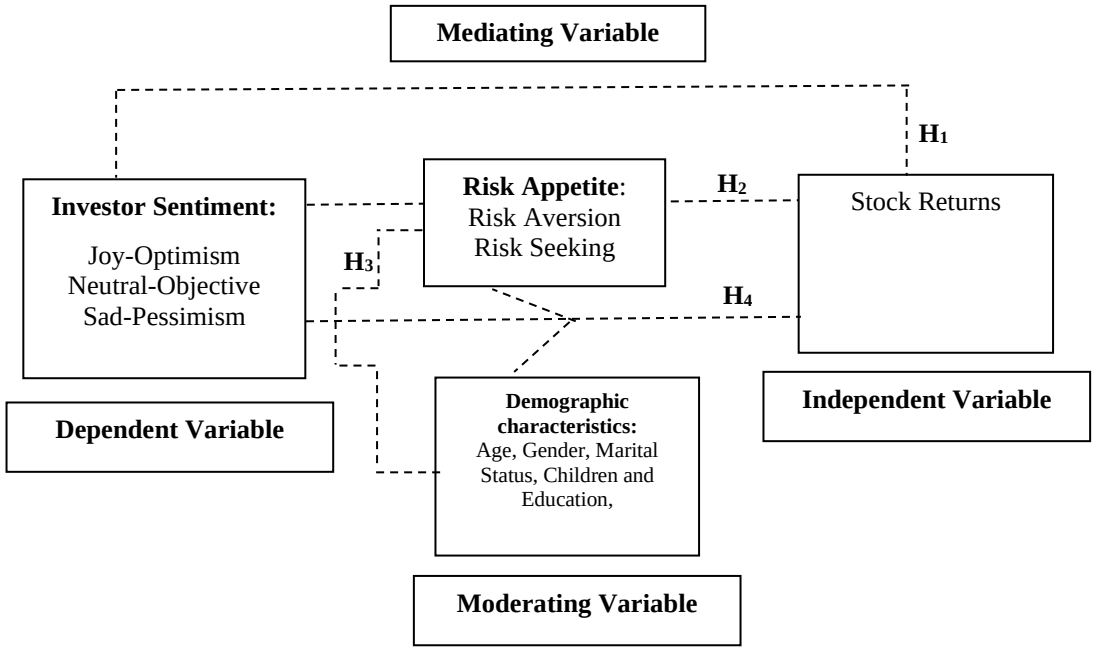
5.6 The Final Conceptual Framework

The general objective of the study was to establish the relationship between investor sentiment and stock returns of individual investors at NSE. The was tested using the first null hypothesis and the outcome reflected as H_1 showed that there was no significant relationship between

investor sentiment and stock returns of investors at the NSE. The second objective was on the relationship among investor sentiment, risk appetite and stock returns of individual investors and is reflected as H_2 in the model below. The outcome of the investigation was that there was no significant mediation effect of risk appetite.

In line with the third objective of the study, the moderated mediation effect of demographic characteristics in the relationship between investor sentiment and risk appetite was tested. The results of the tests were not significant and therefore there is no significant moderated mediation effect this is shown as H_3 in the model below. The fourth and last objective of the study was on the joint effect of the study variables and the test was that there was no significant relationship, shown as H_4 among investor sentiment, risk appetite, demographic characteristics and stock returns of individual investors at the NSE.

Fig 5.1 The Final Conceptual Model



5.7 Discussion of Findings

This chapter was about measuring relationships among the study variables. The general objective of this research was to establish the relationship among investor sentiment, risk appetite, demographic characteristics and stock returns of individuals at the NSE. This section highlights the outcomes of the hypothesis tests carried out in the investigation. The section further presents a discussion of the findings. The section also gives explanations of the outcomes obtained from the tests conducted.

5.7.1 Investor Sentiment and Stock Returns

The first specific objective of this study was to establish the relationship between investor sentiment and stock returns of individuals at the NSE. The research had hypothesized that there was no significant relationship between investor sentiment and stock returns. The investigation was anchored on prospect theory which argues that investors are irrational in making investment decisions. Stepwise regression was used to analyse the relationship. The outcome of the analysis was as shown in Table 5.1 showed that $\overline{R}^2 = .001$ meaning that investor sentiment could only explain .1% of the change in Sharpe Ratio and F-statistic was ($F=.946$, $p > .05$) which was not significant.

Therefore, the model could not be used to predict the stock returns of investors at NSE. Table 5.1 further showed that the coefficient tests were not significant and they were as follows; constant ($\beta_0=1.819$, $p > .05$) and investor sentiment ($\beta_1=-.296$, $p > .05$. Thus, the study failed to reject the null hypothesis that the relationship between sentiment and Sharpe ratio was not

significant. The explanation for such an outcome is that, apart from the disruption caused by the pandemic, which made investors and stocks prices follow unusual trends and closure of the bourse the political climate in the country was very unstable and it affected trading. Another reason for the lack of relationship is that Sharpe ratio was computed using secondary data which is objective and fixed and primary data from investors who are subjective and change depending on what they are going through at a particular moment. At the time when the survey was being conducted the investors were going through the effects of COVID-19 and political uncertainty, which are occurrences that caused unprecedented fear especially in the stocks market (Himanshu, Mushir, & Suryavanshi, 2021). It was a difficult period for making decisions because of closure of business operations including the asset trading.

The outcome of this study agrees with Cherono (2018) which found that investor behaviour was not related to market reactions. Further, these outcomes are contrary to Nyamute (2015) who examined investor behaviour and performance and found that overconfidence negatively affected returns. The current study is opposed to Islam, Mumtaz and Hanif (2020) which studied how investor behaviour contribute to anomalies and established that overconfidence contributed to market fluctuations. The current study contradicts Wenzhao, Su and Duxbury (2021) who investigated the relationship between sentiment and returns and concluded that high sentiments negatively impact returns. Lansing, LeRoy and Ma (2022) researched whether the cause of abnormal returns was irrationality or volatility of macroeconomic factors. They concluded that irrationality influenced abnormal returns.

5.7.2 Investor Sentiment, Risk Appetite and Stock Returns

The second specific objective was to establish the intervening effect of risk appetite in the relationship between investor sentiment and stock returns. This investigation hypothesized that there was no significant mediation effect of risk appetite in the relationship between investor sentiment and stock returns. The regression results of the mediation effect were reflected in Table 5.2 the first model had $\overline{R}^2 = .184$ which explained 18.4% of the change in risk appetite and which could be attributed to investor sentiment. The model statistic was ($F=19.994$, $p < .01$) meaning that was significant and could project risk seeking. The second model had $\overline{R}^2 = .114$ therefore, it could predict 1.4 % of the change in risk aversion. The F-statistic of the model was $F=11.454$, $p > .05$ and it was significant and thus could be applied in predicting risk aversion. However, the last model which estimated Sharpe Ratio using investor sentiment and risk appetite was not significant. Therefore, the study failed to reject the null hypothesis that there was no mediating effect of risk appetite in the relationship between investor sentiment and stock returns. The explanation for this situation is that the climate in the market was volatile with investors being highly uncertain about the future especially after the prices plunged and the market closed due to the recession caused by Corona virus pandemic. This situation caused a lot of disruption in the market in terms of price fluctuations and flight of investment. The economic crisis was worsened by uncertainty in the political arena and the memory of past experience of election related violence.

According to literature risk appetite has the capacity to predict future performance especially during periods of volatility (Gai & Vause, 2018). However, this is contrary to the findings of the current study which found that risk appetite could not predict Sharpe Ratio. The above

study outcomes contradict the findings of Qadan (2019) which found that risk was significant in explaining the power of volatility and returns. The study measured risk using price data from a research centre which is an indirect measurement as compared to a survey done among investors. The current study also contradicts the one by Rashid, Fayyaz and Karim (2019) which found a significant mediating effect of risk in the relationship between sentiment and investment decisions. This study only considered risk tolerance but did not take into account the risk seeking tendency of investors. In addition, the cultural set up where the two studies were conducted was different from the one of NSE.

5.7.3 Investor Sentiment, Demographic Characteristics and Risk Appetite

The third specific objective was to establish the moderating effect of demographic characteristics in the relationship between investor sentiment and risk appetite. The study hypothesized that there would be no significant moderating effect on the relationship between investor sentiment and risk appetite. Table 5.3 depicts the results of the regression which show that $\overline{R}^2$ =.126 which implied that 12.6% of the change in risk seeking was due to the model.

F-statistic was (F=2.615, $p < .01$) and therefore the model was significant. The variables and interaction terms that were significant from the coefficient tests were; joy-optimism (β_1= -2.718, $p < .001$), sad-pessimism (β_3= 3.062, $p < .001$), children (β_7= -6.710, $p < .001$), JO*education (β_{12}= 2.156, $p < .001$) and SP*children ($\beta_{22=}$ -3.453, $p <.001$). The moderated mediation effect of risk appetite was not significant (β_{12}=-2.096, $p > .05$). Therefore, demographic characteristics did not have a moderating influence in the relationship between investor sentiment and risk appetite. The prediction power of the model was weakened when

moderated mediation effect was included. Hence, the study failed to reject the null hypothesis that there was no moderated mediation effect of demographic characteristics in the relationship between investor sentiment and risk appetite.

The above outcome implies that, being pessimistic about the market contributed positively to returns. This is because a unit of Sharpe ratio was similar to 3.062 units of sad-pessimism. On the other hand, a unit of Sharpe ratio was equivalent to -2.718 of joy-optimism meaning that being optimistic led to a reduction in returns. The findings of this study are similar to Olweny, Namusonge and Onyango (2013) which found that there was no significant relationship between demographic factors and risk tolerance. Similarly, Onsomu (2017) and Blake, Cannon and Wright (2021) found that demographic characteristics had no significant moderating effect on investor behaviour and investment decisions.

The outcome of the current study can be explained by the public health crisis and political tension that the investors were facing. The interaction between joy-optimism and education had a positive influence of 2.156 on a unit of Sharpe ratio. This meant that optimism was positively associated to Sharpe ratio when the investor had a high level of education. While on the contrary the interaction between sad-optimism and children had negative effect of -3.453 on a unit of Sharpe ratio. A unit of Sharpe Ratio was equivalent to -6.170 of children which mean they were negatively associated implying that having children led to lower returns since there would be less income to invest.

The findings of the study agree with Onsomu (2014) which established that demographic characteristic had no moderating effect in the relationship between overconfidence and investment strategy. The current study is consistent with the one by Nyamute (2015) which examined the relationship between investor behaviour, demographics and portfolio performance. The study found that demographics had a moderating influence in the relationship between investor behaviour and performance. Lan et al. (2018) investigated which investment options were preferred by investors and found that demographic characteristics determined investor behaviour and asset selection. Dickason and Ferreira (2018) investigated the link between risk tolerance, investor biases and personality. The study found that personality affected risk tolerance which in turn influenced investor biases.

5.7.4 Investor Sentiment, Risk Appetite, Demographic Characteristics and Stock Returns

The fourth specific objective of this study was to establish the joint effect of sentiment, risk appetite, demographic characteristics and stock returns of individuals at the NSE. The study hypothesized that there was no significant joint effect among investor sentiment, risk appetite, demographic characteristics and stock returns. The results of the regression presented in Table 5.4 showed that the model ($F=1.588$, $p > .05$) was not significant in forecasting Sharpe Ratio. The coefficient tests showed that the only significant variable was education ($\beta =.962$, $p < .05$) the study thus failed to reject the null hypothesis. The implications of these findings is that investor sentiment, risk appetite and demographic characteristics jointly do not have an influence on Sharpe Ratio. This however, may have been the case because the period of the

study was characterized by uncertainty due to political instability and a worldwide health crisis caused by the corona-virus pandemic.

The study found that investor preferences affect risk tolerance and affect the decisions they make about investments. In addition, relying on past experience for investment decisions had a negative impact on performance. Musembi, Simiyu and Njoka (2020) determined the influence of investor sentiment and risk factors on the equity market. Koskei (2021) found that the political climate can affect a market and can interfere with the stability of outcomes in research which can explain why the current study did not obtain significant relationships. The study established that risk factors had a positive influence on investor sentiment which consequently improved equity performance. The study was affected by the fact that the pandemic was on going at the time of conducting this research. The respondents of the interview were going through difficult moments and may have affected their participation making their response subjective to the on-going crisis this is similar to (Yang, 2022).

CHAPTER SIX: SUMMARY OF FINDINGS, CONCLUSIONS AND IMPLICATIONS

6.1 Introduction

The objective of this study was to investigate the relationship among sentiment, risk appetite, demographic characteristics and stock returns of individual investors at the NSE. To achieve this objective the study conducted hypothesis tests on the relationships among the four study variables. This chapter presents the findings and conclusions from the investigations conducted on the six hypotheses. The contributions to knowledge, policy and practice that resulted from the findings are also discussed in the chapter. A section in the chapter has been dedicated to the limitations and challenges encountered in the course of the research and it ends with the recommendations for future research.

6.2 Summary of Findings

The first hypothesis (H_{01}) investigated the relationship between investor sentiment and stock returns of individuals at NSE. This in pursuit of the general objective of establishing the relationship between investor sentiment and stock returns. Stepwise regression established that there was no significant relationship ($p > .05$) existed between investor sentiment and Sharpe Ratio. Therefore, the study failed to reject the null hypothesis.

The second hypothesis (H_{02}) investigated the mediating effect of risk appetite in the relationship between investor sentiment and stock returns. This hypothesis was tested in order to achieve the second objective of the study which was to establish the effect of risk appetite in the relationship between investor sentiment and stock returns of individuals at NSE. The

results of testing for the mediating effect was that risk appetite had no significant influence in the relationship between investor sentiment and stock returns ($p > .05$). Hence, the study failed to reject the second null hypothesis.

The third hypothesis (H_{03}) investigated the moderating effect of demographic characteristics in the relationship between investor sentiment and risk appetite. This test was aimed at achieving the third objective of the study. The outcome of the regression analysis showed that there was no moderation effect of demographics in the relationship between investor sentiment and risk appetite since the coefficient tests were not significant ($p > .05$). Thus, the study rejected the fourth null hypothesis.

The fourth hypothesis (H_{04}) examined the joint effect of sentiment, risk appetite, demographic characteristics and stock returns. The fourth objective was achieved by the statistical analysis of the hypothesis on the relationship among all the study variables. The regression results were that there was no significant relationship ($p > 0.05$) among the study variables. Hence, the study failed to reject the null hypothesis since the relationship among the variables was not significant.

6.3 Conclusions of the Study

This section deals with the conclusions drawn from the results of the investigation. This research aimed at investigating the relationship among sentiment, risk appetite, demographic characteristics and stock returns of individual investors at the NSE. Prospect theory was the basis of this study on sentiment and stock returns of individual investors. The study adopted

a positive approach since it aimed at collecting objective data, analyzing it and drawing conclusions from the results obtained from the statistical tests. The study formulated four research hypotheses on the relationships of the study variables and subjected them to statistical analysis. Data was collected from both primary sources, that is from the individual investors and from secondary sources such as NSE and CBK. The study received 270 analyzable questionnaires which was a response rate of 70.3%.

Majority of the survey participants were male and they made up 58.9% of the entire sample. The age group that had the highest percentage of 43.3% of the participants was between 36 to 45 years old. 60% of the participants were married and they were the largest group under marital status. In terms of educational level, the largest group had 44.1% and they were Masters holders. The biggest group in number of children was of those who had 2-3 children and they were 43.7%. Majority of the participants, as shown by the mean of 2.59 which was the highest under sources of information, showed that they mainly relied on the past experience. In the second indicator of investor sentiment, 4.85 was the highest mean which meant that most of the investors were not overactive in the market since they traded once a year. Under sad-pessimism the indicator that got the highest mean was; average stock market expectations and it was 3.17. In the category of risk aversion, the highest mean of 3.04 under reasons for investment was for future income thus reflecting a low risk tolerance. In regard to stock returns, 90% of the investors in the sample got a negative Sharpe Ratio implying that, they had earnings that were lower than the 91-day treasury bill rate.

The study failed to reject the first Hypothesis(H_{01}) since the relationship between investor sentiment and stock returns was not significant. Therefore, since Sharpe Ratio had no significant relationship with investor sentiment, investors should rely on more objective decision criteria while making decisions. This is particularly important during moments of economic, political or health crisis that has in the recent past been experienced in Kenya.

The second hypothesis (H_{02}) was not rejected by the study because risk appetite had no mediating influence in the relationship between investor sentiment and stock returns. Thus, investor sentiment did not make a difference on risk appetite. Therefore, risk appetite was found to play no role in the relationship between investor sentiment and stock returns. Investors should consider other factors when making investment decisions since risk appetite has no impact on returns.

The study failed to reject third hypothesis (H_{03}) since the statistical test did not return significant results. This implies that the demographic characteristics did not have a moderating effect on the relationship between investor sentiment and risk appetite. The study concluded that demographic characteristics did have an impact on investor sentiment and risk appetite meaning that there could be other factors that were have an influence but were not included in the model. Some of these factors could be the pandemic that was disrupted the securities market significantly and altered the lives of investors. Further the political campaigns and debates were also unsettling for the market and could explain why the outcomes of the tests were not significant.

The research did not reject the fourth hypothesis (H_{04}) because there was no significant relationship among investor sentiment, risk appetite, demographic characteristics and Sharpe ratio. Therefore, the study concluded that other factors had more influence in Sharpe ratio than the variables that were investigated in the study. In addition, the prevailing political situation was disorienting to the market and its participants this was made worse by the onset of the COVID-19 pandemic that shook the world and destabilised the exchanges.

6.4 Contributions of the Study Findings

The insights acquired from this study about investor sentiment, risk appetite and demographic characteristics will contribute to the existing body of financial knowledge and practice. Hence, this section discusses how the study will contribute towards the three areas of knowledge, policy and practice.

6.4.1 Contributions to Knowledge

The findings of this study contribute to theory and knowledge in the field of behavioural finance. Traditional finance theories have held that investment decisions are rationally made, but in time this has come into question. This study contributes to resolving the conflict on the irrationality of the investor with knowledge on the relationship among investor sentiment, risk appetite, demographic characteristics and individual stock returns. The study also investigated the moderating effect of demographic characteristics and the mediation effect of risk appetite in an attempt to gain deeper insights into the relationship between investor sentiment and stock returns. In the literature reviewed these variables have not been investigated together in one study and particularly not at the NSE.

The current student investigation investor sentiment at the NSE this is an area that had not been investigated before in the local market. Most of the studies that have been conducted on behavioural finance have been on investor biases such as anchoring, representativeness, mental accounting, herding to name but a few. In addition, the study identified indicators of investor sentiment three indicators; joy-optimism, neutral-objective and sad-pessimism that can assist future research in this field of behavioural finance. This study was timely since the period when it was conducted was quite turbulent and emotion of investors were intense especially fear and pessimism due to uncertainty about the future.

The current study contributed to knowledge by conducting a detailed analysis of the moderated mediation effect relying on Hayes (2009) model. This model allows the moderation to influence other relationship paths except and not only the main relationship. Most of the reviewed papers moderation was tested as an influence on the direct relationship between the dependent and independent variable (Nyamute, 2016). Therefore, the current study contributed to knowledge by analysing the moderating influence of demographic characteristics on the mediation link between investor sentiment and stock returns. This type of analysis gives deeper insights into the relationship between investor sentiment, risk appetite and demographic characteristics since it is more representative of the real world. In the true world the relationships among these variables do not influence in only one way which can be tested using Hayes (2009) model.

This study has contributed to knowledge by depicting that there was no influence of investor sentiment on stock returns even after including moderating and mediating variables which were demographic characteristics and risk appetite respectively. This explains why studies have conflicting results from the investigations undertaken since they did not include the indirect effects of moderation and mediation in the investigation. Some found the relationship between sentiment and stock returns to be positive (Qadan, 2019; Rashid, Fayyaz and Karim, 2019; Lan et al., 2018), others studies got a negative relationship (Hu & Wang, 2013) while others found that there was no relationship at all (Kasoga, 2021; Parveen et al, 2021).

The study outcome contradicts the existing theories on the relationship between irrationality and stock returns. Nonetheless the study was conducted during the COVID-19 pandemic which could have influenced the results of the research which showed no relationship among the study variables. The study was also conducted during political campaign gearing up to national elections this impacted the market significantly. The outcome of the study during that period could suggest that the current theories relied in this study do not hold in moments of upheaval. Consequently, new theories are needed to define the relationship among investor sentiment, risk appetite, demographic characteristics and returns in periods of turmoil.

The findings of this study contribute new knowledge by showing that some demographic characteristics such as number of children was negatively affected returns and that the level of education was positively related to returns however, when interacted with risk appetite the relationships stopped being significant. The current research tested the moderated mediation in a similar way to the study conducted by (Onsomu, 2018) however, the said study used

Baron and Kenny (1986) while the current one used Hayes (2009) model. The current study makes a contribution to knowledge by showing how Hayes (2009) model can be applied in behavioural finance studies which have complex relationships and also when the main direct effect is not significant since the mediation and moderation influence could yield other outcomes. This model allows deeper insights to be obtained from the investigations of complex indirect and direct relationships in the field of behavioural finance and which yield results that are closer to the real world.

The measurement of intangible variables, such as sentiment and risk appetite, using proxies is not straightforward or easy. Subsequently, accessible methods are needed for developing countries and markets which is the contribution to knowledge that this study makes. The literature reviewed did not outline appropriate proxies for investor sentiment and risk appetite (Rashid, Fayyaz and Karim, 2019; Smales, 2017) that can be used in the local market. Hence, this study contributes to theory by demonstrating how to measure intangible realities through analysis of responses obtained from questions on investor sentiment indicators; joy-optimism, neutral-objective and sad-pessimism and from queries on risk appetite indicators; risk seeking and risk aversion. This method is more accessible in estimating risk appetite and investor sentiment for the researchers in the local market more than the models proposed by Smales (2017) or by others like (Gai & Vause, 2018).

6.4.2 Contributions to Managerial Policy

The findings of this study can give guidance to corporate leaders and regulators in the formulation of policies and regulations that foster market stability and growth in investment.

The study established that there was a positive and significant relationship between investor sentiment and risk appetite however, the joint effect of the two variables had no impact on Sharpe ratio. This implied that the joint effect of investor sentiment, risk appetite, demographic characteristics and stock returns was not significant. The finding is contrary to what is contained in literature that investor sentiment (Wenzhao, Su and Duxbury, 2021; Lansing LeRoy and Ma, 2022) and risk appetite (Parveen et al., 2021) tend to have a negative impact on returns. Therefore, this information can guide policy makers to establish regulations that encourage investors to be objective while making investment decisions. For example, the regulatory bodies could limit the number of times an investor can trade a stock so as prevent inflation of prices. Further, limiting trading will further ensure that investor sentiments remain moderate and do not increase risk or decrease risk appetite which could affect market equilibrium. In general, the NSE, CMA and CBK are still growing and consequently, these regulatory bodies can benefit from the findings of this research especially because it is conducted in the local market.

The study found that most investors felt that provision of investment information was not sufficient enough to give a clear picture of the market and assets and to guide decisions. Therefore, the study recommends that NSE and CMA could find out from the investors what additional information they would be interested in and then they should require more disclosure by listed companies. For example, the company disclosures could be about matters that affect asset valuation or the image and reputation of the institution such as but not limited to changes of management, major suppliers, retrenchment plans, organisational restructure, resizing, relocation and digitization. In addition, the study found that majority of the investors

find the financial statements complicated. Accordingly, NSE and CMA should develop ways of getting companies to simplify annual reports to make them understandable. These regulating bodies should encourage the boards of directors to find ways of educating investors about how to analyse financial statements and reports in order to get useful information for investment and avoid rumours.

Findings of the study show that most investors felt that the economic environment was too volatile for investment. This means that stability was lacking to foster investment. Therefore, the recommendation is that the Government of Kenya should ensure that it manages inflation rates and other fluctuations in the country that eradicate the economic power of investors. The Government should aim at creating an economic climate where interest rates and prices of oil and commodities are stable so as foster borrowing for business growth, because volatility in these areas affects investment negatively. The political environment was also a concern for the investors and a majority felt it was too volatile. Subsequently, most investors were uncertain about the future because of the civic aspects in the country. Therefore, the Government should not only come up with regulations but ensure that persons responsible for division among people or who make unsettling remarks are made accountable. This is because stability is needed to encouraged long term investment.

The NSE, CMA, CBK and Government should establish ways of cushioning the market from unforeseen events that have economic impact. The Government and the regulatory bodies have tools such as interest rates, special disaster funds, foreign exchange reserves and commodity price control which can be used to protect the economy and stock market from

catastrophes like the pandemic. Most of the investors in the study had negative returns due to the market being exposed to adverse economic and environmental factors. For example, stock prices dropped when the presidential re-election was announced in late 2017. Then as the NSE was recovering, in 2020 the COVID-19 pandemic struck which caused a shutdown that had dire effect on many businesses. This showed that the regulators needed to have established market protection and buffers that could have cushioned businesses when the economy was closed, so as to remain afloat and prevent asset price fluctuations.

6.4.3 Contributions to Practice

The findings of this study will apply particularly to developing markets which have fewer facilities to conduct research on intangible aspects of stock trading such as investor sentiment which are becoming important factors in the market. The findings of this study are useful for investors since most of them in the survey said that they were not knowledgeable about stock trading accordingly. They trade blindly and hence do not achieve optimum performance. Consequently, the investor can benefit from knowledge gained from this study, that since sentiments have no impact on Sharpe ratio they should obtain objective information about stocks and learn how to interpret facts and figures. This information would therefore, be useful in guiding the investor to form a portfolio. Thus, investors can get some ideas from this study on how to improve aspects of their trading behaviour so as not to negatively impact performance. The investor is set to form a better balanced portfolio if they use knowledge from this study on sentiment.

The knowledge from this study can be used by investment managers, brokers and dealers to educate their clients on asset trading by encouraging them not to rely on sentiments since they have no impact on returns. Hence, with knowledge from this study, they will be better placed in ensuring clients avoid emotional pitfalls in investment which do not contribute to betterment of the portfolio. Company directors, brokers and dealers could have an open day to educate investors based on the knowledge from this study. The forum could bring together all the participants including regulators so as to demystify the concept of sentiment and stock trading. These programmes can be conducted both in physical presence or via social media platforms which are convenient and easily accessible which makes it possible to reach out to many investors who previously would have needed to travel long distances.

Knowledge from this study is useful for managers of listed companies as they can learn that most investors felt that the information provided about stocks is neither sufficient nor easy to interpret. Therefore, they can strive to avail more disclosures about their company and to present this information in an easily understandable way. The directors and managers, by making available all the necessary information would prevent the investors from relying on rumours to make decisions which do not have a positive impact on returns. Company leaders will also learn from this study that investor sentiments have no impact on returns and therefore will avoid using emotions to attract investments instead they should rely on objective facts that are clearly presented.

6.5 Limitations of the Study

Behavioural finance is a new field of research and so it was difficult for the participants to grasp the concepts well in order to take part accordingly in the research, as a consequence several people opted out of the survey because of the complexity of the subject. Some of them raised questions about whether the researcher was working for an authority who was trying to keep track their wealth. Thus, some of them felt they could not take part in the study even after presenting authorisation documents from the University and from NACOSTI. Therefore, the researcher had to keep requesting brokerage firms to continue requesting other clients to participate.

Investor psychology is a novel field in the field of finance as in other subjects this area is more investigated in the advanced markets in comparison to the local one. These studies have led to the development of indices for measurement of intangible phenomena like investor sentiment and risk appetite. The indices developed are localised and they facilitate research in those locations where it was developed. On the contrary, the current research did not have the advantage of having a readily available index for investor sentiment nor for risk appetite the study had to develop one from appropriate proxies since most of the reviewed literature dealt with indices that are only available in developed markets.

Data collection for this research coincided with the pandemic which posed another challenge of access to participants. The researcher had planned to physically visit the brokerage firms and speak to the management about the survey. Unfortunately, these offices were closed which caused further delay in the investigation. At the time when the operations were starting

again in the country the use of papers was highly discouraged because they were a means of transmitting the corona virus. Thus, the strategy of data collection had to change and move to the online platforms. This meant involving a programmer to design a digital version of the questionnaire and to create a database which had serious budgetary and time implications.

When conducting the pilot testing with the digital questionnaire one of the respondents deleted the database which posed a challenge to the research. As a result, the distribution of questionnaires had to be stopped for redesigning to take place in order to prevent such an occurrence from happening in the future. The questionnaire had to be put on a separate site from the database so as to limit access, the change was costly to the research.

Switching from paper to a digital questionnaire had the major disadvantage that the programmer was not a finance person. The implication of this was that the researcher had to spend a lot of time explaining the meaning of most concepts which led to further delays. Many times, digital migration is accompanied by technological mishaps and this research was no exception. The digital questionnaire was blocked by several corporate networks which prevent sharing documents without a licence for no-phishing so obtaining the appropriate certification resulted in additional costs.

When the firms opened again data collection took on another angle as it became an exercise in boldness and resilience. Many brokerage firms and individuals turned the researcher away. They had various reasons for lack of willingness to take part in the research. The brokerage firms quoted company policy that does not allow third party documents being shared to

clients. They also claimed that confidentiality would be breached. Some participants did not answer the questions in full and so their questionnaires had to be removed from the study. The researcher spent considerable resources of time and money in contacting people who could help in the research but unfortunately, not all turned out to be helpful for the research. Nevertheless, the study did get a sufficient response rate to conduct a meaningful analysis.

6.6 Future Research Directions

This study made its contribution of new knowledge but nevertheless, it was not exhaustive on the subject of investor sentiment and risk appetite. A future study could have, as an objective, to develop an investor sentiment index for the NSE. This would be a useful tool in making investment decisions and would develop asset trading at NSE even further. The index could also facilitate for more research in the field of behavioural finance to be conducted. Similarly, developing a risk appetite index would also be a good tool to develop for the NSE as it would be beneficial to all market players.

This study has been conducted during a period of crisis in politics and public health that had a big negative impact on investment at NSE. Therefore, conducting this study again during a period of stability in both field of public health and politics would give better insights into the impact on investor sentiment and risk appetite. Further, risk appetite was found to have no mediating effect in the relationship between sentiment and stock returns. This could mean that there are other variables which have a mediating effect like financial literacy, investment strategy or investment selection criteria. Therefore, a similar study could be undertaken with another mediating variable.

A study investigating which investor education topics are most useful in improving performance at the NSE could be done so as not to spend money on programmes that do not add value. Therefore, a survey could be conducted on the gaps that investors feel that they have and then a curriculum can be developed addressing the need that was highlighted. The investors could then go through a period of training. A longitudinal study could then be conducted on a sample of the investors undergoing the curriculum to track if there is any change in their performance that is related to the learning that they are undertaking.

A comparative study of two study groups could be undertaken to investigate whether the awareness of the investor about sentiment impacts performance at NSE. The experimental group would be trained about the subjectivity of investors and sentiment over a brief period and then sent out to trade. On the other hand, the control group would be trading without any training on sentiment. Then the performance of the two groups could be compared to see if there was a difference between the groups that could be associated with awareness of investor sentiment. This would be beneficial to both the market and all its participants since the investors would avoid guess work while trading because they would be knowledgeable about the intricacies of investments. The outcome of the study would contribute to improving and growth of the bourse and its operations.

A project to design a digital platform where an investor can view and compare different types of investment options on a daily basis could be undertaken. The platform should make it possible for the investor to interact with other investors on the platform. The platform should

allow the investor to derive comparative reports and trends of different assets; in order to make a selection. The platform should have the possibility of asking questions and getting answers from experts in the investment field. This would make investment accessible to more people. Such an interactive platform would reduce the mystery and fear that people have about trading stocks and thus it would take NSE to a higher level of growth and development.

MANUAL REFERENCES

Aduda, J., Odera, E. O., & Onwonga, M. (2012). The Behaviour and financial performance of individual investors in the trading shares of companies listed at the Nairobi Stock Exchange, Kenya. *Journal of Finance and Investments Analysis*, 1(3), 33-60.

Alber, N., & Gamal, G. (2019). The effect of demographic factors on investor's risk tolerance using Fuzzy Analytic Hierarchy Process. *SSRN*, Available at https://ssrn.com/abstract=3314721.

Alghalith, M., Floros, C., & Dukharan, M. (2012). Testing dominant theories and assumptions in behavioural finance. *The Journal of Risk Finance*, 13(3), 262-268.

American Association of Individual Investors. (2019, Feb 7). *AAII Investor survey update*. Retrieved from American Association of Individual Investors: www.aaii.com

Aroni, J., Namusonge, G., & Sakwa, M. (2014). Influence of Dividend Pay-out on Investment in Shares -A Survey of Retail Investors in Kenya. *International Journal of Business and Social Studies*, 5(1), 2014.

Asad, H., Toqeer, I., & Mahmood, K. (2022). A qualitative phenomenological exploration of social mood and investors' risk tolerance in an emerging economy. *Qualitative Research in Financial Markets*, 14(1), 189-211.

Baker, H. K., Kumar, S., & Goyal, N. (2019). Personality traits and investor sentiment. *Review of Behavioural Finance*, 13(4), 354-369.

Baker, M., & Wurgler, J. (2007). Investor sentiment in the stock Market. *Journal of Economic Perspectives*, 21(2), 129-151.

Barber, B. M., & Odean, T. (2013). The Behaviour of individual investors. *Handbook of the Economics of Finance, Elsevier*, 2, 1533-1570.

Barberis, N., Mukherjee, A., & Wang, B. (2016). Prospect Theory and stock returns: An empirical test. *The Review of Financial Studies*, 29(11), 3068-3107.

Bayar, Y., Sezgin, F. H., & Ozturk, O. F. (2020). Financial literacy and financial risk tolerance of individual investors: Multinomial Logistic Regression Approach. *Sage Open*, 10(3), 2158244020945717.

Bijl, L., Kringhaug, G., Molnar, P., & Sandvik, E. (2016). Google searches and stock returns. *International Review of Financial Analysis*, 45(5), 150-156.

Biktimirov, E., & Thomas, B. (2003). Definitions of returns. *Journal of Accounting and Finance Research*, 11, 24-37.

Blake, D., Cannon, E., & Wright, D. (2021). Quantifying loss aversion: Evidence from a UK population survey. *Journal of Risk and Uncertainty*, 63, 27-57.

Blumberg, B., Cooper, D. R., & Schindler, P. S. (2005). *Business Research Methods.* London: The McGraw-Hill Co.

Boehmer, E., Jones, C. M., Zhang, X., & Zhang, X. (2021). Tracking retail investor activity. *The Journal of Finance*, 76(5), 2249-2305.

Bosch-Badia, M.-T., Montllor-Serrats, J., & Tarrazon-Rodon, M.-A. (2017). Analysing assets performance inside a portfolio: From crossed beta to the net risk premium ratio. *Journal of Banking & Finance*, 42(1), 154-165.

Brooks, C., Sangiorgi, I., Saraeva, A., Hillendbrand, C., & Money, K. (2020). The importance of staying positive: The impact of emotions on attitude to risk. *International Journal of Finance & Economics*, https://onlinelibrary.wiley.com.ezproxy.library.strathmore.edu/doi/10.1002/ijfe.

Brown, G. W., & Cliff, M. T. (2005b). Investor Sentiment and Asset Valuation. *The Journal of Business*, 78,2, 405-440.

Capital Markets Authority. (2021). *The CMA Quarterly Capital Markets Statistical Bulletin Q1 2021*. Nairobi: Capital Markets Authority.

Chang, C.-L., & Fang, M. (2020). Noise trading and abnormal return in stock market. *Revista Argentina de Clinica Psicologica*, 29(4), 317-324.

Cherono, I. (2018). Effect of investor behaviour on stock market reaction in Kenya. Doctoral dissertation, JKUAT-COHRED.

Cherono, I., Olweny, T., & Nasieku, T. (2019). Investor behaviour biases and stock market. Journal of applied finance & banking , 9(1), 147-180.

Chiu-Lan, C., & Fang, M. (2020). Noise trading and abnormal return in the stock market. Revista Argentina de Clinica Psicologica, 29(4), 317-324.

Comlekci, I., & Ozer, A. (2018). Behavioral finance models, anomalies, and factors affecting investor psychology. Global Approaches in Financial Economics, Banking, and Finance, https://doi.org/10.1007/978-3-319-78494-6_15.

Cronbach, L. J. (1951). Coefficient alpha and the internal stucture of tests. Psychometrika, 16(3), 297-334.

D'Hondt, C., & Roger, P. (2017). Investor Sentiment and stock return predictability: The power of ignorance. Dans Finance, 38, 7-37.

Dickason, Z., & Ferreira, S. (2018). Establishing a link between risk tolerance, investor personality finance in South Africa. Cogent Economics & Finance, 6(1), 1519898.

Fairchild, A. J., & Mackinnon, D. P. (2009). A general model for testing mediation and moderation effects. Prevention Science, Springer, 10(2), 87-99.

Fama, E. (1970). Efficient capital markets: a review of theory and empirical work. *Journal of Finance*, 25(2), 383-417.

Fama, E. F. (1998). Market efficiency, long-term returns and behavioural finance. *Journal of Financial Economics*, 49(3), 283-306.

Fang, H., Chung, C.-P., Lu, Y.-C., Lee, Y.-H., & Wang, W.-H. (2021). The impact of investors' sentiments on stock returns using fintech approaches. *International Review of Financial Analysis*, 77, 101858.

Gai, P., & Vause, N. (2006). Measuring investors' risk appetite. *International journal of central banking*, 2 (10.2139/ssrn.872695).

Gai, P., & Vause, N. (2018). Measuring investors' risk appetite. *International Journal of Central Banking-Bank of England*, https://www.ijcb.org/journal/ijcb06q1a5.pdf.

Garay, U., & Pulga, F. (2021). The performance of retail investors, trading intensity and time in the market: evidence from an emerging stock market. *Heliyon, Science Direct*, 7(12), https://doi.org/10.1016/j.heliyon.2021.e08583.

Gonzalez-Hermosillo, B. (2008). Investor risk appetite and global financial market conditions. *International Monetrary Fund Working Paper*, WP/08/85.

Haritha, P. H., & Abdul, R. (2020). An empirical examination of investor sentiment and stock market volatility: evidence from India. Financial Innovation, 6,1,1-15.

Haritha, P. H., & Uchil, R. (2020). Influence of investor sentiment and its antecedent on investmen decision-making using partial least square technique. Management Research Review, 43(11), 1441-1459.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the New Millenium. *Communication Monographs*, 76(4), 408-420.

Himanshu, R., Mushir, N., & Suryavanshi, R. (2021). Impact of Covid-19 on portfolio allocation decisions of individual investors. *Journal of Public Affairs*, 21(4), e2649.

Himanshu, R., Mushir, N., & Suryavanshi, R. (2021). Impact of Covid-19 on portfolio allocation decisions of individual investors. *Journal of Public Affairs*, 21(4), e2649.

Jiang, B., Zhu, H., Zhang, J., Yan, C., & Shen, R. (2021). Investor sentiment and stock returns during the COVID-19 pandemic. *Frontiers in Psychology*, 12, 708537.

Hu, C., & Wang, Y. (2013). Noise trading and stock returns: evidence from China. *China Financial Review International*, DOI:10.1108/CFRI-02-2012-0017.

Islam, M. U., Mumtaz, A., & Hanif, H. (2020). The role of heuristics toward stock market anomalies (Finding at individual investors). *Absyn University Journal of Social Sciences*, 13(1), 452-454.

Jackson, Susan E., Schuler, Randall S., Werner, & Steve. (2011). *Managing human resources.* Boston, Massachusetts: South- Western Cengage Learning.

Kabiru, J. N., Ochieng', D. E., & Kinyua, H. W. (2015). The effect of general elections on stock returns at the Nairobi Securities Exchange. *European Scientific Journal*, 11(28), 435-460.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, ABI/INFORM Global*, 47(2), 263-291.

Kannadhasan, M. (2015). Retail investors' financial risk tolerance and their risk-taking behaviour: The role of demographics as differentiating and classifying factors. *IIMB Management Review*, 27(3), 175-184.

Kasoga, P. S. (2021). Heuristic biases and investment decisions: multiple mediation mechanisms of risk tolerance and financial literacy-a survey at the Tanzania stock market. *Journal of Money and Business*, 1(2), 102-116.

Kelly, P. J., & Meschke, F. (2010). Sentiments and stock Returns: The SAD anomaly revisited. *Journal of Banking & Finance*, 34 (6), 1308-1326.

Kim, S.-H., & Kim, D. (2014). Investor sentiment from internet message postings and predictability of stock returns. *Journal of Economic Behaviour & Organization*, 107(B), 708-729.

Koskei, L. (2021). Exchange rate fluctuations and the performance of Nairobi Securities Exchange in Kenya during the Coronavirus pandemic. *International Journal of Business, Economics and Management*, 8(1),1-9.

Lan, Q., Xiong, Q., He, L., & Ma, C. (2018). Individual investment decision behaviours based on demographic characteristics: Case from China. *PLoS ONE*, https://doi.org/10.1371/journal pone 0201916.

Lansing, K. J., LeRoy, S. F., & Ma, J. (2022). Examining the sources of excess return predictability: Stochastic volatility or market inefficiency? *Journal of Economic Behavior& Organization*, 197, 50-72.

Lippi, A., & Rossi, S. (2020). Run for the hills: Italian investors' risk appetite before and during the financial crisis. *International Journal of Bank Marketing*, 38(5), 1195-1213.

Litner, J. (1965). Security prices risk and maximal gains from diversification. *Journal of Finance*, 20(4), 587–615.

Malkiel, B. G. (2003). The efficient market hypothesis and its critics. *CEPS Working Paper No. 91*, https://s3.amazonaws.com/academia.edu.documents/32122406/.

Markowitz, H. (1952). Portfolio selection. *Journal of Finance*, 7(1), 77-91.

Martin, Ian W. R., & Nagel, Stefan (2022). Market efficiency in the age of big data. *Journal of Financial Economics*, 145(1), 154-177.

Musembi, M., Simiyu, E., & Njoka, C. (2020). Symmetric and Asymmetric effect of investor sentiment on performance of equity market in Nairobi Securities Exchange. *International Journal of Services Technology and Management*, 8, 438-447.

Nairobi Securities Exchange. (2022, March 19). *Nairobi Securities Exchange*. Retrieved from Nairobi Securities Exchange: www.nse.co.ke

Naseer, M., & Tariq, Y. (2015). The Efficient Market Hypothesis: A critical review of the literature. *The IUP Journal of Financial Risk Management*, 12(4), 48-63.

Nyamute, W. (2016). Investor behaviour, investor demographic characteristics, investment style and individual investor portfolio at the Nairobi Securities Exchange. *Unpublished JKUAT PHD Thesis*.

Nyamute, W., Lishenga, J., & Oloko, M. (2015). The relationship between investor behaviour and portfolio performance at the Nairobi Stock Exchange. *International Journal of Multidisciplinary Research and Development*, 2(5), 548-551.

O'Brien, R. M. (2007). A Caution Regarding Rules of Thumb for Variance Inflation Factors. *Quality & quantity, Springer*, 41(5), 673–690.

Olweny, T., Namusonge, G. S., & Onyango, S. (2013). Financial attributes and investor risk tolerance at the Nairobi Securities Exchange-A Kenyan Perspective. *Asian Social Science*, 9(3), 1911-2025.

Onsomu, Z. N. (2014). The impact of behavioural biases on investor decisions in Kenya: male vs female. *Impact: International Journal of Research in Humanities, Arts and Literature*, 2(6), 87-92.

Onsomu, Z. N. (2018). Behavioural biases, demographics, investment strategy and portfolio performance of individual investors at the Nairobi Securities Exchange. *Unpublished PHD University of Nairobi*.

Onsomu, Z. N., Kajiage, E., Aduda, J., & Iraya, C. (2017). Risk tolerance, demographics and portfolio performance. *Journal of Business & Economic Policy*, 4(3), 69-74.

Parveen, S., Satti, Z. W., Subhan, Q. A., Riaz, N., Baber, S. F., & Bashir, T. (2021). Examining investors' sentiments, behavioural biases and investment decisions during COVID-19 in the emerging stock market: a case of Pakistan stock market. *Journal of Economic and Administrative Sciences*, https://www.emerald.com./insight/content/doi/10.1108/JEAS-08-2020-0153/full/html.

Peress, J., & Schmidt, D. (2021). Noise traders incarnate: Describing a realistic noise trding process. Journal of Financial Markets, 54, p.100618.

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting

Qadan, M. (2019). Risk appetite, idiosyncratic volatility and expected returns. International *Review of Financial Analysis*, 65, 101372.

Rajararan, V. (2003). Investor's demographics and risk bearing capacity. *Finance India*, 27(2), 565-576.

Rashid, A., Fayyaz, M., & Karim, M. (2019). Investor sentiment, momentum and stock returns: an examination of direct and indirect effects. *Economic Research-Ekonomska Istrazivanja*, 32(1), 2638-2656.

RBS Morgan. (2019). RBS Morgan Risk Profile questionnaire. *JP Morgan*, www.rbsmorgans.com.

Rossiter, J. R. (2019). A critique of prospect theory and framing with particular reference to consumer decisions. Journal of Consumer Behaviour, 18(5), 399-405.

Sayim, M., Morris, P. D., & Rahman, H. (2013). The effect of US individual investor sentiment on industry specific stock returns. *Review of Behavioural Finance*, 5,1, 58-76.

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach, 7th edition.* Chichester, West Sussex, United Kingdom: John Wiley & Sons.

Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *Journal of Finance*, 19(3), 425-442.

Sharpe, W. F. (1994). The Sharpe ratio. *The Journal of Portfolio Management*, 21(1), 49-58.

Shefrin, H. (2008). Risk and return in behavioural SDF-based asset pricing models. *Journal of Investment Management*, 6(3), 1-18.

Shinde, C. M., & Zanvar, P. (2015). A study of investment pattern on the basis of demographic traits. *International Journal of Research Granthaalayah*, 3(11), 175-205.

Shleifer, A., & Summers, L. H. (1990). The noise trader approach to finance. *Journal of Economic Perspectives*, 4(2), 19-33.

Singh, J. E., Babshetti, V., & Shivaprasad, H. N. (2021). Efficient market hypothesis to behavioural finance: A review of rationality to irrationality. *Science Direct, Materials*

Today:Proceedings, https://www.sciencedirect.com/science/article/pii/S2214785321023701.

Smales, L. (2017). The importance of fear: investor sentiment and stock returns. *Journal of Applied Economics*, 49(34), 3395-3421.

Sreenu, N., & Naik, S. (2021). Investor sentiment and stock return volatility: evidence from the Indian Stock Exchange. *Asia-Pacific Journal of Business Administration*, https://doi.org/10.1108/APJBA-11-2020-0405.

Sul, H. K., Dennis, A. R., & Yuan, L. I. (2017). Trading on Twitter: Using social media sentiment to predict stock returns. *Journal of the decision sciences institute*, 48(3), 454-488.

Sun, Y., Zeng, X., Zhou, S., Zhao, H., Thomas, P., & Hu, H. (2021). What investors say is what the market says: measuring China's real investor sentiment. *Personal and Ubiquitous Computing*, 25,587-599.

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in science education*, 48(6), 1273-1296.

Trueman, B. (1988). A theory of noise trading in securities markets. *The Journal of Finance*, 43(1), 83-95.

Tversky, A., & Kahneman, D. (1974). Judgement under uncertainty: heuristics and biases. *Science, New Series, JSTOR*, 185(4157),1124-1131.

Uhlenbrock, B. (2009). Financial markets' appetite for risk and the challenge of assessing its evolution by risk appetite indicators. *Bank of International Settlements*, 31,221-259.

Verma, R., & Verma, P. (2021). Investor sentiments and pricing errors. Review of Behavioral Finance, 13(4), 450-462.

Wenzhao, W., Su, C., & Duxbury, D. (2021). Investor sentiment and stock returns: Global evidence. *Journal of Empirical Finance*, 63, 365-361.

Wooldridge, J. M. (2010). *Econometrics analysis of cross section and panel data.* London: The MIT Press.

Yang, Q. (2022). Summary of the researches on the influence of investor sentiment on stock returns under the background of big data. SHS Web of Conferences, EDP Sciences, 151, p. 01001.

Zhang, C. (2008). Defining, modelling, and measuring Investor Sentiment. *University of California*, http://citeseerx.ist.psu.edu/viewdoc.

APPENDICES

Appendix I: Questionnaire

Investor Sentiment, Risk Attitude and Demographic Characteristics and Stock Returns of Individual Investors at the Nairobi Securities Exchange

My name is Kitonyi Saiti, I am a doctoral student at the University of Nairobi and I am doing a research on behavioural finance on the topic "Investor sentiment, risk attitude, demographic characteristics and stock returns of individual investors at the Nairobi Securities Exchange". I kindly request you to please take some few minutes to answer the easy questions below which are about trading at the NSE. The answers you give will really assist me in this research. I thank you in advance for your cooperation and consideration in answering this questionnaire. All the information collected in this study will be treated with the highest level of confidentiality and will only be used for academic purposes.

A. Demographic Characteristics

1. Please tick your gender: Male _____ Female_____
2. Please tick where your age falls under:

   15-25_____ 26-35_____37-45_____46-55_____56 and over_____
3. Please tick your marital status:

   Married_____ Single _____Widowed_____
4. Please tick how many children you have?

   0-1_____ 2-3_____4and over_____
5. Please tick your highest level of Education?

   Doctorate____ Master _____Bachelors' Degree_____ Diploma_____ Certificate_____

6. How long have you participated at the Nairobi Securities Exchange?

   Less than 1 year_____ 1-5_____6-10_____11-15_____16 and over_____

7. Please tick the social media platform that you belong to?

   Facebook _____Tweeter _____You tube _____Whatsapp ____Other _____None____

8. Please tick how frequently you visit the social media platform?

   Several times Daily_____ Once a day____ Weekly_____ Monthly _____ Rarely_____

9. Please tick your occupation: Self-employed _____ Employed _____ Student_____

10. Please tick the industry of your occupation: Formal sector_____ Informal sector_____

B. Investor Sentiment

11. Where do you get information about whether to buy, hold or sell stocks? Fill the value that best reflects your frequency in consulting the following sources of information. Key for answering: 1-Never, 2-Rarely, 3-Sometimes, 4-Most of the time, 5- Always

	Source of information	**Value of consultation frequency**
a	Family and friends	
b	Financial Consultant e.g. Broker	
c	Past experience	
d	Financial Statement analysis	
e	From experienced investor	
f	Newspapers and news	
g	Read investment research reports	
h	Annual General Meetings (AGM)	

12. Do you find financial statements easy to understand? Please select by ticking next to the

    Do you find financial statements easy to understand? Please select by ticking next to the response that reflects how you feel. 5-Strongly Agree___4-Somehow agree____ 3-Neutral____ 2-Disagree____1-Strongly Disagree____

13. Please tick the answer that best describes your attendance to AGM for the last 5 years?

    5-I have attended all AGM_____

    4-I have attended majority of the AGM_____

    3-I have attended half of the AGM_____

    2-I have attended very few of the AGM_____

    1-I have not attended any AGM_____

14. Please fill in the table below how do you feel about the future expectations of the stocks you have invested in at the Nairobi Securities Exchange?

    1-strongly agree, 2-moderately agree, 3-agree, 4-moderately disagree, 5-strongly disagree

	Stock Expectation	**Value that reflects your view**
a	The returns will be high	
b	The returns will be moderate	
c	The returns will remain the same	
d	The returns will be low	
e	There will be negative returns	

15. Please tick how frequently you trade stocks at the Nairobi Securities Exchange?

    Daily____ Weekly_____ Fortnightly_____ Monthly_____ Yearly_____

16. Please tick how long you hold on to a stock that is declining before you decide to sell?

Sell immediately_____ Wait until the price starts to rise_____ I would not sell_____

17. Please tick how long you hold on to a rising stock before you decide to sell?

Sell immediately_____ Wait until the price starts to decline_____ I would not sell_____

What is your belief about the future performance (in the next one year) of the stock market at the Nairobi Securities Exchange? Write the value which reflects the strength of your agreement with the statement. 1-strongly agree, 2-moderately agree, 3-agree, 4-moderately disagree, 5-strongly disagree

	Stock Expectation	**Value that reflects your view**
a	The stock market will decline in performance	
b	The stock market will have an average performance	
c	The stock market will performing well	

18. On a scale of 1 to 3 how would you rate the availability of information at the Nairobi Securities Exchange? Please tick the response you find appropriate:

    1-Can improve_____

    2-Average_____

    3-Good_____

19. On a scale of 1 to 3 what are your beliefs about the state of macroeconomic environment for investing at the Nairobi Securities Exchange? Please tick your response:

    1-The macroeconomic environment is too volatile for investment_____

    2-The macroeconomic environment is stable_____

    3-The macroeconomic environment is fosters investment_____

20. On a scale of 1 to 3 what are your beliefs about the stability of political environment for investing at the Nairobi Securities Exchange? Please tick your response:

    1-The political situation is too volatile for investment_____

    2-The political situation is stable_____

    3-The political situation fosters investment_____

C. Risk Appetite (RBS Morgan, 2019)

21. On a scale of 1-4 rate by ticking the answer that reflects the stability of your current source of income where;

    1-Unstable_____, 2-Somehow stable_____, 3-Stable_____, 4-Very Stable_____

22. What is the likelihood of you borrowing money to buy assets at NSE? The scale for rating is as follows: 1-None____, 2-Low_____, 3-Medium____, 4-High_____

23. Please tick the phrase that best describes your knowledge on stock trading on a scale of 0-4 1-No knowledge____2-Average knowledge____, 3-More than average knowledge ____, 4-Very highly knowledgeable_____

24. What maximum period of time would you invest e.g. 70% of your wealth before you need it for your expenses. (Please tick appropriate answer)

    0-1 year_____1-2 years_____3-4 years_____4-5 years_____ Over 5 years _____

25. Which of the following statements best describes your criteria in selecting an investment: Please give a score between 1 and 3 to the statements such that BEST is (3) and LEAST is (1) describes your criteria. The highest score goes to the one that best describes your criteria and the least to the one that least describes your criteria.

    3-Risky high income assets_____2-Mix of risky and low risk assets____1-Low risk assets_____

26. Please tick the response below that best explains your reason for investing at NSE.

	Reason for investing	**Rate response**
1	For a regular income to cater for my expenses	
2	For my retirement	
3	For acquiring future investment	
4	For the thrill of investment	
5	I have surplus cash that I can trade with	

D. Stocks

27. In the following page kindly fill in the table the number of shares you owned at the end of the years 2015 to 2020 in the NSE listed the companies. Alternatively, you could supply me with your CDSC statement and remove your name. **THANK YOU FOR YOUR COOPERATION.**

Appendix II: Stock Brokerage Firms

1. Dyer & Blair Investment Bank Ltd Goodman Tower, 7th floor, P.O. Box 45396 00100 **Tel**: 0709930000. **Fax**: 2218633 **Email**: shares@dyerandblair.com **Web**: www.dyerandblair.com	2. Francis Drummond & Company Limited Hughes Building, 2nd floor, P.O. Box 45465 00100 **Tel**: 318690/318689 **Fax**: 2223061 **Email**: info@drummond.co.ke **Web**: www.drummond.co.ke	3. Ngenye Kariuki & Co. Ltd. (Under Statutory Management) Corner House, 8th floor, P. O. Box 12185-00400 **Tel**: 224333/2220052/2220141 **Fax**: 2217199/241825 **Email**: ngenyekari@wananchi.com **Web**: www.ngenyestockbrokers.co.ke
4. Suntra Investment Bank Ltd Nation Centre,7th Floor, P.O. Box 74016-00200 **Tel**: 2870000/247530/2223330/2211846/0724-257024, 0733-222216 **Fax**: 2224327 **Email**: info@suntra.co.ke **Web**: www.suntra.co.ke	5. Old Mutual Securities Ltd IPS Building, 6th Floor, P. O. Box 50338- 00200 **Tel**: 2241379, 2241408 **Fax**: 2241392 **Email**: info.oms@oldmutualkenya.com **Web**: www.oldmutual.co.ke	6. SBG Securities Ltd CfC Stanbic Centre, 58 Westlands Road, P. O. Box 47198 – 00100 **Tel**: 3638900 **Fax**: 3752950 **Email**: sbgs@stanbic.com **Web**: www.sbgsecurities.co.ke

7. Kingdom Securities Ltd Co-operative Bank House,5th Floor, P.O Box 48231 00100 **Tel**: 3276940/3276256/3276154 **Fax**: 3276156 **Email**: info@kingdomsecurities.co.ke	8. AIB CAPITAL LTD Finance House, 9th Floor, P.O. Box 11019-00100 **Tel**: 220178 / 2212206 **Fax**: 2210500 **Email**: info@aibcapital.com **Web**: www.aibcapital.com	9. ABC Capital Ltd IPS Building, 5th floor, P.O. Box 34137-00100 **Tel**: 2246036/2245971 **Fax**: 2245971 **Email**: headoffice@abccapital.co.ke
10. Sterling Capital Ltd Barclays Plaza, 11th Floor, Loita Street, P.O. Box 45080- 00100 **Tel**: 2213914/244077/ 0723153219/0734219146 **Fax**: 2218261 **Email**: info@sterlingib.com **Web**: www.sterlingib.com	11. ApexAfrica Capital Ltd The Riverfront, 1st Floor, Prof. David Wasawo Drive, Off Riverside Drive , P.O. Box 43676- 00100 **Tel**: +254-020-7602525/020 2226440 **Email**: invest@apexafrica.com **Web**: www.apexafrica.com	12. Faida Investment Bank Ltd Crawford Business park, Ground Floor, State House Road, P. O. Box 45236-00100 **Tel**: +254-20-7606026-35 **Fax**: 2243814 **Email**: info@fib.co.ke **Web**: www.fib.co.ke

13. NIC Securities Limited 1st NIC House, Masaba Road, P.O.Box 44599-00100 **Tel**: 2888 444 / 0711 041 444 **Fax**: 2888 505 **Email**: info-securities@nicgroup.com **Web**: www.nic-securities.com	14. Standard Investment Bank Ltd ICEA Building, 16th floor, P. O. Box 13714- 00800 **Tel**: 2228963/2228967/2228969 **Fax**: 240297 **Email**: info@sib.co.ke	15. Kestrel Capital (EA) Limited 2nd Floor, Orbit Place, Westlands Road, P.O. Box 40005-00100 **Tel**: 251758/2251893,2251815,2250082 **Fax**: 2243264 **Email**: info@kestrelcapital.com **Web**: www.kestrelcapital.com
16. African Alliance Securities Transnational Plaza, 1st Floor, Wing B, P.O. Box 27639 - 00506 **Tel**: +254 20 276 2000/ +254 20 276 2600 **Fax**: +254 20 221 6070 **Email**: info@africanalliance.com **Web**: www.africanalliance.com	17. Renaissance Capital (Kenya) Ltd Purshottam Place ,6th Floor, Westland , Chiromo Road, P.O BOX 40560-00100 **Tel**: 3682000 **Fax**: 3632339 **Email**: infokenya@rencap.com **Web**: www.rencap.com	18. Genghis Capital Ltd 1st Floor, Purshottam Place Building, Westlands Road, P.O Box 9959-00100, Nairobi Kenya **Tel**: +254 730145000 / +254 709185000 **Fax**: 246334 **Email**: info@genghis-capital.com
19. CBA Capital Limited CBA Centre Mara Ragati Road Junction, Upper Hill,	20. Equity Investment Bank Limited Equity Centre, Hospital Road, Upper Hill,	21. KCB Capital Kencom House 2nd Floor, P.O Box 48400 – 00100

P.O. Box 30437-00100 **Tel**: 0202884000/+254 20 2884000 / 365, 0711056365 **Fax**: 0202734616	P.O Box 75104 – 00200 **Tel**: +254-20-2262477 Mobile: +254-732-112477/+254-711-026477 **Fax**: +254 20 2711439 **Web**: www.equitybankgroup.com	**Tel**: +254 711 012 000 / 734 108 200, +254 20 3270000 / 2851000 / 2852000 **Email**: investmentbanking@kcb.co.ke **Web**: kcb.co.ke
22. Barclays Financial Services Limited Waiyaki Way, West End Building, Floor 5 **Tel**: + 254 (0)20 4254000 / + 254 (0)20 4254501 / +254 711 097000 **Email**: Barclays.kenya@barclays.com	23. Securities Africa Kenya Limited The Exchange Building, 2nd Floor,Westlands Road, P.O Box 19018-00100 **Tel**: +254-735 571530, +254-714 646406 **Email**: infoke@securitiesafrica.com **Web**: www.securitiesafrica.com	24. EFG Hermes Kenya Limited Orbit Place, 8th Floor, Westlands Road, P.O Box 349, 00623 **Tel**: +254 (020) 3743040 **Email**: kenyaoperations@EFG-HERMES.com **Web**: www.EFG-HERMES.c

Appendix III: Individual Investors Data for Analysis

Investor	SR	IS	RA	ln_sp	Gender	MaritalStatus	Age_group	children	education
1.	0.02	3.28	2.75	5	1	1	0	0	1
2.	-1.26	3.56	2.13	2	0	1	0	0	1
3.	-1.76	2.94	2	5	0	0	0	1	1
4.	-2.14	3.28	2.63	5	0	1	0	0	1
5.	-1.61	3.33	2.5	4	0	0	0	1	1
6.	-1.37	3.28	1.88	3	1	1	0	0	1
7.	-2.92	3	2.63	3	1	1	0	0	1
8.	-2.11	3.11	2.13	3	1	0	0	1	1
9.	-1.66	3.44	2.38	3	0	1	0	0	1
10.	-2.46	2.94	2.25	2	0	1	1	1	1
11.	-1.8	3.22	2.13	3	1	0	1	1	1
12.	-1.73	3	2.25	3	1	1	0	0	1
13.	-1.09	3.61	2.25	3	1	1	0	0	1
14.	-1.52	2.89	2.5	3	0	1	0	0	1
15.	-2.13	3.28	2.63	3	0	1	0	0	1
16.	-1.61	3.39	3.25	4	1	1	0	0	1
17.	-1.51	3.06	2.25	3	0	0	1	1	1
18.	-0.71	3.22	2.25	3	0	1	0	1	1
19.	-1.73	3.5	2	3	1	1	0	0	1
20.	-1	3.28	2.25	2	1	1	0	0	1
21.	-7.25	3.44	2.63	3	1	0	1	1	1
22.	-1.7	3.06	2	4	1	1	0	0	1
23.	-1.86	3.33	2.13	3	0	0	1	1	1
24.	-1.73	2.28	1.88	3	1	1	0	0	0
25.	-3.02	3.17	2.38	3	0	0	1	1	1

26.	-2	3.22	2.63	3	1	0	1	1	1
27.	-1.64	3.61	2.25	2	1	1	0	1	1
28.	-4.99	2.94	2.25	4	0	0	0	1	1
29.	-1.71	3.67	2.5	4	1	1	0	0	1
30.	-0.04	2.83	2.5	3	1	0	1	1	1
31.	-0.52	3.17	2.38	3	0	1	0	0	1
32.	-1.69	3.33	1.5	3	0	0	0	0	0
33.	-2.26	3.56	2.88	3	1	1	0	0	1
34.	-1.05	3.22	2.25	5	0	1	0	0	1
35.	-1.7	2.83	2.88	4	1	0	0	1	1
36.	-0.25	3.83	2.88	2	1	1	0	0	1
37.	-1.73	3.11	2.13	3	1	1	0	1	1
38.	-1.1	3	2.63	4	0	1	0	0	1
39.	-0.03	2.94	2.38	2	1	1	1	0	1
40.	-0.52	3	2.88	3	0	1	0	0	1
41.	-1.43	3.44	2.38	3	0	1	0	0	1
42.	-1.74	3.17	1.5	3	0	0	1	1	1
43.	-2.91	2.89	2.25	4	0	0	0	0	1
44.	-1.77	3.06	2.25	3	1	1	0	0	1
45.	-1.73	3.72	2	3	1	1	1	1	1
46.	-3.4	3.11	2.25	3	0	0	0	1	1
47.	-4.89	3.44	2.25	5	0	0	1	1	1
48.	-0.59	2.72	2.38	3	0	1	0	0	1
49.	-1.35	2.28	1.63	3	1	0	1	1	1
50.	-5.01	4.06	2.5	3	1	1	1	0	1
51.	-1.28	3.17	2	3	1	1	0	0	1
52.	-1.73	2.78	2	3	1	1	0	0	0

53.	-1.38	2.56	2.25	3	0	0	0	1	1
54.	-1.99	3.83	2.75	4	1	1	0	0	1
55.	-1.39	3.56	2.75	4	1	1	0	0	1
56.	-5.65	3.28	2.63	3	1	1	0	0	1
57.	-1.03	3.22	2.5	3	1	1	0	0	1
58.	-1.63	3.33	2.13	3	1	1	1	1	1
59.	-1.55	3.39	2.38	4	0	1	0	0	1
60.	-1.73	3.33	1.88	3	1	0	1	1	1
61.	-1.73	3.17	2.13	3	1	1	0	1	1
62.	-1.76	2.89	2	4	0	0	0	1	1
63.	-1.83	3.22	2	3	0	1	0	0	1
64.	-1.84	2.67	2.75	3	1	0	0	1	1
65.	-1.27	3.17	1.88	3	1	1	0	0	1
66.	-4.2	3.22	2.25	3	0	0	1	1	1
67.	-2.95	2.78	2	4	1	1	0	0	1
68.	-2.26	3.17	2.88	4	0	0	0	0	1
69.	-10.71	3.06	2.38	2	1	0	1	1	0
70.	-2.19	3.17	2.38	3	1	1	0	0	1
71.	-1.73	3.17	2.13	3	1	1	0	1	1
72.	-7.18	2.67	2.13	3	0	1	0	1	1
73.	-2.99	3	2.25	4	0	0	0	0	1
74.	-2.95	3.06	2.88	3	1	1	1	1	1
75.	-4.89	3.44	2.25	5	0	0	1	1	1
76.	-7.78	3.06	2.38	2	1	0	1	1	0
77.	-1.61	3.33	2.5	2	0	0	0	1	1
78.	-2.08	3.22	2.5	5	1	0	1	1	0

79.	-2.48	3.5	1.88	4	1	1	0	0	1
80.	-1	3.11	1.88	4	0	1	0	0	1
81.	-0.79	2.94	2.63	2	0	0	0	1	1
82.	-2.99	2.61	2.63	4	0	0	0	1	1
83.	-1.37	3.22	2.13	3	1	1	0	0	1
84.	-3.57	3.72	1.88	3	0	0	0	1	1
85.	-2.14	2.83	2.13	3	1	1	0	0	1
86.	-2.09	2.89	2.25	2	0	1	0	0	0
87.	-2.7	3.39	2.88	3	0	0	1	1	1
88.	-2.28	3.17	2.5	3	0	1	0	1	1
89.	-2.25	3.06	2	3	0	1	0	0	1
90.	-1.8	3.44	2.25	3	1	1	0	0	1
91.	-1.71	3.11	2.38	2	0	0	0	1	1
92.	-1.47	2.72	2	3	1	1	0	0	1
93.	-2.99	3	2.25	4	0	0	0	0	1
94.	-1.2	2.67	2.88	3	0	0	0	0	1
95.	-2.19	3.67	1.88	3	1	1	1	1	1
96.	-1.56	3.28	2.25	2	1	1	0	0	1
97.	-1.83	3.22	2	3	0	1	0	0	1
98.	-1.73	2.89	2.25	3	1	1	0	0	0
99.	-1.4	2.94	2.13	2	0	1	0	0	1
100.	-1	3.39	2.25	4	1	1	1	1	1
101.	-1.73	2.78	2.25	3	1	0	0	1	1
102.	-1.39	3.56	2.75	4	1	1	0	0	1
103.	-1	3.83	2.38	4	1	1	0	0	1
104.	-4.23	2.94	1.5	3	0	1	0	0	1
105.	-4.01	2.72	2.5	4	0	1	1	0	1

106.	-0.8	2.44	2	0	0	0	1	1	1
107.	-1.62	2.39	2.38	3	0	1	0	0	1
108.	-1.99	3.17	3	3	0	0	0	1	1
109.	-0.19	2.78	2	3	1	1	0	0	0
110.	-5.83	2.94	2.25	4	1	1	0	0	1
111.	-1.87	3	2.75	3	0	1	0	0	1
112.	-1	3.11	1.88	4	0	1	0	0	1
113.	-6.77	3.11	2	4	0	1	1	1	1
114.	-4.54	3.33	2.75	4	1	1	1	1	1
115.	-2.18	3.67	2.5	3	0	1	0	0	1
116.	-1.44	3.72	2.63	5	1	1	0	0	1
117.	-1.8	2.78	3	4	0	1	0	0	1
118.	-0.09	3.28	2.5	3	1	1	0	0	1
119.	-1.3	2.78	2.13	2	0	1	0	0	1
120.	-1.76	3.06	2.38	5	1	1	0	0	1
121.	-1.9	2.78	2.63	3	1	1	0	0	1
122.	-1.3	2.61	2.25	4	0	0	0	1	1
123.	-1.52	2.22	1.38	2	0	0	0	0	1
124.	-1.9	3.17	2.63	4	0	0	0	1	1
125.	-1.74	3.22	2.25	5	1	1	0	0	1
126.	-1.95	3.06	2.38	3	0	1	0	0	1
127.	-2.92	3.11	1.75	2	0	0	0	1	1
128.	-1.91	3.11	2.25	3	0	1	0	0	1
129.	-0.46	3.06	2.63	3	0	0	0	1	1
130.	-0.64	2.67	2.5	3	0	1	0	0	1
131.	-2.05	3.22	2.5	5	1	0	1	1	0
132.	-2.2	2.72	2	4	1	1	0	0	1

133.	-1.73	3.06	2.38	3	0	1	0	0	1
134.	-1.7	2.94	2.63	3	1	1	0	0	1
135.	-0.97	3.22	2.5	2	1	1	0	0	1
136.	-0.29	3.5	2.63	4	0	1	0	0	1
137.	-0.63	3.78	2.38	3	1	1	0	0	1
138.	-1.58	3.33	2.88	2	1	1	0	0	1
139.	-1.83	3.22	2	3	0	1	0	0	1
140.	-2.51	2.89	1.88	2	0	1	1	1	1
141.	-1.88	3.17	2.25	7	1	1	0	0	1
142.	-0.49	3.72	2.63	5	1	1	0	0	1
143.	-1.99	3.44	2	4	0	0	1	1	1
144.	-1.81	3	2.25	4	1	1	1	0	1
145.	-1.2	3	2.63	3	0	0	0	1	1
146.	-2.09	3.67	2.88	3	1	1	0	0	1
147.	-2.18	3.06	2.13	3	0	0	0	1	1
148.	-2.28	3.44	1.75	2	1	1	0	0	1
149.	-3.82	2.67	2	2	1	0	0	0	1
150.	-2.44	2.94	1.88	2	1	1	0	0	1
151.	-1.41	3	2.13	2	1	1	0	0	0
152.	-0.48	3.44	1.75	5	1	1	0	0	1
153.	-0.92	2.78	1.88	3	0	0	0	0	0
154.	-1	3.11	2.63	4	1	1	0	0	1
155.	-1.73	2.94	2.88	3	1	1	0	0	1
156.	-4.95	2.28	1.75	3	0	1	0	0	1
157.	-2.46	2.94	2.25	2	0	1	1	1	1
158.	-1.91	2.56	2.75	2	1	1	0	0	1
159.	-1.2	2	2	3	0	0	1	0	1

160.	-1.73	2.72	2	4	1	1	0	0	1
161.	-1.95	3.06	2.25	3	1	1	0	1	1
162.	-1.95	3.22	2	3	1	1	0	0	1
163.	-2.48	2.89	2.63	5	0	0	0	1	1
164.	-1.9	2.78	2.63	3	1	1	0	0	1
165.	-1.76	3.22	2.25	5	1	1	0	0	1
166.	-1.47	2.72	2	3	1	1	0	0	1
167.	-1.73	3	2.25	3	1	1	0	0	0
168.	-3.47	4	2.75	4	0	1	1	0	1
169.	0.06	3	2.5	4	1	1	0	0	1
170.	-1.26	2.94	1.88	2	1	1	0	0	1
171.	-1.81	3	2.13	2	0	1	0	1	1
172.	-2	3.39	2.88	3	1	1	0	0	1
173.	-3.89	3.06	2	3	1	1	0	1	1
174.	-2.14	3.11	1.75	3	1	1	0	0	1
175.	-2.01	3.33	2.5	3	1	1	0	0	1
176.	-1.67	2.89	2.38	3	0	0	0	1	1
177.	-0.54	2.28	1.63	3	1	0	1	1	1
178.	-1.96	3.06	2.5	3	1	1	0	1	1
179.	-0.39	2.72	2.13	2	1	1	0	0	1
180.	-1.09	3.11	2	3	0	1	0	0	1
181.	0.01	2.78	1.88	2	0	0	0	1	1
182.	-1.44	3.44	2.38	2	0	1	0	0	1
183.	-1.73	3.33	2.38	3	0	0	1	1	1
184.	-7.25	3.33	2.63	3	1	0	1	1	1
185.	-3.47	4	2.75	3	0	1	1	0	1
186.	-1.73	3.5	2	4	1	1	0	0	1

187.	-0.22	3.17	2.88	3	0	0	0	0	1
188.	-1.43	3.22	2.88	4	0	0	0	0	1
189.	-2.75	2.83	2.63	2	0	1	0	1	1
190.	-2.09	3.28	1.88	3	1	0	1	1	1
191.	-1.62	3.06	2.63	3	0	0	0	1	1
192.	-2.16	3	2.5	3	0	1	0	0	1
193.	-3.51	3.67	3	4	1	1	0	0	0
194.	-7.6	3.06	2.38	4	1	0	1	1	0
195.	-1.52	3.39	3	2	1	0	1	1	0
196.	-1.26	3.5	2.88	2	1	0	1	1	0
197.	-2.34	3.89	2.88	3	1	0	0	1	1
198.	-1.03	2.89	3	7	0	1	0	0	1
199.	-1.35	3.33	2.5	2	0	1	0	0	1
200.	-1.3	3.17	2.13	3	0	1	0	0	1
201.	-0.87	3	2.63	2	1	0	1	1	1
202.	-3.48	3.33	2.88	4	0	0	1	1	1
203.	-1.94	3.11	2.88	4	1	1	1	0	1
204.	-1.76	3	2.88	6	0	0	1	1	1
205.	-1.62	3.44	3.25	4	1	0	1	1	1
206.	-1.38	3.17	2.88	3	1	1	1	1	1
207.	-1.52	2.61	2.13	3	1	0	1	1	1
208.	-1.61	3.33	2.5	2	0	1	1	1	1
209.	-1.93	3.44	2.75	5	1	0	0	0	1
210.	-1.68	3.61	2.88	5	1	1	0	0	1
211.	-1.35	3	2.5	4	0	0	1	1	1
212.	-1.62	3.67	3	3	1	1	0	0	1
213.	-1.53	3.67	2.88	3	0	0	1	1	1

214.	-3.49	3.56	3.25	5	1	1	0	0	1
215.	-1.53	2.94	2.88	4	0	0	1	0	1
216.	-1.67	3.28	2.63	5	1	0	1	0	1
217.	-1.87	3.5	2.88	2	0	0	1	0	1
218.	-1.3	3.28	2.5	4	1	1	1	1	1
219.	-1.52	3	2.38	2	1	1	1	1	1
220.	-1.94	3.17	3.13	2	1	1	1	0	1
221.	-0.1	3.44	2.63	5	0	0	0	0	1
222.	-1.69	2.94	2.25	3	1	0	1	0	1
223.	-2.2	3.22	3.38	5	1	0	0	0	1
224.	-1.2	2.89	2.5	4	1	1	0	0	0
225.	-2.09	3.72	3.13	3	1	0	1	1	1
226.	-2.21	3.33	2.38	4	1	1	0	0	0
227.	-1.52	3.11	2.38	4	1	1	1	0	1
228.	-1.92	3.5	2.75	2	0	1	1	0	1
229.	-1.73	3.22	2.13	5	0	0	0	0	0
230.	-1.68	3	3.25	3	0	0	0	1	1
231.	-1.6	3.44	2.38	4	0	1	1	0	1
232.	-1.13	3.44	2.63	4	1	0	1	1	1
233.	-1.44	3.06	3.5	4	0	1	1	0	0
234.	-1.51	3.61	2.38	4	1	0	1	1	1
235.	-1.55	3.17	2.63	3	1	0	1	1	1
236.	-2.04	3.17	2.25	2	1	0	1	0	1
237.	-1.7	3	3.13	3	1	0	1	1	1
238.	-2.25	3.44	2.75	3	1	0	1	1	1
239.	-1.73	2.94	3.25	4	1	0	1	1	1
240.	-1.84	3.11	2.38	3	1	0	1	1	1

241.	-1.61	3	2.13	4	1	0	1	1	1
242.	-2.42	3.22	3	4	1	0	0	0	0
243.	-1.62	3.5	2.88	6	1	1	1	1	1
244.	-1.75	3.39	2.38	3	1	0	1	1	1
245.	-0.92	3.33	2.25	3	1	1	1	1	0
246.	-1.87	3.22	2.38	3	1	0	1	1	1
247.	-1.62	3.61	2.75	3	1	1	0	0	0
248.	-1.73	3.22	2.5	3	1	0	1	1	1
249.	-1.88	3.72	2.63	3	1	0	1	1	1
250.	-1.16	3.06	2.88	7	0	0	1	1	1
251.	-1.55	3.17	3.38	3	1	0	1	1	0
252.	-1.73	4.06	2.75	2	1	0	1	1	1
253.	-1.36	3.11	2.38	3	1	0	1	1	1
254.	-1.46	3.33	3.38	5	1	1	0	0	1
255.	-1.52	3.39	3.13	3	1	1	1	1	1
256.	-1.38	3.11	3.13	2	1	1	0	1	1
257.	-1.68	3.22	2.63	3	1	0	1	1	1
258.	-1.99	3.44	3.13	4	1	1	1	1	1
259.	-1.4	3	3.25	4	1	0	0	0	0
260.	0.12	3.78	2.88	2	0	0	1	1	1
261.	0.12	3.33	2.88	6	1	1	0	0	1
262.	-1.38	3.5	2.38	3	1	1	1	1	0
263.	-1.75	3.28	2.75	3	1	1	0	0	0
264.	-1.96	3.67	3.5	3	1	0	1	1	1
265.	-1.71	3.67	2.75	3	1	1	0	0	0
266.	-1.93	2.44	2.88	5	1	0	1	1	1

267.	-24.24	3.39	2.63	3	0	1	0	0	1
268.	-12.12	3.28	3.38	2	1	0	1	1	0
269.	-2.15	3.06	2.5	3	1	0	0	1	1
270.	-1.72	3.56	2.38	4	0	1	1	0	0

Appendix IV: Brokerage Firms that Participated

1. Sterling Capital,
2. Dyer & Blair,
3. Francis Drummond,
4. Kingdom Securities,
5. Suntra Investments,
6. Old Mutual,
7. SBG Securities,
8. Standard Investment Bank and
9. Genghis Capital.
10. Image Registrars-share registration company
11. Research 8020

The number of questionnaires distributed in the survey:

86 investors of SBG Securities,

92 of Standard Investment Bank and

82 of Genghis Capital,

85 of Research 8020 and

55 investors who are known by the researcher

Total 400

Appendix V: Treasury Bill Rate

https://www.centralbank.go.ke/bills-bonds/treasury-bills/

Average of 91-Day Tenor Treasury Bill Rates

01/01/2015	8.6198
01/02/2015	8.58925
01/03/2015	8.486
01/04/2015	8.418
01/05/2015	8.2565
01/06/2015	8.2578
01/07/2015	10.259
01/08/2015	11.52433333
01/09/2015	14.61325
01/10/2015	21.41122222
01/11/2015	11.54233333
01/12/2015	11.21057143
01/01/2016	11.35825
01/02/2016	10.6304
01/03/2016	8.7185
01/04/2016	8.9195
01/05/2016	8.1622
01/06/2016	7.25
01/07/2016	7.41
01/08/2016	7.0665
01/09/2016	8.05525
01/10/2016	7.804
01/11/2016	8.192
01/12/2016	8.4415
01/01/2017	10.3464
01/02/2017	8.635
01/03/2017	8.628
01/04/2017	8.76925

01/05/2017	8.7092
01/06/2017	8.3918
01/07/2017	8.2234
01/08/2017	8.174
01/09/2017	8.133
01/10/2017	8.089
01/11/2017	8.01225
01/12/2017	8.007
01/01/2018	8.0434
01/02/2018	8.02875
01/03/2018	8.02075
01/04/2018	8.0012
01/05/2018	7.9575
01/06/2018	7.8335
01/07/2018	7.6846
01/08/2018	7.63925
01/09/2018	7.64175
01/10/2018	7.5608
01/11/2018	7.35625
01/12/2018	7.3432
01/01/2019	7.193
01/02/2019	7.02
01/03/2019	7.07575
01/04/2019	7.3888
01/05/2019	7.17275
01/06/2019	6.90475
01/07/2019	6.6226
01/08/2019	6.43725
01/09/2019	6.35
01/10/2019	6.38325
01/11/2019	6.64775
01/12/2019	7.1704
01/01/2020	7.22775

01/02/2020	7.30725
01/03/2020	7.2906
01/04/2020	7.2105
01/05/2020	7.27
01/06/2020	7.1412
01/07/2020	6.23575
01/08/2020	6.1948
01/09/2020	6.286
01/10/2020	6.49425
01/11/2020	6.6858
01/12/2020	6.90175