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**THE EFFECTS OF COGNITIVE BIASES ON INVESTMENT DECISIONS AMONG
RETAIL INVESTORS AT THE NAIROBI SECURITIES EXCHANGE**

SAADIA ABDIKADIR SHEIKH

102349

**A RESEARCH THESIS IN PARTIAL FUFILLMENT OF THE REQUIREMENT FOR
THE DEGREE OF MASTER OF COMMERCEIN FINANCE AT STRATHMORE
UNIVERSITY**

STRATHMORE UNIVESRSITY BUSINESS SCHOOL



STRATHMORE UNIVESRSITY

NAIROBI, KENYA

MAY 2025.

DECLARATION

I declare that this work has not been previously submitted and approved for the award of degree by this or any other university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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Saadia Abdikadir Sheikh

Admission Number:102349

Signature  Date:19th May 2025


Approval

This research of Saadia Abdikadir Sheikh was reviewed and approved for examination by:

Dr. Albert Ochieng Abang'a,

Lecturer-Accounting and Finance,

Strathmore University Business School.

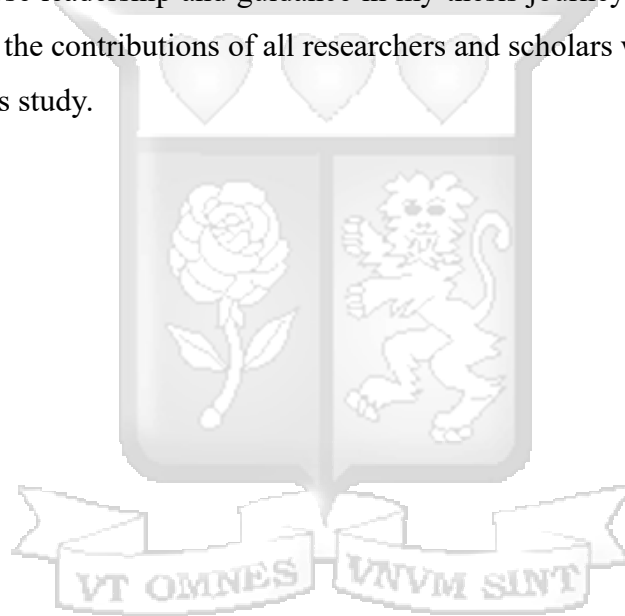
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I am grateful for the guidance and help offered to me by my thesis Supervisor, Dr. Albert Ochieng Abang'a whose leadership and guidance in my thesis journey is greatly appreciated. Lastly, I acknowledge the contributions of all researchers and scholars whose work has served as a foundation for this study.



DEDICATION

This work is dedicated to my family for their continuous encouragements and unwavering support during this study.



ABSTRACT

Financial markets play a crucial role in economic development through capital mobilization and allocation, yet retail investor participation in the Nairobi Securities Exchange (NSE) remains low despite various policy interventions. While traditional finance theories such as the modern portfolio theory assume investor rationality, behavioral finance theories such as the prospect theory recognize that psychological factors significantly influence investment decisions. This research investigated the effects of cognitive biases on retail investors' investment decisions in the Nairobi Securities Exchange (NSE). The specific objectives were to investigate the effect of anchoring, illusion of control and loss aversion biases on retail investment decisions retail at the NSE, Kenya. The study surveyed 88 active retail investors in April 2025 in Nairobi County using structured questionnaires that were administered online. The study adopted a quantitative approach to collect and analysing data the Statistical Package for Social Sciences. The collected data was coded and classified appropriately to ensure responses were processed correctly. It was revealed that all three behavioral biases, anchoring bias illusion of control bias, and loss aversion bias had a positive significant influence on retail investors' investment decisions at the NSE. The study recommends intensified investor education programs to address these behavioral biases, collaboration among regulatory bodies and financial advisors to develop training on rational investment approaches as well as incorporation of behavioral awareness into financial literacy campaigns to help investors recognize and mitigate the impact of psychological biases on their financial choices. The study limitations were that of overreliance reliance on self-reported data, which may be subject to bias in social desirability or inaccurate self-assessment. It also focused on individual investors at the Nairobi Securities Exchange, which may limit the generalizability of the findings to institutional investors or investors in other markets.

Key terms: Cognitive biases, Investor behavior, Nairobi Stock Exchange.

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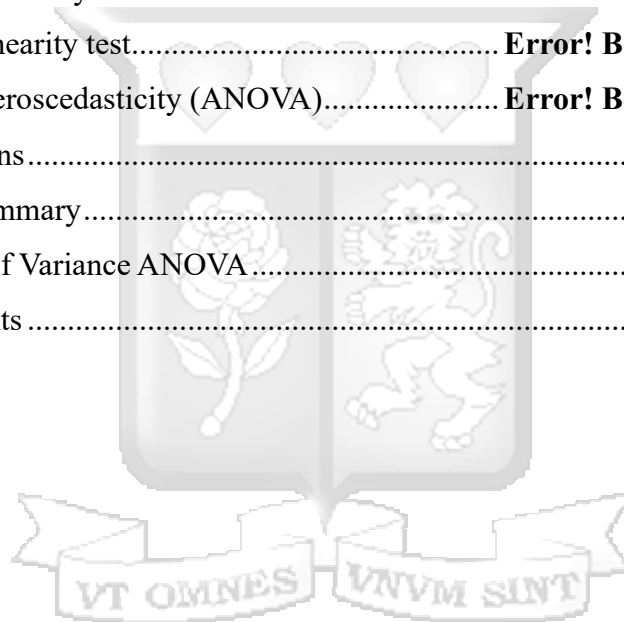
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ABBREVIATIONS

APT	Arbitrage Pricing Theory
CAPM	Capital Asset Pricing Model
CMA	Capital Markets Authority
EMH	Efficient Market Hypothesis
ICIFA	Institute of Certified Investment and Financial Analysts
MPT	Modern Portfolio Theory
NSE	Nairobi Securities Exchange



DEFINITION OF TERMS

Anchoring Bias: Anchoring bias occurs when investors over-rely on initial information, e.g., historical prices of stock or anchors, when making financial decisions. It results in misestimation and suboptimal investment choices (Bruckmaier et al., 2021).

Capital Asset Pricing Model (CAPM): CAPM captures the expected return-risk relationship-systematic, indicating how securities should be priced in a perfect market. Portfolio management is one of the most common usages of CAPM (Fama and French, 2015).

Cognitive Biases: Cognitive biases are systematic deviations from rational choice, leading investors to make mistakes. Cognitive biases can affect investment choices and the behavior of markets (Korteling et al., 2023).

Illusion of Control: Illusion of control is a form of psychological bias where investors overestimate their ability to predict or influence financial market outcomes. The bias often leads to excessive risk-taking and trading (Barber and Odean, 2013).

Investment Decisions: These are decisions involving the selection of financial assets made by investors based on their expected return, risk appetite, market conditions. They are affected by economic factors, investor preferences, behavioral and psychological biases (Statman, 2019).

Loss Aversion: The tendency for individual investors to feel losses more strongly than they feel gains of equal magnitude. It causes individual investors to hold on to losing stocks longer than rational choice would suggest (Tversky and Kahneman, 1992).

Retail Investor: Retail investor refers to an individual who transacts in securities for personal investment and not institutional investment. Retail investors typically possess limited funds and rely on market data available to the public (ICIFA, 2022).



CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Financial markets have a role in the growth of world economies through the mobilization, allocation of capital within the economies and ensuring funding in productive investment opportunities (Nawaz, 2019). These markets create an important platform for wealth creation, risk mitigation as well as providing financial intermediation for retail investors and firms for investment (World Bank, 2023). The stock market forms the most effective channel for business organizations to raise capital as it allows individuals to grow their financial assets but also take part in the development of a strong equity market that has depth and liquidity (Mishkin and Eakins, 2018).

In more developed countries such as the United Kingdom, Germany, France, United States and China, financial markets have played crucial role in facilitating economic growth and developments as well, as the establishments of strong and resilient stock markets that support investor activities (IMF, 2022). The London Stock Exchange (LSE) and New York Stock Exchange (NYSE) have significant contributed to high market efficiency levels, led by developed financial systems, investor education, and technology adoption (Malkiel, 2019). Stock market participation in Asian Markets such as China and India have increased over the years because of government led incentives for financial inclusion and retail investor engagement (Chaudhry and Bajwa, 2021).

In Africa, financial markets have over the years lagged the rest of the global markets, with the vibrant stock markets in Africa being that of Egypt, South Africa, Nigeria and Kenya (AfDB, 2024). The Johannesburg stock Exchange (JSE) is the leading stock exchange with the most liquidity with both institutional investors and retail investors (Osei-Assibey et al., 2021; Silwal and Bajracharya, 2021). While other stock markets in the continents like Ghana, Tanzania having low liquidity coupled with regulatory problems as well as low investor confidence level (Okonkwo & Okereke, 2025). African stock markets are more volatile, with investor sentiment significantly influenced by economic uncertainty, inflation, and ineffective regulations (Raut, 2020; Silwal and Bajracharya, 2021; Monicah and Shiundu, 2020; Kuria, 2019; Lawal et al., 2024).

1.1.1 Cognitive Biases

Cognitive biases are the systematic patterns of deviation from rationality, norm in judgement that causes an individual to make inaccurate judgement, perceptual distortion, and illogical interpretation in decision making process (Kahneman & Klein, 2009). Similarly, it can also be defined as systematic, universal tendencies, inclination or dispositions found in individual's decision making which make investors' decisions to be vulnerable to inaccurate, suboptimal or wrong outcomes (Korteling et., 2023). Behavioral finance unlike the traditional finance theories recognizes that cognitive biases can significantly shape an individual investor decision as well as the overall. Most behavioral variables within these factors such as anchoring, loss aversion, over-confidence, and market information have an effect on investor decision-making (Barber and Odean, 2013). Anchoring biases come about when an individual investor is seen to be heavily relying on their initial references points such as historical stock prices when arriving at a decision, thus, resulting in investors failing to adjust their expectations with account to the newly available information in the market (Shefrin & Statman, 2000).

Anchoring has been found to have a high influence on an investor behavior in particularly their decision making as it leads to mispricing in the market and irrational trading patterns. Individual investors are fixed on having to hold on to overpriced assets based on their past high or undervalued value due to previous performance (Kengatharan & Kengatharan, 2014). Another critical bias that influences investor's behaviour and decision making is that of loss aversion. This is the reason why individual investors fear losses more than they value gains of equivalent amount. It causes an investor to continue holding onto underperforming assets longer than a rational investor would in a normal situation, all in attempt to avoid realizing further losses (Kahneman & Tversky, 1979).

In global markets, studies have documented various cognitive biases influencing retail investors, leading to market inefficiencies and bad investment decisions (Malkiel, 2019). Research in the United Kingdom and United States has identified biases such as illusion of control, anchoring, and loss aversion direct investors away from rational decision-making (Statman, 2019). Barber and Odean (2013) showed that overconfident investors be likely to ignore both technical and fundamental analysis when making investment decisions and instead rely on their perceived personal experience (Barber and Odean, 2013). In China and India, behavioral biases are found to lead to herding behavior, excessive trading, and speculative investment strategies (Chaudhry and Bajwa, 2021). In India, research shows that loss aversion is the most significant cognitive biases affecting investor decisions followed by overconfidence

and experience (Varshini & Vinayalaxmi, 2024). In Africa, research on behavioral finance is still scarce, but South African and Nigerian research reveals that loss aversion, herding, and overconfidence significantly influence investor behavior (Okonkwo & Okereke, 2025). South African investors are more risk-tolerant compared to investors in East Africa, who are risk-averse and more reliant on social networks when making investment decisions (Osei-Assibey et al., 2021).

Studies done on Zimbabwean stock market concur that loss aversion causes investors to be more reluctant in selling off declining stocks further contributing to prolonged market downturns (Hunguru et al., 2020). Investors follow market trends and other investors' decisions due to lack of investor education and are more risk-averse after encountering heavy losses (Hunguru et al., 2020). Kaustia et al., (2023) also noted that risk aversion is an important factor in affecting investor decisions and that failure to control it would lead to biases in the other variables. Individual investors have been giving an illusion of control in investment behaviour whereby they tend to overstate their ability to predict and influence market movements (Qadri & Shabbir, 2014). This leads to investors having to undertake an excessive amount of trading activities that are high risk in nature with the belief that they can outperform the market by relying on personal skills and failing to recognize the market pattern (Qadri & Shabbir, 2014). A recent study done by Ong'eta and Nasution (2021) on individual investor behaviour in NSE, also argued that overconfidence bias, which in this case closely relates to the illusion of control, tends to contribute to instances of increased market volatility due to high frequent trading.

1.1.2 Investment Decision

According to Statman (2019), financial success depends on investment decisions when operating within volatile market conditions such as the Nairobi Securities Exchange (NSE). The allocation of economic resources to equities, bonds, real estate, and derivatives happens for expected future returns during investment decision-making. Modern Portfolio Theory by Markowitz (1952) demonstrated that rational investors use diversification to achieve maximum returns and minimum risks. Real-world investment decisions deviate from pure rationality because psychological, emotional, and cognitive factors actively influence how investors perceive and behave in financial decisions.

The Securities Industry and Financial Markets Association (SIFMA, 2024) noted that in 2023, most global equities markets performed phenomenally well. Global market capitalization in equities rose 13.4% compared to 2022, amounting to USD 115 trillion. For example, in the

United States, the Dow Jones index increased by 13.7%; in the United Kingdom, by only 4% in the FTSE 100. In Japan, Nikkei rose by 44% and in India, SENSEX went up 13%. In Africa, both JSE Index and EGX30 index rose by 5.3% and 66% respectively, while the NGX's All Share Index grew by 46%. While in Kenya, the NASI, NSE 20, and NSE 25 declined by 27.74%, 10.44%, and 24.04%, respectively in 2023, while equity market turnover declined 6% on a year-on-year basis to KES. 88 billion (CMA, 2024). This is also reflected in the overall decline in equity market capitalization at the NSE declined by 28% on a year-on-year basis to KES. 1.44 trillion, representing a loss of market capitalization of KES. 550 billion.

Foreign investor participation has shown a steady decline, dropping from 73.7% in December 2018 to 43.1% in the first half of 2023 (CMA. 2024). This decline has been primarily driven by tightening of monetary policy in advanced economies, causing rise in interest rates and subsequent capital outflows from emerging markets. The trend of net foreign investor outflows has continued into 2024, further complicated by domestic business environment challenges and firm-specific issues. These persistent outflows have contributed to exchange rate depreciation and increased market volatility, creating a challenging environment for the local equities market despite some positive indicators in early 2024, including increases in total equity turnover and shares traded.

The classical economic and financial theories base their assumptions on investors who demonstrate complete rationality while efficiently processing all available information to make optimal decisions. According to Fama (1970), the Efficient Market Hypothesis assumes that securities prices have and reflect on all available information, which prevents systematic mispricing from occurring. Real-world investors demonstrate irrational behaviour in their decision-making process because they experience numerous cognitive biases. The distortions in judgment because of these biases result in poor investment decisions that include excessive risk-taking and irrational exuberance, panic selling, and herd behaviour (Nyakurukwa & Seetharam, 2023). The NSE retail investors who lack financial knowledge and experience of speculative trading become easy targets for these biases.

The NSE investors base their investment decisions on various elements, which include macroeconomic conditions and firm performance, as well as interest rates, inflation, and regulatory policies. Behavioural factors, together with fundamental and technical elements, strongly influence how investors form their market sentiment and trading behaviour (Nyakurukwa & Seetharam, 2023). Retail investors make financial decisions through

heuristics, which are mental shortcuts that simplify complex choices but produce systematic errors. Investors who demonstrate overconfidence bias tend to exaggerate their forecasting abilities for stock movements, which results in excessive market activity and increased risk exposure.

Market efficiency and liquidity, together with volatility at the NSE, experience significant effects from cognitive biases in investment decisions (Naik & Reddy, 2021). Market bubbles and downturns both become worse because investors engage in herding behaviour by following others instead of using independent decision-making. Market rallies in the NSE showed speculative trading surges because investor sentiment pushed up stock valuations instead of fundamental market analysis. Investors who exhibit confirmation bias will choose investments based on selected facts that confirm their previous convictions while overlooking opposing evidence, thus leading to suboptimal decisions.

Behavioural biases have a role in the disposition effect, which causes investors to sell winning stocks too soon to secure small profits but keep underperforming stocks for extended periods, thus damaging their portfolio performance. Research by Gupta and Shrivastava (2022) indicates that retail investors in emerging markets, including Kenya, face challenges with this bias because they tend to hold onto their investments emotionally and have trouble accepting losses. Representativeness bias makes the incorrect assumption that current market trends will persist forever, which results in overreaction during bull markets and becoming overly pessimistic during bear markets. Market equilibrium suffers from these biases, which lead to excessive price fluctuations in the NSE.

1.1.3 Retail Investors at NSE

The Nairobi Securities Exchange (NSE) is widely recognized as one of the most developed stock markets in East Africa, and it has a long history of providing a platform for institutional and retail investors trading in securities (Wanjohi & Mwita, 2019). The Nairobi Securities Exchange has had over sixty years of growth and development since its establishment in 1954 offering an avenue for investors to wealth creation. It was formed in accordance with the Companies Act (CAP 486) of the Kenyan law and is governed by the Capital Market Authority of Kenya (CMA) that safeguards the development of the market as well as check compliance of the listed companies. Currently, the exchange provides a platform for the issuance and trading of financial instruments classes such as equities, bonds, derivatives. There are 65 listed

companies on the Nairobi Securities Exchange (NSE) which have been categorised into various sectors in the economy (NSE, 2024).

A retail investor in Kenya is individual who is with or without professional expertise or knowledge in the finance sector with an average monthly income between Ksh. 50,000 to Ksh. 200,000 with both short-term and long-term investments, and whose main reason for investing is for capital growth and income generation (ICIFA, 2022). The average individual investor at the NSE is under 45 years with a moderate investment portfolio and traded less than 7 years (Kirera & Mburugu, 2019). Investors engage in decision making by choosing one alternative of investments over other investment alternatives. Retail investors show a multifaceted decision-making pattern that often point out that they do not always use rational and are often driven by emotions. Bikas et al. (2013) found that retail investors often overestimate their skills and knowledge, with men trading more frequently than women. They tend to prefer investing in well-known local companies rather than diversifying their portfolios, relying heavily on readily available and familiar information contrary to traditional portfolio management theories.

In 2023, retail investors had 30% share of the stock markets while institutional investors held the majority with 70% of the market share (NSE, 2024). Participation of retail investors has also come down over the years, particularly from 2015 to 2021, by virtue of economic uncertainty, shift in the taste of investments, and regulation (CMA, 2022). Despite many efforts, including financial education initiatives, online trading websites, and incentives to encourage market participation, retail investors continue to face severe decision-making issues, raising questions about the role of behavioral factors in their investment behavior (Monicah & Shiundu, 2020). Retail investors trading securities for private investment opportunities rather than institutional investment, make decisions based on a combination of psychological, economic, and societal factors (Baker & Nofsinger, 2010). Retail investors in the United States and United Kingdom make investment decisions based on the available financial literacy, technology, and risk models (Statman, 2019). Within India and China, pro-participation policies by the government have caused retail investments to rise, while biases in choice-making still prevail (Chaudhry & Bajwa, 2021).

In Africa, stock market participation is minimal, and studies show that investment choices are influenced by investor education, risk tolerance, and regulatory matters (Osei-Assibey et al., 2021). A few studies in Nigeria and South Africa show that retail investors might lack adequate

financial literacy, leading to irrational trading activities (Okonkwo & Okereke, 2025). In Kenya, the decision-making habits of retail investors vary, depending on usual cues such as financial literacy, income, risk, and psychological bias (Wanjohi & Mwita, 2019; Kuria, 2024). Traditional finance theory suggests that the investor will do rational evaluation of risk and reward prior to choosing an investment opportunity (Ogunlusi & Obademi, 2021). In contrast, the empirical literature asserts that psychological bias plays a massive role in behavior in the stock market (Barber & Odean, 2013). Similarly, dividend policies have been found to impact investment decisions (Aroni et al., 2014), while financial literacy and social networks have significant effect on investment decisions (Parvin & Panakaje, 2022).

Market development and investor behaviour studies also revealed insights into structural factors affecting retail investor behavior. East African stock markets are highly concentrated, with the best shares being held by pension funds, SACCOS, banks, and insurance firms (Ndiritu & Mugivane, 2015). Financial literacy and social connection have a critical role in market participation. Investors in stock markets are significantly influenced by not only the individuals' level of financial literacy but also social inclusion (Parvin & Panakaje, 2022). Individual financial literacy and stock market involvement in Europe are influenced by social connectivity at the national level. This suggests that in countries with higher social connectedness, individuals might rely more on social networks for information about the stock market, making their own financial literacy relatively less critical for participation (Arts, 2018). Investment in the NSE is positively influenced by behavioral biases considerations especially, cognitive biases and rationality factors (Kimeu et al., 2016). This shows the need for comparative studies between traditional and behavioral finance on investment decisions.

1.2 Problem Statement

Retail investors in Kenya's financial market are fraught with challenges from information asymmetry, market sentiments, limited financial literacy, and exposure to poor advice (ICIFA, 2022). In 2023, the number of registered retail investors at NSE who had active monthly participation were 6,840 traders in 2024 (NSE, 2024). These have contributed to the inconsistencies in retail investor trading patterns and low investor participation in the market (NSE, 2024). Despite robust investor participation, regulatory oversight and investment firms' regulation, Kenya's retail investments at the NSE remain minimal compared to foreign investors and institutional investors.

Recent policy interventions, including financial literacy, regulation and macroeconomic policies, (Kaustia et al., 2023; Silwal & Bajracharya, 2021; Ong'eta, 2021) have sought to streamline the market and increase investor awareness. However, persistent neglect of psychological aspects of retail investor behavior, presents systematic weaknesses in investor decision making at the Nairobi Stock Exchange (NSE, 2024). These gaps are further amplified by investor's forecasting, market indexing and initial stock purchase price confidence, which limits opportunities for collective problem-solving.

Previous research has failed to capture how cognitive biases influence investment decisions in the Kenyan stock market. Previous research (Kimeu et al., 2016; Kaustia et al., 2023; Silwal & Bajracharya, 2021; Ong'eta, 2021) has been focused on macroeconomic variables, financial literacy, and regulation but has not considered the psychological aspects of retail investor behavior. Besides, most behavioral finance evidence originates from developed markets, and they might therefore be non-representative for emerging economies like Kenya (Malkiel, 2019; Chaudhry & Bajwa, 2021; Lawal & Sakariyahu, 2024). In addition, the NSE has gone through changes in market structure, investors, and technology (Ong'eta, 2021; Wanjohi & Mwita, 2019; Monicah & Shiundu, 2020; Kuria, 2019), and yet limited studies have focused on how the interaction of such changes with cognitive biases influences decision-making.

1.3 Objectives

1.3.1 General Objective

The study objective sought to investigate the effects of specific cognitive biases on retail investors' investment decisions in the Nairobi Securities Exchange (NSE).

1.3.2 Specific Objectives

- i. To determine the effect of anchoring bias on retail investors' investment decisions at the Nairobi Securities Exchange, Kenya.
- ii. To examine the effect of illusion of control bias on retail investment decisions at the Nairobi Securities Exchange, Kenya.
- iii. To evaluate the effect of loss aversion bias on retail investment decisions retail at the Nairobi Securities Exchange, Kenya.

1.4 Research Questions

- i. What is the effect of anchoring bias on retail investors' investment decisions at the Nairobi Securities Exchange?

- ii. What is the effect of the illusion of control bias on retail investors' investment decisions at the Nairobi Securities Exchange?
- iii. What is the effect of loss aversion bias on retail investors' investment decisions at the Nairobi Securities Exchange?

1.5 Significance of the Study

1.5.1 Regulators and Policy makers

This research will help policy makers and the regulators in the financial sector to formulate relevant strategies that help to minimise the negative impact of the cognitive biases on retail investor decisions, especially with investment decisions. This study therefore government bodies to come up with policies that will encourage more investors to actively participate and make more educated investment decisions in the securities market. It will support policy makers in financial institutions and brokerage firms to have better clientele profile and create products that target a wider client by creating policies that will increase in individual investor involvement in the securities market.

1.5.2 Investors

The outcome of this research is intended to provide valuable insights to aid investment managers and investors in understanding how psychological, emotional and behavioral biases influence their investment decisions. Additionally, it will form a basis for self-evaluation by individuals considering their past decisions, helping them gauge the extent of their biases and make necessary adjustments.

1.5.3 Academicians

This research will enhance the general body of knowledge in finance and serve as educational material for future scholars and researchers who wish to deepen their understanding of behavioral finance and utilize the study to develop research questions. The study will greatly advance financial economics by examining the relationships among various economic, social, cultural, demographic, and behavioral factors that influence overall investment decisions.

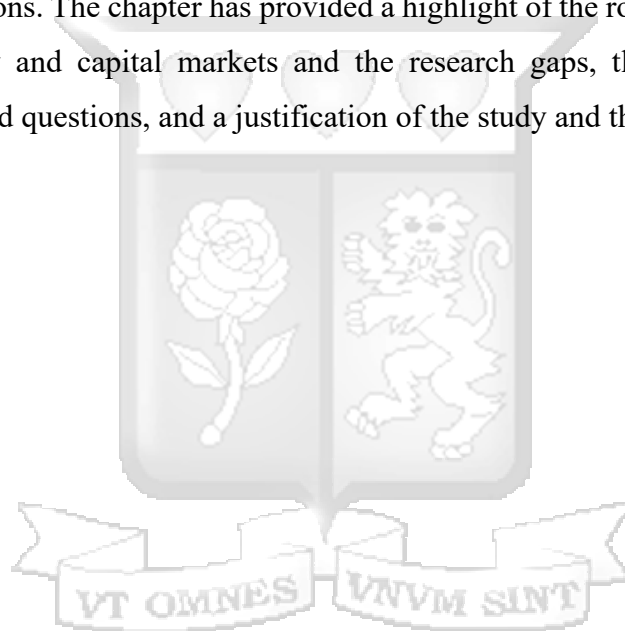
1.6 Scope of the Study

The research focused on determining the effect of cognitive biases on investment decisions of retail investors at the Nairobi Securities Exchange with an aim of understanding reasons for investment decisions. The specific objectives of the study were to investigate the effect of anchoring, illusion of control and loss aversion biases on retail investment decisions retail at the NSE, Kenya. The two theories that were used to guide the study were the modern portfolio

theory and the behavioral finance theories such as the prospect theory. The study was conducted among the NSE investors in the securities counter, as provided by the twenty-three registered security firms operating within Nairobi County, who appeared in their registers and databases at the time of the study. The population targeted were 6,840 registered individual retail investors at the NSE who were actively trading (NSE, 2024). The sample size was determined with Cochran's formula with Finite Population Correction (FPC) to find a sample size of 80 and adjusted sample size of 88 respondents. The study was carried out in April 2025 and in Nairobi County.

1.7 Chapter Summary

Chapter One has provided the background to the study, with an introduction to cognitive biases and investment decisions. The chapter has provided a highlight of the role of retail investors in the Kenyan economy and capital markets and the research gaps, the problem statement, research objectives and questions, and a justification of the study and the scope.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter gives an overview of the scholarly works done in the field of behavioral finance. It covers theoretical foundation of the study and the empirical studies that guided and supported the research. The theoretical framework provided the foundation for the development of concepts and the theories supporting behavioral finance. An empirical review of cognitive biases that affect an individual investor decision on NSE. This was followed by a summary of knowledge gaps arising from the study, the conceptual framework and then conclude with operationalization of the variables.

2.2 Theoretical Framework

The two theories that were used are Behavioral Finance theory and Modern Portfolio Theory. The theories were used to analyze the behavior of retail investors at the Nairobi Securities Exchange (NSE). This helped to provide an integrated framework to analyze the effect of cognitive biases on investment decisions and market efficiency in Kenya's stock market. The necessity for the integration of these two theories was that they could together explain both the rational and irrational behavior of investors. While MPT provided an understanding of risk, return, and market efficiency, behavioral Finance explained for the psychological causes for deviations from these models. This approach allowed a more advanced study of financial markets, acknowledging that while markets seek efficiency, the nature of people could lead to persistent inefficiencies.

2.2.1 Modern Portfolio Theory

Modern portfolio theory (MPT) or the portfolio management theory was first mentioned in 1952 by Harry Markowitz in his portfolio selection paper. The main hypothesis put forward was that in constructing a portfolio, investors will be willing to optimise their estimated return for a given level of risk. This linked the aspect of higher risk with high returns for investments. Investors are risk-averse and rational decision makers who select portfolio based on their risk returned preferences. Over the years, MPT has become one of the most fundamental economic theories in the areas of investment decisions, finance and economics (Markowitz, 1952).

MPT claimed that an asset's risk and return characteristics are assessed based on its contribution to the overall portfolio return and risk rather than in isolation (Markowitz, 1991). This led to the development of the efficient frontier concept that showed a selected set of optimal portfolios

with the highest expected return for a given level of risk or the lowest risk for a given level of expected return. It suggests that investors should not only hold one type of asset but rather diversify their investment to reduce the total portfolio risk by learning to effectively diversify their portfolio. This is because the risk held by a diversified individual is inherently less than that of undiversified with an individual asset. It was found that investors had two kinds of decisions in constructing their portfolio. This was mainly the asset allocation decisions and selection of assets to be included in the portfolio (Markowitz, 1952). Investors ought to focus on systematic diversification rather than believing they can control market outcomes through active trading. The theory predicts portfolio construction based on mathematical optimization rather than perceived control over market movements (Zahera & Bansal, 2018).

Despite its significant contribution to financial theory, MPT has faced numerous criticisms for the assumptions. It assumed investors were willing to maximize their return on investment from a given level which is not the case. Investors are fundamentally risk-averse and are likely to choose assets with the lowest risk. The limitation of the theory is that it assumed that the returns were normally distributed with investors having the same access to information and absences of taxes and transaction costs. However, the returns are not normally distributed with some being observed or have skewness and kurtosis (Rachev et al., 2005). Also, investors assess investments depending on their contribution to overall portfolio risk and return, not on individual gains or losses. The theory does not explain for the asymmetric preferences about gains versus losses, an aspect that fundamental in loss aversion bias (Filbeck et al., 2017).

Postmodern portfolio developments have attempted to address this limitation by adding alternative risk measures such as the downside risk and conditional value at risk to better capture the risk preferences of investors (Rockafella & Uryasev, 2002; Sortino & Satchell, 2010). Furthermore, there are robust portfolio construction methods like the hierarchical risk parity approaches that recognize the need to have hierarchal structure of asset correlations (Bailey & de Prado, 2013). Some of the limitations of MPTs have been addressed by the recent developments in portfolio theory. The concept of the modern portfolio theory has extended the capital asset pricing model CAPM by introducing systematic and unsystematic risks. Investors should be compensated only by bearing the systematic risk while the unsystematic risk is eliminated through diversification of the portfolio (Fama & French, 2004).

The model was further improved into the five-factor asset pricing model by accounting for size, profitability, value and investment factors (Fama & French, 2015). Despite this criticism, the

theory remains foundational to understanding rational investment behaviour. Its assumptions of investor rationality have been challenged by the behavioral finance theories, that recognize that investor behaviour deviates from rational expectations due to psychological biases.

The Modern Portfolio Theory (MPT) can be directly linked to the Kenyan investment landscape by highlighting how its principles apply to the NSE and retail investor behavior. While MPT assumes rational investment decision-making, the Kenyan market shows significant deviations that can be explained by cognitive biases. Retail investors at the NSE demonstrate behavior that contradicts MPT's assumptions of rational risk assessment. With only 1,477,959 registered retail investors and a mere 6,840 active monthly traders (NSE, 2024), the low participation suggests that factors beyond rational risk-return calculations are influencing decision-making. The concentrated ownership structure of the NSE, where institutional investors hold 70% market share (NSE, 2024), indicates that retail investors may face additional barriers to implementing optimal portfolio strategies as proposed by MPT (NSE,2024).

2.2.2 Behavioral Finance Theory.

Behavioral finance theories emerged as a response to the limitation of traditional finance theories such as the MPT and EMH in explaining market phenomenon and investor behaviour. It combines insights from behavioral sciences, psychology, sociology in explaining how emotional and Cognitive biases influence investment decision and market outcomes (Baker & Ricciardi, 2015). Behavioral finance examines how investors behave in the real world unlike traditional finance that focuses on how investors should behave theoretically (Statman, 2019).

Psychologist Daniel Kahneman and Amos Tversky were the first ones to establish the foundation for behavioral finance. This was through their revolutionary work on cognitive biases and heuristics that demonstrated that individual (Kahneman & Tversky, 1979). Two key limitations of traditional financial models identified were psychological biases that systematically distort the way investors interpreted and acted on information as well as the cognitive limitations preventing investors from processing information perfectly (Hirshleifer, 2015). This creates limited arbitrage that explains why market inefficiencies can persist even when identified by a rational investor.

Behavioral finance uses these insights to integrate into the traditional asset pricing models soecifically CAPM and APT to form Behavioral Asset Pricing Models. Thus, the model explains why market anomalies such as momentum, overreaction or underreaction to news

hence challenging the notion of efficient market theory (Barberis, 2018). Behavioral finance has moved beyond the field of psychology with numerous studies done in integrating neuroscience with behavioral finance to understand the neurological basis of financial decision making (Frydman & Camerer, 2016).

The development of the prospect theory by Daniel Kahneman and Amos Tversky challenged the expected utility theory by explaining how individuals make decisions under risk and uncertainty. Theory prospect theory has been used to explain some of the biases that an individual decision maker experiences such as loss aversion, mental accounting, regret aversions. They argue that there are seeming regularities in human behaviour when evaluating risk and uncertainty (Kahneman & Tversky, 1979). Investors tend to evaluate potential outcomes as either losses or gains in relation to a reference point rather than absolute wealth (Barberis N. C., 2013). Empirical studies have found that losses have a greater effect than their equivalent gains with estimates signifying that losses weigh 1.5 to 2.5 times higher than their corresponding gains (Tversky & Kahneman, 1992).

Investors experience a framing effect whereby when two equivalent outcomes of investment are presented to them, they are risk averse with potential gains and a risk-seekers with potential losses. This pattern explains why investors often become risk-seeking when facing losses, attempting to recover their position rather than accepting a certain loss (Barberis N. C., 2013). A key concept on more developed prospect theory, the cumulative prospect theory is probability weighting function whereby investors subjectively overweigh small probabilities and underweight moderate to high probability (Tversky & Kahneman, 1992). The theory provides a framework for understanding the effects of cognitive biases on individual investor behaviour in the financial markets.

For the Kenyan context, prospect theory's emphasis on loss aversion is particularly relevant given the market's volatility and the documented reluctance of NSE investors to realize losses (Kirera & Mburugu, 2019). The framing effect helps explain why Kenyan investors become risk-seeking when facing losses in volatile NSE conditions, attempting to recover their position rather than accepting losses.

2.3 Empirical Review

This section reviews the existing studies and literature discussions that have covered and assessed the effects of these three cognitive biases that guide this study on investment decisions.

2.3.1 Anchoring Bias and investment decision

Anchoring biases in decision-making were first discussed by Psychologists Kahneman and Tversky in their research paper titled “Judgment under Uncertainty: Heuristics and Biases”. Anchoring biases happen when an individual investor heavily relies on initial information when making financial decisions despite the chance that the information may be irrelevant or arbitrary. They stated that investors start with anchoring value and make sufficient adjustment away from it. Investors believe that current prices are right and hold much importance on recent experiences (Tversky & Kahneman, 1992). Further development in anchoring studies led to the development of the selective accessibility model whereby it was found that anchors activate consistent information in memory hence biasing subsequent judgment (Strack & Mussweiler, 2017). In addition, it was demonstrated that anchoring effects continue to persist even when decision makers are explicitly informed and financially incentivized to avoid them (Chapman & Johnson, 2018). Recent Research further distinguishes between self-generated anchors and externally provided anchors stating that both operate at a different level since anchors come from various sources such as historical prices, analyst forecasts, or self-generated reference points (Epley & Gilovich, 2016).

Barno, Cheboi, and Muganda (2021) examined the role of financial literacy in the relationship between anchoring and investment decision-making among Small and Medium Enterprises (SMEs) in Nairobi County. The authors of the study, which was published in the East African Journal of Business and Economics, used a survey design to investigate how entrepreneurs make their investment decisions based on past stock prices, market trends, and expert opinions. The results of the study showed that financially literate investors were less likely to be influenced by anchoring bias as they used detailed market analysis as opposed to relying on arbitrary reference points. This study thus underscores the importance of financial literacy in minimising cognitive biases in investment decisions and thus implies that educational programs may be useful in improving the rationality of retail investors at the NSE.

Njeru and Matanda (2023) built on this by analysing behavioral factors that affect investment decisions made by individual investors in the real estate market in Nairobi County. The study conducted in the International Academic Journal of Economics and Finance established that anchoring bias played a major role in property valuation and purchase decisions. In the process of setting price expectations, investors used the initial listing prices as their reference points instead of undertaking independent market assessments. The study’s outcomes show that anchoring is not only a phenomenon in the stock market but also in the real estate market,

which could be of interest to NSE investors who are interested in diversifying their portfolios. Bett, Langat, and Kingori (2024) analysed herding behavior alongside cognitive biases such as anchoring in individual investor choices at the NSE. The research showed investors tend to base their choices on current market patterns and peer actions which produce excessive price swings and speculative bubbles. The research demonstrated that anchoring bias drives market inefficiencies through herding behavior which confirms the requirement for investor education about independent financial analysis.

Kasoga (2021) analysed heuristic biases including anchoring in the Tanzanian stock market. The research published in the *Journal of Money and Business* applied surveys to study how risk tolerance and financial literacy affect investment decisions through heuristic biases. Investors who demonstrated both low risk tolerance and insufficient financial literacy tended to fall victim to anchoring when selecting stocks because they relied on past price points instead of fundamental analysis. The research findings match observations made at the NSE regarding how retail investors frequently depend on past stock performance when conducting trades.

Ayaa et al. (2022) carried out a conceptual analysis of the effect of heuristic techniques and biases, including anchoring, in investment decision-making. Their study, which was published in the *International Journal of Academic Research in Business and Social Sciences*, indicated that anchoring is often reinforced by media reports and financial analysts' projections that influence investor expectations and result in persistent mispricing in stock markets. The study recommended that there is a need for regulatory bodies to be vigilant and prevent market manipulation that takes advantage of anchoring bias. Evbayiro-Osagie and Chijuka (2021) investigated the psychological factors affecting investment decisions in the Nigerian capital market with a special emphasis on anchoring bias. The researchers discovered that Nigerian investors depend on past market crises or booms to form their expectations which results in either excessive caution or over-optimism. The research indicates that NSE investors might show anchoring behavior especially when market downturns from the past occur.

Owusu and Laryea (2023) presented concrete evidence of anchoring bias in investment choices made by Ghanaian investors through their *Review of Behavioral Finance* publication. The researchers found evidence that investors use past stock prices as anchors for their buy and sell choices even when new information indicates different valuations. The study proposed behavioral finance training as a solution to help investors manage this bias which could benefit NSE retail investors. Loris and Jayanto (2021) analyzed several cognitive biases including

anchoring among Syariah investors in Indonesia. The research published in *Journal Akuntansi* revealed how religious and ethical principles combine with anchoring bias to affect investment choices. Although their research focused on Islamic finance, they established that cultural and ideological elements might strengthen anchoring tendencies among investors from various backgrounds including NSE investors.

2.3.2 Illusion of control Bias and Investment Decision

The illusion of control is the tendency of an investor to overestimate their ability to predict or influence the outcomes of a situation where they have little or no actual control (Van der Leeuw & Dirks, 2024). This is witnessed when individual investors in financial markets think they can beat and outdo the market through their skills despite the information and data suggesting otherwise. A study by Barber and Odean (2013) revealed that the illusion of control has a significant influence in financial decisions as investors exhibiting these bias tendencies tend to take excessive risks, trade more frequently and hold undiversified portfolio. Investors while making investment decisions overlook the consequence of risk and underrate the result which conflicts their preferences and overrate the result which confirms their preferences (Gino et al., 2011).

Investors under the influence of the illusion of control bias inclined to holding undiversified portfolio with some holding three to four stocks per portfolio instead of the recommended amount of 15-20 stock to achieve optimal portfolio (Mishra & Metilda, 2015). This is further supported by research in the developed market whereby the investors with the illusion of control have 35% more likelihood of overtrade leading to reduced return due to the increased transaction costs (Dorn & Huberman, 2005). This bias is especially pronounced during market volatility as investors believe they can successfully time the movements of the market. An experimental study done on investors with a portfolio comprising of risk-free assets and two risky lottery assets showed the effect of the illusion of control as investors excessively invested in a lottery when they oversaw the chance move. It found that the illusion of control intensifies when investors have more information or choices as it is seen that additional information does not improve predictive accuracy (Fellner, 2009). There is high confidence in outcome levels when investors manually select their investment than when using automated systems (Ong'eta, 2021). In studying the relationship between illusion and control and investment sophistication, Van der Leeuw and Dirks (2024) found that contrary to normal belief that experience might mitigate biases, experienced investors showed illusion of control particularly in favourable market conditions. They also found out that trading activities amplified significantly during

bull market phases signifying that a positive outcome reinforced investors' perception for personal control irrespective of the fundamental market forces.

In the Kenyan market, the illusion of control is a significant factor leading to market volatility in the Nairobi security exchange. This is because investors frequently credited successful investments to their skills while at the same time blaming failures on external factors (Ong'eta & Nasution, 2021). This was particularly apparent amongst young male investors with higher educational qualifications but limited investment experience. Likewise, investors under the age of 45 with moderate portfolio and trading experience of less than seven years displayed pronounced signs of illusion of control when investing (Kirera and Mburugu, 2019). These individuals place more emphasis on their academic knowledge to translate into market expertise (Kimeu et al., 2016).

Muriithi (2021) investigated how behavioral biases such as the illusion of control influence actual investment choices of real estate developers operating in Nairobi, Kenya. The research revealed that developers who strongly believed in their control over project outcomes tended to invest more in projects despite existing market uncertainties. The developers ignored outside risk variables because they trusted their individual skills and experience would protect them from financial damage. Excessive confidence sometimes resulted in financial problems because market developments failed to match their expectations. The research demonstrated that investors must combine their confidence with actual market data analysis.

Ong'eta and Nasution (2021) investigated behavioral elements which affect investment results at the Nairobi Securities Exchange (NSE). The study revealed that investors who displayed illusion of control bias chose to trade frequently because they thought they could successfully predict market timing. The investors who traded excessively paid more in transaction costs and generated lower investment returns because of their active trading. The research indicates that the illusion of control produces poor investment choices thus investors need education about market unpredictability and rational decision-making.

The research by Nalurita et al. (2024) analyzed the influence of locus of control on how cognitive biases affect investment choices. Investors with an internal locus of control tend to fall more deeply into the illusion of control bias because they think their direct actions produce results. These investors demonstrated greater confidence in their stock price prediction abilities and market performance capabilities. Risk-awareness training together with structured investment planning should be implemented according to the research to reduce the negative

effects of this bias. The research by Ludenyo (2021) analyzed the influence of cognitive biases on stock market investments among teachers in Vihiga Sub-County, Kenya. Investors who experienced the illusion of control bias showed reduced portfolio diversification because they trusted their personal knowledge and previous investment success would lead them to make consistent profits. Excessive confidence led to major financial losses when market conditions shifted in unexpected ways. The research demonstrates why investment frameworks need to be structured to promote diversified investments and data-based choices.

Yasmin and Ferdaous (2023) studied behavioral biases in Bangladeshi capital market investors and discovered that illusion of control bias significantly influenced their investment choices. The investors who displayed this bias depended more heavily on their individual assessment and previous positive results than on fundamental market research. The research showed these investors maintained their losing stocks for longer periods because they thought their investment decisions would eventually produce positive results. Such investor behavior produced poor portfolio results and elevated financial dangers. The research by Dhungana et al. (2022) analyzed cognitive biases in investment decision-making in Nepal which was published in the *Quest Journal of Management and Social Sciences*. The research revealed anchoring bias among inexperienced investors who based their decisions on historical stock performance instead of fundamental indicators. The authors suggested that investment advisory services should incorporate behavioral finance principles as a strategy which could be useful for retail investors in the NSE.

2.3.3 Loss Aversion Bias and Investment Decision

Loss aversion is the process whereby an investor is inclined to experience losses more intensely than the joy of equivalent gains in financial markets (Kahneman & Tversky, 1979). It was found that investors experience the pain of loss of about one and a half times to two and a half times intensely than the pleasure of gains, this not only impacts the individual investor behaviour but also overall market dynamics (Kahneman & Tversky, 1979; Barber and Odean, 2001). This brings up two concepts in loss of aversion; firstly, investors are more sensitive to losses than gains as they are assumed to be loss averse, but also, seem to evaluate their portfolios more frequently in terms of selling and holding investments (Benartzi & Thaler, 1995). This leads to the creation of disposition effect whereby investors hold onto losing investments for too long and sell quickly the winning investments (Shefrin & Statman, 1985).

In European markets, loss averse investors hold fewer asset classes leading to under diversification of the portfolio hence to attain optimal portfolio (Dimmock & Kouwenberg, 2010). The intensity of loss aversion may vary with the investor's cultural background. For instance, loss aversion is stronger in investors from collective societies than in investors from individualistic societies (Hwang & Satchell, 2010). This is the same with Asian markets such as the Chinese markets where individual investors are strongly influenced by loss aversion than those in American markets (Chen et al., 2017). On the contrary, a survey done in 53 countries across the world using sample of questions from the Hofstede survey on cultural dimension as well as lottery questions on loss aversion found that the loss aversion increases with poor distance, individualism and masculinity and less with uncertainty avoidance (Wang et al., 2017). It also found there is a link between loss aversion and distribution of major religions in a country. However, the survey found that there was less connection of loss aversion to macroeconomic variables. A recent study done on Zimbabwean investors stated that loss aversion significantly contributed to the prolonged market downside resulting from investors refusing to let go of loss-making assets and realize losses (Hunguru et al., 2020).

In Kenya, a survey done on cognitive biases affecting investors showed that about 67% of surveyed investors continued to hold onto loss making investment positions longer than a rational investor would. When looking at investor experience and lifecycle, loss aversion is more significant in new investors as they lack experience and market cycle patterns, knowledge (Kirera & Mburungu, 2019). Investment experience is seen to be a good moderator for loss aversion effects over time. Similarly, it has been shown that there is a significant negative relationship existing between loss aversion and portfolio performance whereby loss averse investors underperform market benchmarks (Nyamute et al., 2015).

2.4 Research Gaps

The research gaps in previous studies are classified into four categories: conceptual, contextual, knowledge, and methodological gaps. Conceptual gaps emerge when studies tend to focus on behavioral factors without isolating specific cognitive biases, as in Kimeu et al. (2016), which discussed behavioral influences on investment choice without regard to individual biases. Furthermore, Ong'eta and Nasution (2021) researched investment performance yet did not research the influence of cognitive biases on investment choices directly. Current research examined these biases in isolation rather than exploring their combined effects, as seen in studies by Barno, Cheboi, and Muganda (2021) on anchoring bias and Muriithi (2021) on illusion of control, which didn't explore interactions with other biases. Contextual gaps occur

when various geographical points are researched, and hence their findings cannot be used directly for the Kenyan stock exchange. Hunguru et al. (2020), for example, touched on Zimbabwe, and Varshini and Vinayalaxmi (2024) researched the Indian market, with no applicability to the NSE. Qadri and Shabbir (2014) also investigated illusion of control and overconfidence within the stock market of Pakistan, and an approach specific to Kenya is what is needed.

Gaps exist in knowledge around the influence demographic characteristics, cultural factors, and some forms of bias play in investment. Kirera and Mburugu (2019) profiled the NSE retail investors mostly demographically but did not link the same with cognitive biases. Similarly, Lawal and Sakariyahu (2024) tested the contribution of cultural factors toward stock market investment but not cultural factors' interference with cognitive bias. Common patterns had been followed by most research papers like Tuyon and Ahmed (2016) and Owusu and Laryea (2023), wherein generalized statistical indicators had been relied on without segregating investment decisions correlated with bias under strict classification thus a methodological gap exist. Bridging these gaps is essential to forming a complete understanding of how cognitive biases influence investment choices in the NSE and lead to contributions to both behavioral finance research and investor practice.

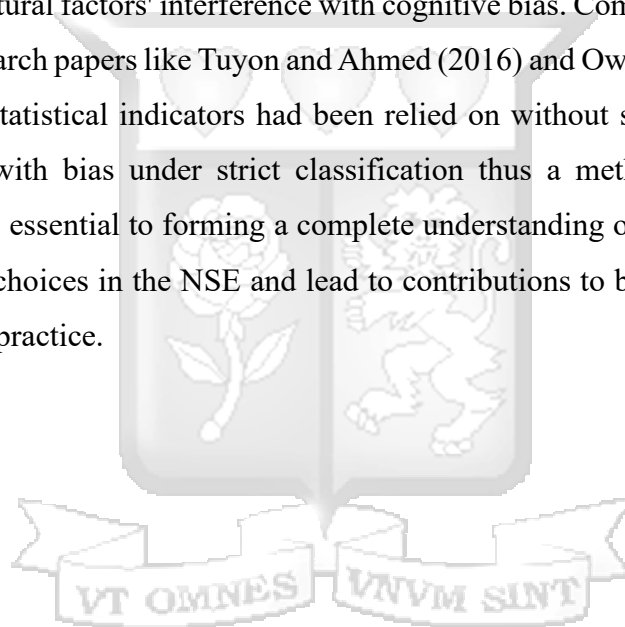
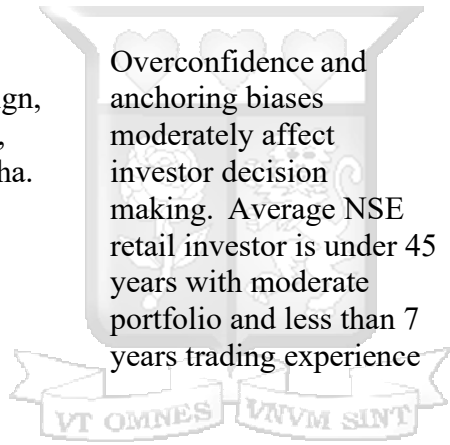


Table 1: Research Gaps Summary

Authors	Study objective	Model Applied	Findings	Research Gap-	Knowledge Gap (focus)
(Ong'eta & Nasution, 2021)	Behavioral Factors Influencing Investment Performance of Individual Investors in Nairobi Securities Exchange.	Multiple regression analysis.	Strong positive correlation between investment performance and investment decisions. 78% variance in investment performance predicted by herding, escalated commitment, availability bias and overconfidence.	Based on performance outcomes, not on investment decisions.	Understanding the effect of cognitive bias on investment decisions.

(Kimeu et al., 2016)	Examine the behavioral factors influencing individual investment decisions in NSE.	Descriptive statistics, correlation analysis, and regression analysis.	Investment decisions in NSE positively influenced by behavioral factors (prospect, herding, heuristic, rationality).	Behavioral factors discussed broadly, not specific isolated cognitive biases.	Targeted research on Cognitive bias with combined and individual impacts.
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(Kirera & Mburug u, 2019)	Influence of heuristic biases on individual investor decision- making.	Cross-sectional descriptive design, factor Analysis, Cronbach's alpha.	Overconfidence and anchoring biases moderately affect investor decision making. Average NSE retail investor is under 45 years with moderate portfolio and less than 7 years trading experience	Study Primarily demographic profiling, it did not link to cognitive decision processes.	To investigate moderating effects of demographic characteristics on cognitive biases in investment decisions.
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(Hunguru et al., 2020)	Influence of loss aversion on investor behavior	Quantitative survey, multiple regression analysis, correlation analysis, random Sampling, Anova.	Loss aversion causes unwillingness to sell declining stocks, contributing to prolonged market downturns. Regression model indicated that the behavioral biases explained 88.5% of the observed change in individual investor decisions.	Study done in Zimbabwe and is not showing the Kenyan context.	Kenya-specific research on loss aversion effects in NSE context needs to be done to compare both findings.
(Varshini & Vinayalaxmi, 2024)	Impact of psychological aspects on investor behaviour and its relationship with equity market dynamics.	Analytical hierarchy process, Regression analysis. Quantitative research method, surveyed.	Loss aversion has significant impact on investor behavior, followed by overconfidence, professional experience, and investment volume.	Study was on Indian market and not Kenyan stock market context.	Establishing a hierarchy of cognitive bias in individuals investing in the NSE.



(Lawal & Sakariya hu, 2024)	Investor heterogeneity and global stock market participation.	Generalized linear model regression, robustness test.	Firms and individuals' propensity to engage in the stock market is influenced by their cultural beliefs and adherence. Adverse effect of culture on participation in developing markets.	Focused broadly on cultural factors without assessing specific cognitive biases.	Understanding of moderating effects of culture on the effect of cognitive biases on investment decisions.
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(Ndiritu & Mugivane, 2015)	Stock market development and investor participation.	Descriptive analysis.	East African stock markets highly concentrated by institutions holding best shares indicating lack of investor awareness.	Did not examine psychological barriers. Only focused on structural market factors.	Understanding cognitive biases contributions to retail investor participation barriers beyond structural factors.
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(Qadri & Shabbir, 2014)	Impact of overconfidence and illusion of control biases on the investment decisions of individual investors.	Regression analysis. Quantitative approach with questionnaire survey.	Overconfidence and illusion of control significantly impacts investor decision making and has positive relationship.	Focused on Pakistani stock markets.	Studying other behavioral biases like loss aversion, impact of biases on the trading volume.
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(Tuyon & Ahmed, 2016)	Behavioral finance perspectives on Malaysian stock market efficiency.	Regression analysis, segmentation analysis.	Relationship between risk and return is heterogeneous, varying across different. Market states and risk levels. Negative news during crises significantly affects investor decisions and market returns.	Studied the only the Malaysian stock market.	Kenyan perspective on Behavioral finance perspectives on stock market efficiency.
(Owusu & Laryea, 2023)	How of anchoring affects investor decision making regarding mutual funds and how it differs amongst gender and level of financial knowledge.	Pearson's chi-square test and two-way analysis of variance.	Investors are significantly influenced by anchoring bias. Females more susceptible to anchoring than men. It is not reduced with higher financial knowledge, but it increases. Investors use treasury bill rates and historical performance as anchors in investment decisions.	Focused on mutual fund investors, specific to Ghanian context.	Understanding Anchoring bias influence on investment decisions in NSE by individual investors.

Source: Researcher (2025)

2.5 Conceptual Framework

A conceptual framework is a diagram that shows the relationship between the independent variable and the dependent variable (Mugenda and Mugenda, 2003). In this research, the independent variable were cognitive biases represented by anchoring, illusion of control and loss aversion biases. The dependent variable was the Investment decisions. Figure 2.1 shows the conceptual framework.

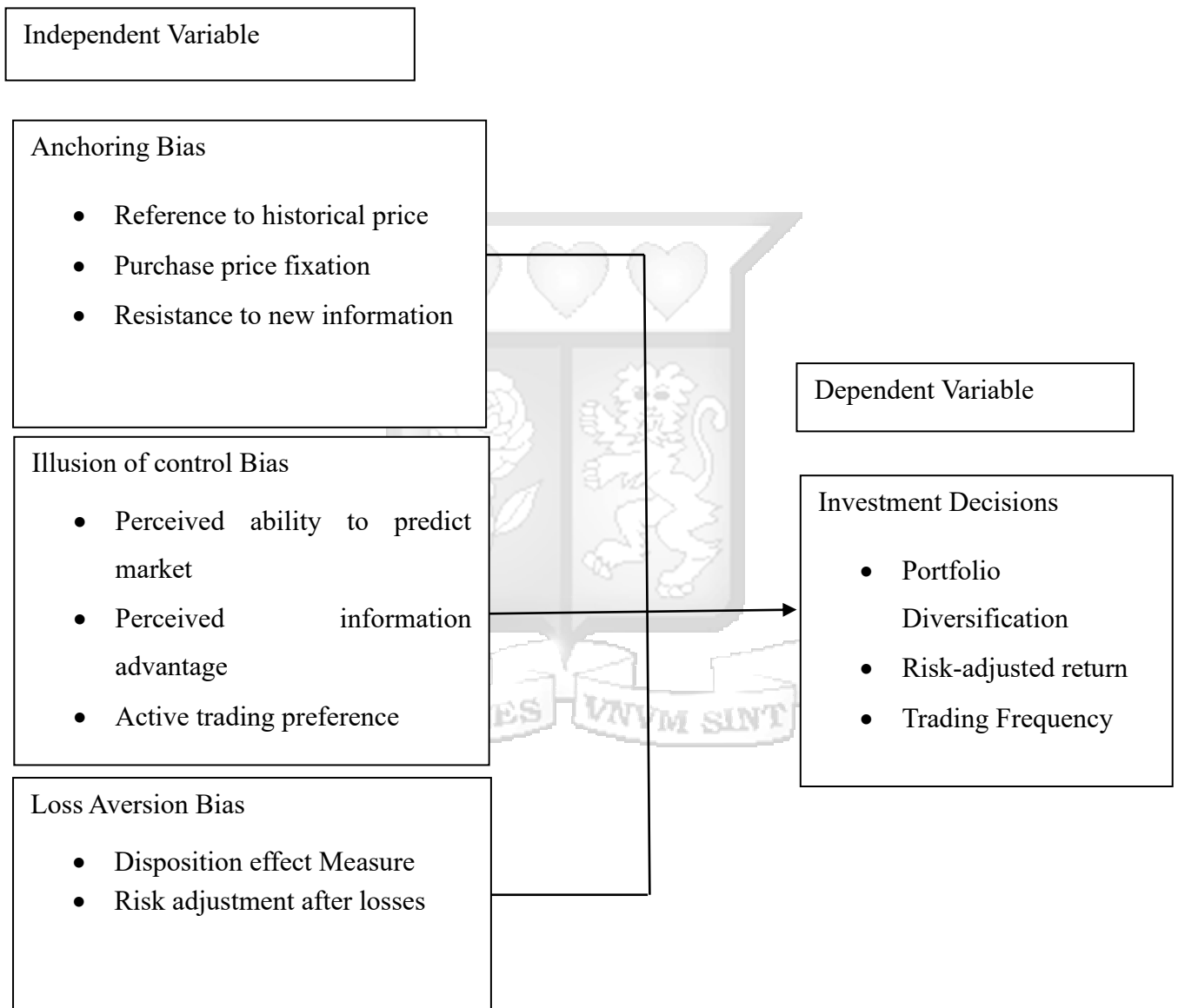


Figure 1: Conceptual Framework

Source: Researcher (2025)

2.6 Operationalization of Variables

Table 2.1: Operationalization of Variables

Variable	Indicator	Measurement	Type of Measure	Sources
Dependent variable				
Investment Decisions	Portfolio diversification	5-point Likert Scale measuring portfolio diversification of securities held at a given time	Ordinal	Statman, (2019).
	Risk adjusted returns	5-point Likert Scale measuring perceived risk-adjusted performance	Ordinal	Ong'eta and Nasution, (2021).
	Trading frequency	5-point Likert scale measuring self-reported trading frequency of trades (monthly, quarterly)	Ordinal	Tuyon and Ahmed, (2016).
Independent Variable				
Anchoring Bias	Reference to historical price	5-point Likert scale measuring tendency to rely on initial information	Ordinal	Bruckmaier et al., (2021) Hunguru et al., (2020)
	Purchase price fixation	5-point Likert scale measuring statements like: "I frequently evaluate my stocks based on their purchase prices" and "I consider my initial purchase price as the most important reference point"	Ordinal	Owusu and Laryea, (2023) Hunguru et al., (2020)
	Resistance to new information	5-point Likert scale measuring willingness to adjust initial price estimate after receiving new information	Ordinal	Hirsheifer, (2020). Hunguru et al., (2020)
Illusion of Control.	Perceived ability to predict market	5-point Likert scale measuring perceived control, for example "My investment success is primarily due to my skills and knowledge"	Ordinal	Barber and Odean, (2013)

	Perceived information advantage	5-point Likert scale measuring confidence in market predictions.	Ordinal	Hunguru et al., (2020)
	Active trading preference	5-point Likert scale measuring preference for index funds direct stock picking versus direct stock picking.	Ordinal	Barber and Odean, (2013)
Loss Aversion	Disposition effect measure	5-point Likert scale measuring tendency to hold losing investments longer than winning ones	Ordinal	Epley and Gilovich, (2016)
	Risk adjustment after losses.	5-point Likert scale measuring comparing the risk preferences before and after experiencing investment losses.	Ordinal	Hunguru et al., (2020)

Source: Researcher (2025)

2.7 Summary of the Chapter

Chapter two presented the theoretical review foundation of the research thesis with theories of Modern Portfolio Theory, Efficient Market Hypothesis, Behavioral Finance Theory. It also presented empirical studies on specific cognitive biases affecting the investment decisions of individual investors as well as the research gap, conceptual framework and operationalization of the variables.



CHAPTER THREE

METHODOLOGY

3.1 Introduction

Chapter three highlights the research philosophy, research design, study population and sample, data collection and analysis, validity, reliability as well as ethical considerations.

3.2 Research Philosophy

Research philosophy or paradigm is a broad basic set of beliefs and assumption guiding a researcher in inquiring about research and the process of scientific research (Rahi, 2017). For research to be valid, the researcher must follow a research philosophy that helps researcher avoid following individual philosophy and know how to use the alternatives that are recognized in the scientific world (Rahi, 2017). It is important as it allows the reader to understand and interpret the research by knowing the biases and particulars stance taken by the researcher thus informing their understanding of the researcher's work (Creswell and Creswell, 2023). The three main philosophies used in scientific research are Postpositivist or positivist, Interpretive, and pragmatism research (Rahi, 2017). Interpretivisms approach allows for the researcher to interpret the subjective meanings, concepts and opinions investors have in arriving at investment decision (Rahi, 2017). Interpretivism is inclined toward relating to social realities in terms of perceptions and thus uses alphabetical data. (Alharahsheh and Pius, 2020).

The pragmatic approach assumes that knowledge can be constructed from real experiences, judgements and focuses on the practical results of theories, ideas and not just notions of truth (Kaushik and Walsh, 2019). The positivist approach tends to determine the causes influencing an outcome observed in behaviors of individuals and measured in an objective manner (Creswell and Creswell, 2023). The approach aligns with the research objective of finding a quantifiable relationship between the cognitive biases and investment decisions taken by individual investor.

The most suitable research philosophy for the study was the positivism research philosophy. Positivism research philosophy emphasized the use of measurable, objective, and quantifiable data (Maksimovic and Evtimov, 2023). Positivism was particularly aligned with research that relied on quantitative data. The study relied on quantitative data collected through questionnaires with closed-ended questions rated on a Likert scale (Robinson, 2024). The approach also followed a deductive reasoning as it starts from theories like the prospect theory

and portfolio theory to arrive at a general hypothesis and aligned with the research objectives (Haque, 2022).

3.3 Research Design

The study used a descriptive cross-sectional survey design to assess the relationship between the different variables at a given time while providing a quantitative description of trends, attitudes and opinions of sample population without having to interfere with the independent variables and collect data from various demographics (Hirose and Creswell, 2023). A quantitative approach was considered for this research as it allowed for the collection of quantitative data to get insights from data sets (Creswell and Creswell, 2023). This helped to understand how cognitive biases influence individual investors' investment decisions.

3.4 Population

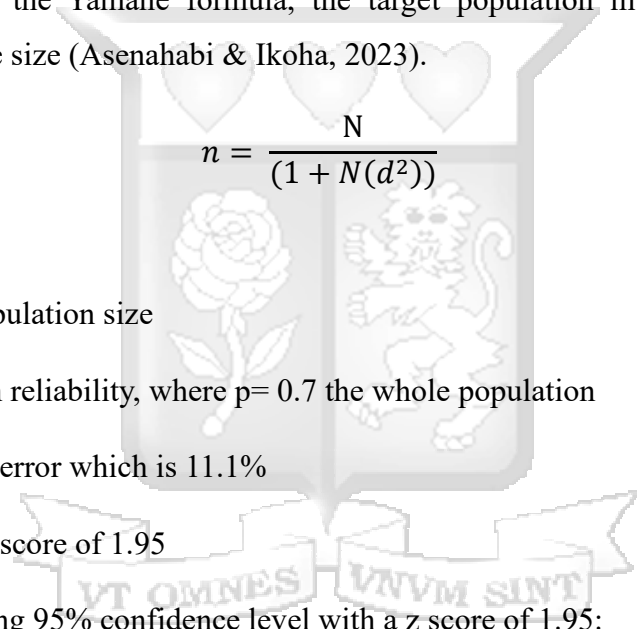
The target population for the study was individual investors that were actively trading in the Nairobi Securities Exchange. There were 6,840 active investors that are registered with the twenty- three registered brokerage firms in Nairobi, Kenya (NSE, 2024). The target population represented a group of market participants that have diverse background and investment levels. The target population was made up of individual investors with or without investment expertise who are actively traded at least one trade for the past twelve months with monthly income range below KSH.s 200,000. This population represented individuals whose investment decisions are affected by the specific cognitive biases being studied. They are a registered with the twenty-three listed brokerage firms in Nairobi County.

3.5 Sampling Technique

The research had opted for the use a two-stage sampling approach. A purposive sampling technique was first used as the primary sampling technique which was non-probability sampling technique whereby researchers intentionally select participants based on specific characteristics that are crucial to the study's objectives (Creswell and Creswell, 2023). It was also known as judgement sampling. The technique was valuable for allowing for strategic and intentional selection of participants because of their specific traits and qualities that matched the study's criteria of being actively trading investors in the Nairobi Securities Exchange. The technique targeted investors with specific attributes that had to have traded at least once in the past twelve months, have a monthly income range below KSH 200,000. It ensured that the sample comprised of individuals is most likely to provide meaningful insights into investment decision-making processes. This approach was suitable for this study as it allowed for a focused

investigation of how specific cognitive biases influence investment decisions, ensuring that the selected participants could provide the most informative and nuanced data about the research questions. The second stage employed the use of random sampling within the purposively selected group to ensure all individuals had equal chance of selection hence reducing selection bias.

Sample size was the portion of the population that would be selected to act as a proxy or representative for the entire population (Asenahabi and Ikoha, 2023). The Yamane formula was used in determining the sample size. This formula was utilized as it is best suited to use in sampling methodology where the researcher has knowledge of target population size (Singh & Masuku, 2014). This was because the figure of actively trading individual investor were 6,840 investors and to use the Yamane formula, the target population must be known before calculating the sample size (Asenahabi & Ikoha, 2023).



$$n = \frac{N}{(1 + N(d^2))}$$

N = Target population size

P = Population reliability, where p= 0.7 the whole population

d = Margin of error which is 11.1%

Z = selected z score of 1.95

Therefore: using 95% confidence level with a z score of 1.95:

$$n = \frac{6840}{1 + (6840 * 0.111^2)}$$

$$n = \frac{6840}{85.2756}$$

$$n = 80$$

The sample size consisted of 80 respondents. The precision level of 11.1% was deemed acceptable for this study considering the specialized nature of the target population and the exploratory focus on cognitive biases in investment decisions (Israel, 1992; Singh & Masuku, 2014). This approach allowed the researcher to maintain statistical validity while

acknowledging the practical constraints of accessing this specific investor population in the Nairobi Securities Exchange. However, an adjusted sample size may be needed to account for possible non-response and incomplete data. According to Dillman et al. (2014), a typical response rate in survey research ranges between 50-60%, necessitating an increase in the initial sample size to ensure adequate statistical power. Using a standard non-response adjustment factor of 10%, the adjusted sample size was 88 respondents. This approach aligned with survey methodology best practices outlined by Fowler (2013), who emphasized the importance of anticipating and mitigating potential data loss through strategic sample size inflation.

3.6 Data Collection

The study data was from primary sources. The collection of primary data relied on structured questionnaire based on the 5-Likert scale except for demographic data, with 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; and 5 = Strongly Agree. We would define only score 4 and 5 that considered investor decisions are influenced by cognitive bias, otherwise, it does not. The questionnaire had five subsections that consisted of demographic information, anchoring bias, illusion of control bias, loss aversion and investment decisions. There were a were 25 questions that are equally distributed with each variable having five questions. All the independent variables which were anchoring bias, illusion of control bias and loss aversion bias were in the modelled together with the dependent variable which was the investment decisions of retail investors. The questionnaires were administered online to investors registered with brokerage firms in Nairobi. The consistency of the questionnaire was tested using Cronbach's Alpha for internal consistencies. The reliability and validity of the questionnaire were also tested by pilot testing with about 8 respondents (10% of the sample size). This was used to assess questions clarity, functionality of the online administered questionnaires and create basis for the adjustments made to improve questions wording and effectiveness of the questionnaire before fully deploying to the respondents.

3.7 Data Analysis

The study adopted a quantitative approach to collect and analysed data through the Statistical Package for Social Sciences (SPSS V27). This tool was appropriate for the study as it facilitated analysis of diverse datasets and applied various statistical tests (Ali et al. 2023). The collected data was coded and classified appropriately to ensure responses are processed correctly. For each specific objective, descriptive statistics specifically mean and standard deviations were

used to analyse the data. These measures provided insights into the central tendency and variability of the data.

The mean offered an average value, giving an overall understanding of the typical response or trend for each variable. Standard Deviation indicated the extent of variation or dispersion in the data, helping identify consistency or differences within the responses (Creswell and Creswell, 2018). Inferential statistics, specifically multiple linear regression analysis, used to establish relationships between independent variables and dependent variables (Silver, 2016). The results and findings were presented in tables and charts. The multiple linear regression analysis used a regression equation of:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

Where:

Y = Investment Decisions (The dependent variable).

α = Constant term

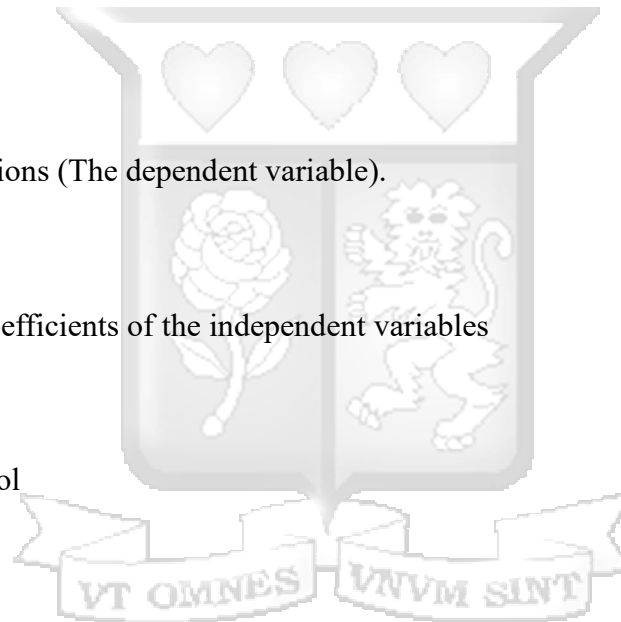
$\beta_1, \beta_2, \beta_3$, = Beta coefficients of the independent variables

X1 = Anchoring Bias

X2= Illusion of Control

X3 = Loss Aversion

ϵ = error term



3.8 Diagnostic Tests

A diagnostic test was conducted to check the effectiveness of data analysis methods for accuracy, reliability, and transparency of research findings. For the study, multicollinearity and heteroscedasticity tests were employed to verify the suitability of the regression model applied.

3.8.1 Multicollinearity Test

Multicollinearity arises when independent variables in regression models are highly correlated, skewing statistical estimates and reducing model reliability (Lindner et al., 2022). A Pearson correlation coefficient of more than 0.8 is generally assumed to indicate multicollinearity (Lindner et al., 2022). In the present study, multicollinearity was assessed based on correlation coefficients computed using SPSS V27 software.

3.8.2 Heteroscedasticity Test

Heteroscedasticity occurs when residual variance is not constant for different levels of an independent variable, which undermined the validity of regression results (Munir, 2023). For detecting heteroscedasticity in the study, the Modified Wald test was applied, that informed whether the error terms possessed a homogenous pattern of variance, that may have led to robust statistical inferences.

3.9 Research Quality

3.9.1 Research Validity

The validity of the data was improved through a lot of effort and resources. To reach internal validity, the respondents were requested to give the same information. External validity entailed checking for the accurateness of the study outcomes could be generalizations or the extent to which the study's conclusions would be deduced for other researchers in other places and at different times. The data was collected from the sample which accurately represented retail investors in Nairobi to uphold external validity (Cooper and Schindler, 2008).

3.9.2 Research Reliability

According to Cooper and Schindler (2008), the degree to which the outcomes produced would be error-free and have results from instrument having consistency are the reliability. Thus, reliability is used to test the research tools' internal consistency. This study will use Cronbach's alpha to check reliability. According to Khan (2008), the Cronbach's alpha helps in establishing if the results obtained are consistent when administered to the same sample. It states that the Cronbach's Alpha demonstrated reliability by displaying the actual score. The true score can further be defined as the 'Alpha' that range from 0 to 1. Additionally, it was used to test the reliability of questionnaires with Likert scale. A high reliability was represented by a high score, while a value of 0.7 was considered as an applicable reliability coefficient or Alpha value (Khan, 2008). The study employed Cronbach Alpha to test reliability.

Table 3.1: Reliability analysis

Scale	Cronbach's Alpha	Number of Items
Anchoring Bias	0.821	5
Illusion of control bias	0.769	5
Loss aversion bias	0.723	5

From the reliability analysis findings obtained in the table, all the scales demonstrate acceptable to good internal consistency based on their Cronbach's Alpha values. The Anchoring Bias scale has the highest reliability with an alpha of 0.821, indicating good internal consistency among its five items. Investment Decisions also show strong reliability at 0.804. The Illusion of Control Bias scale has a slightly lower alpha of 0.769, and Loss Aversion Bias records the lowest at 0.723, though both still fall within the acceptable range. These results suggest that the items within each construct reliably measure their respective behavioral bias or decision-making dimension.

3.10 Ethical Considerations

Ethical consideration was important as it directly contributed to the validity of the study. This research thesis was submitted to and subjected to the approval of Strathmore Institutional Ethics and Scientific Review committee (SERSRC) as well as to the National Commission for Science, Technology and Innovation (NACOSTI) as required by the research regulations in the country. In collecting primary data from the respondents, ethical considerations were considered in areas of confidentiality, anonymity of the respondents would be maintained by keeping all the information gathered confidential and strictly using it for the purpose of academic research only. The research followed to the principle of voluntary consent whereby respondents voluntarily took part in the study out of their own free will. In formulating and administering the structured questionnaires, the research refrained from asking embarrassing questions, inappropriate language and resulting in threats. Respondents were not required to provide compelling response along certain lines or made to face fear or anxiety during data collection.

3.11 Chapter Summary

This chapter has presented the research philosophy of a positive approach with elements of interpretive approach that utilized a descriptive cross-sectional survey design to explain the effect of cognitive biases on investment decisions of retail investor in Nairobi, county. The research will target actively trading investors with a sample size of 378 using a Purposive sampling technique and will collect data using online and descriptive and inferential analysis. The chapter concludes with research quality and ethical consideration.

CHAPTER FOUR

PRESENTATION OF RESULTS

4.1 Introduction

The fourth chapter presents, analyze, and interpret the data collected with respect to the research objectives and hypotheses. It provides a detailed examination of the findings derived from the respondents' input using both descriptive and inferential statistical methods. The analysis includes measures of reliability, descriptive statistics, and multiple regression model to provide meaningful insights into the study variables. The results are presented in a structured format using tables and narratives to enhance clarity and understanding.

4.2 Response Rate

The sample selected for the study was consisted of 88 respondents. The respondents were administered with the questionnaires for data collection. The researcher received back 62 questionnaires having been fully filled. The returned questionnaires had a response rate of 70.5%. This response rate was appropriate and acceptable based on Mugenda and Mugenda (2008) assertion that a response rate above 70% is desirable while 60% is good and below 50% unacceptable. Therefore, the response rate of was accepted and the researcher proceeded with the data analysis.

Table 4.1: Response Rate

Questionnaires	Frequency	Percent
Returned	62	70.5%
Un-returned	26	29.5%
Total	88	100%

4.3 Demographic Information

This section of the study presented the general information of respondent used in the study. The study sought to collect information on age range, highest level of education, monthly income range and years of experience.

4.3.1 Age and Gender of the respondents

The questionnaires included structured questions on the different age groups and gender of the respondents. The table below was tabulated from the data to show the two demographics.

Table 4.2: Gender of respondents

Age	Male	Female	Total	
	Frequency	Frequency	Frequency	Percent
18-30	13	2	15	24
31-40	7	15	22	35
31-41		1	1	2
41-55	2	20	22	35
41-56		1	1	2
Above 56		1	1	2
Total	22	40	62	100

The study collected demographic data regarding the age and gender of respondents. This information was analysed using a cross-tabulation to determine the distribution of various age groups across male and female participants. The findings are presented in Table 4.3. shows that the total number of respondents was 62, with 22 (35%) being male and 40 (65%) being female. This demonstrated that the majority of the respondents were female, indicating greater female participation in the study. Among the male respondents, most fell within the 18-30 age group, representing 13 individuals or 21% of the respondents. This was followed by 7 males (11%) aged between 31-40 years, and 2 males (3%) in the 41-55 age bracket. There were no male respondents in the 31-41, 41-56, or above 56 age categories.

On the other hand, female respondents were more widely distributed across age categories. The highest proportion of females, 20 individuals or 32%, fell within the 41-55 age group. This was followed closely by 15 females (24%) aged 31-40 years. Only 2 females (3%) were aged between 18-30 years. Additionally, there was one female respondent (2%) in each of the following categories: 31-41 years, 41-56 years, and above 56 years. This indicates that while younger males participated more in the study, female participation was higher among the older age brackets, particularly in the 41-55 range.

Across all genders, the most represented age groups were 31-40 and 41-55 years, each contributing 22 respondents or 35% of the total. The 18-30 age group followed with 15 respondents (24%). The remaining age categories 31-41, 41-56, and above 56 years were the least represented, each contributing just 1 respondent or 2%. These findings suggest that while the study engaged a diverse age range, it was dominated by female respondents, particularly

those in their middle ages. This could reflect the nature or relevance of the study's subject matter to women in that age bracket, higher willingness and availability among women in that demographic to participate.

4.3.2 Respondents Level of Education

The data for the highest level of education for all the respondents was obtained from the respondents. The results were presented in the figure below.

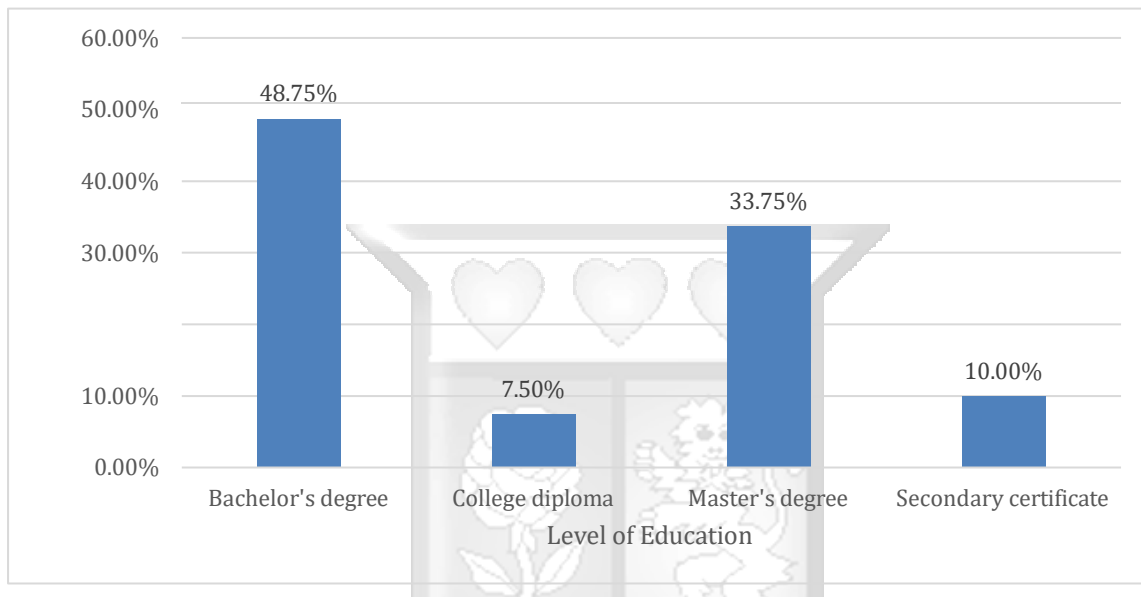


Figure 4.1: Level of Education of Respondents.

From the findings, 48.75% of the respondents had a bachelor's degree as their highest level of education, 33.75% had master's degree, 10% had secondary certificate, while 7.5% had college diploma. These findings could explain the varied rates of investors' investment decisions at the Nairobi Securities Exchange. The results also indicate that the respondents had attained good education and therefore, there were no uneducated and hence the decision making was effective.

4.3.3 Respondents' Monthly Income Range

The research wanted to determine the monthly income distribution of respondents in Kenyan Shillings. results revealed that majority of participants, 23 out of 61 (38%), earned above KSHs 200,000, indicating a significant presence of high-income individuals among the respondents. This was followed by 18 respondents (30%) who reported earnings between KSHs 100,001-200,000, and 12 respondents (20%) who earned between KSHs 50,000-100,000. A smaller portion, 5 respondents (8%), fell within the KSHs 100,000-200,000 category. Only 3 respondents (5%) reported earnings below KSHs 50,000, suggesting that low-income earners

were minimally represented. These findings suggest that most respondents had moderate to high monthly incomes, which could influence their investment capacity and participation in securities trading.

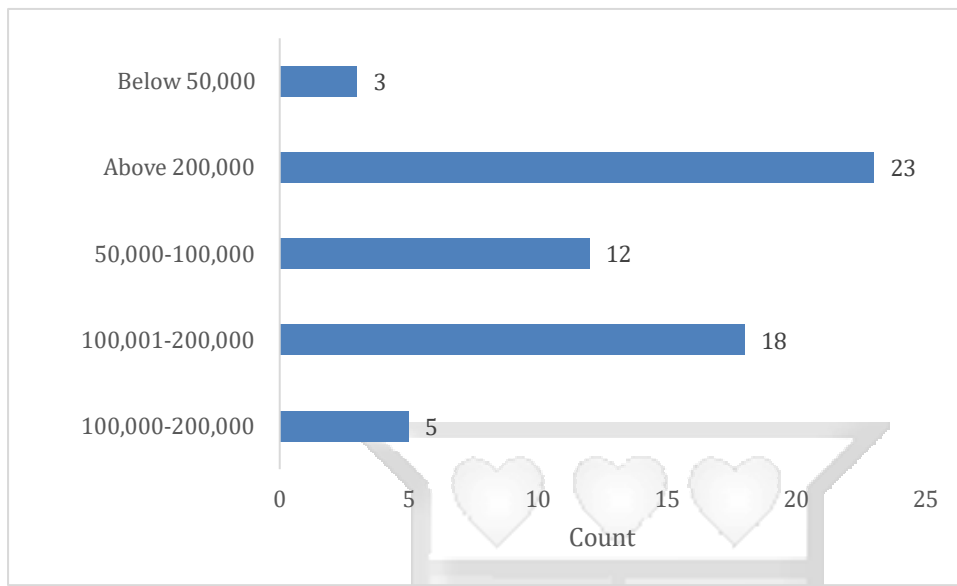


Figure 4.2: Respondents' Monthly Income Range

4.3.4 Respondents' Years of Experience

The study also required to assess the respondents' experience in trading securities. Participants were requested to specify the number of years they had been involved in securities trading. The responses were grouped into five categories; the frequencies are summarized in Table 4.4. The outcomes show that the majority of respondents had limited experience in securities trading. Specifically, 29 out of the 62 respondents (47%) reported having 0–3 years of experience, making it the most represented group. This suggests that a significant proportion of the participants were relatively new to securities trading, possibly reflecting recent entrants into the market or individuals beginning to explore trading opportunities.

The 3-7 years' experience category was the second most populated, with 25 respondents (40%). This indicates that a substantial number of participants had moved beyond the entry-level phase and had gained moderate experience in trading. Only 5 respondents (8%) reported having 7–10 years of experience, while just 1 respondent (2%) had over 10 years of experience, showing that seasoned traders with long-term market experience were underrepresented in the study.

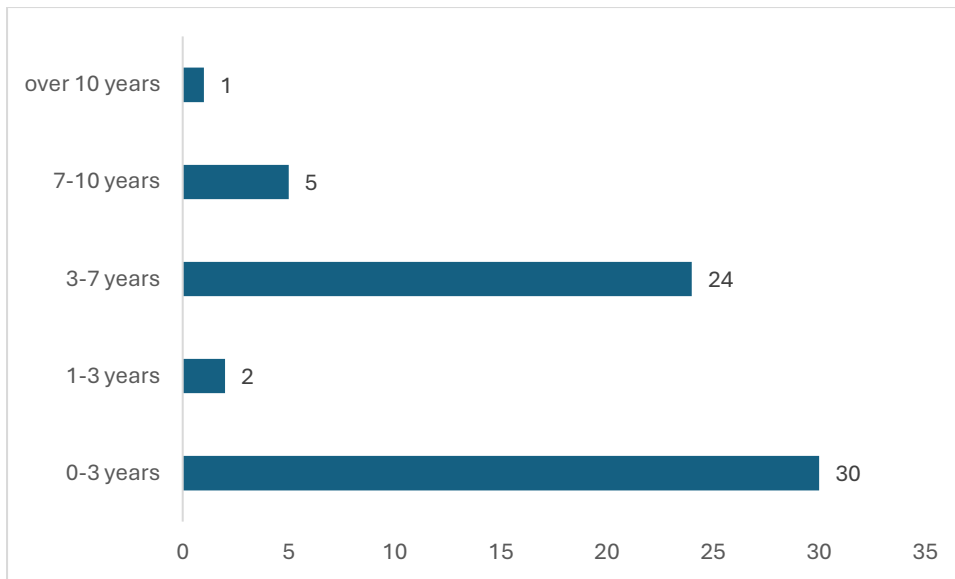


Figure 4.3: Respondents' Years of Experience

4.4 Descriptive Statistics

The data from the all the questionnaire was analysed using mean, and standard deviation to aid in describing it for further analysis.

4.4.1 Anchoring Bias Reponses

Table 4.3: Anchoring Bias responses

Statements	Mean	Std. Dev
I regularly assess my stocks based on their initial purchase price.	3.084	0.952
When making investment decisions, I depend heavily on past stock prices.	4.376	0.863
I find it hard to change my investment prospects when new market information becomes presented.	3.934	0.946
My initial investment research tends to significantly influence my final investment decision.	4.387	1.096
I frequently compare current stock prices to their historical performance when deciding to buy or sell.	3.055	1.045

From the findings, the respondents showed that respondent's investment decisions were strongly influenced by past stock prices. This was evident as they regularly assess their stocks based on their initial purchase price, depend heavily on past stock prices when making decisions, and their initial investment research significantly influenced their final investment.

Additionally, respondents reported difficulty in changing their investment prospects when new market information becomes available. The lowest mean in this category was observed for comparing current stock prices to historical performance when deciding whether to buy or sell. The computed standard deviations for all responses were below two, indicating low variability in the responses, suggesting that the respondents shared similar perceptions about the influence of historical stock performance on their decisions.

The study outcomes correlate with the conclusions of Strack and Mussweiler (2017), who discussed the impact of anchoring bias on decision-making, particularly how individuals tend to rely heavily on initial information or past experiences when making judgments. Furthermore, Chapman and Johnson (2018) support this notion by highlighting how individuals' initial research or data point (such as a stock's price) can significantly affect future decisions, often regardless of subsequent new information. The findings also align with Barno, Cheboi, and Muganda (2021), who observed similar patterns of behavior in the Kenyan stock market where investors tend to anchor their decisions based on earlier stock prices, influencing their investment outcomes.

4.4.2 Illusion of Control Bias Responses

Table 4.4: Illusion of Control Bias Responses

Statements	Mean	Std. D
I make my investment decisions by myself without consulting others.	2.166	0.833
I am confident that the investment skills and knowledge I have in the stock market will enable me to outperform the market and predict price movements	2.43	0.927
I believe that my knowledge and experience give me an advantage in manipulating the investments in my favour	2.43	1.017
It is easy for me to analyze market information and rely on available investment statistics	2.479	0.969
I feel that my education and experience in investments enable me to forecast winning investment	2.47	1.079

From the findings, the respondents showed a high level of confidence in their ability to make independent investment decisions, as indicated by their belief that they make investment

decisions by themselves without consulting others as shown by a mean of 2.166 and SD of 0.833. They also expressed confidence in their skills and knowledge to outperform the market with an average of 2.43 and SD of 0.927 and manipulate investments to their favour as indicated by a mean of 2.43 and SD of 1.017. Despite this, they indicated that it was easy for them to analyze market information with findings having a mean of 2.479 and SD of 0.969 and rely on available investment statistics with responds having a mean of 2.47 ad SD of 1.079. The mean scores for all statements were within the range of 2.0 to 2.5, indicating a moderate belief in their control over investment outcomes. The low standard deviations further suggest that respondents were consistent in their responses regarding their perceived control over their investment decisions.

The study findings correlate with findings from those of Van der Leeuw and Dirks (2024) and Ong'eta and Nasution (2021), who examined how investors' belief in their own abilities are affected by illusion of control bias and can lead to overconfidence in making financial decisions. As these studies suggest, individuals often believe that their decisions are influenced by their own expertise, which can distort their judgment and lead to riskier investment behavior. This belief in one's own control over investment outcomes, despite the underlying randomness of the market, is consistent with findings from the behavioral finance theory, which explains how such biases affect investor behavior in financial markets.

4.4.3 Loss Aversion Bias Responses

Table 4.5: Loss aversion bias responses

Statements	Mean	Std. Dev
I find it more painful to lose money than enjoyable to gain the same amount.	4.452	0.791
I tend to hold onto losing stocks longer than I probably should.	4.301	0.737
After experiencing an investment loss, I have become more cautious in my future investment decisions.	4.000	0.829
I am more likely to sell a winning stock quickly than a losing stock.	3.742	0.930
The fear of potential losses prevents me from making certain investments.	3.625	0.777

From the findings, the respondents exhibited a strong tendency to experience the pain of losing money more intensely than the joy of gaining an equivalent amount, as evidenced by the statement: "I find it more painful to lose money than enjoyable to gain the same amount" having a mean of 4.452 and SD of 0.791. They also demonstrated a tendency to hold onto losing stocks longer than they should and it had a mean of 4.301 and SD of 0.737 after an investment loss, they became more cautious in their future decisions shown by a mean of 4.000 and SD 0.839, and they are more likely to sell of a winning stock quickly as shown by the mean of 3.742, and SD of 0.930. Furthermore, the fear of potential losses influenced their decision to sell winning stock more quickly than losing one, this is seen in the mean of 3.625 and SD of 0.777. The standard deviations for the responses were found to be below, indicating that the respondents had similar views about the impact of loss aversion on their investment behavior.

The study findings correlate with the research of Kahneman and Tversky (1979), regarding the concept of loss aversion, which suggests that losses are psychologically more impactful than equivalent gains. These bias influences investor behavior, causing individuals to hold onto losing investments longer and to make more cautious future investment decisions. Additionally, Kirera and Mburungu (2019) found that loss aversion significantly affects investment decisions in Kenya, with investors often making decisions based on the avoidance of losses rather than potential gains. These findings align with the loss aversion bias in the current study, reinforcing the idea that loss aversion plays an important role in determining investors' decisions in stock markets.

4.4.4 Investment Decision Responses

Table 4.6: Investment decision responses

Statements	Mean	Std. Dev
I frequently trade in stock market securities.	3.286	0.83
I tend to hold an investment portfolio that is well diversified with multiple stocks from different industries.	3.05	0.771
My primary investment objective is long term wealth creation	4.297	0.909
When making investment decisions, I rely on recommendations from family and friends	4.128	0.691
I do extensive personal research before making investment decisions	4.243	0.834

From the findings, the respondents showed a preference for making frequent trades in stock market securities with a mean of 3.286 and SD of 0.83, suggesting a proactive approach to investing. They also preferred to maintain a diversified investment portfolio with multiple stocks from different industries with a mean of 3.05 and SD of 0.771, indicating that risk diversification was a key strategy in their investment decisions. The respondents' primary investment objective was long-term wealth creation with a mean of 4.297 and SD of 0.909, and they were influenced by recommendations from family and friends with a mean of 4.128 and SD 0.691. Furthermore, they did extensive personal research before making investment decisions with mean of 4.243 and SD 0.834, which reflects a cautious and well-informed approach to investment. The computed standard deviations were relatively low, suggesting that the responses were consistently similar across the group of respondents.

The study findings correlate with the modern portfolio theory principles which emphasizes the importance of diversification and informed decision-making in achieving long-term wealth creation. The emphasis on extensive personal research and reliance on recommendations from family and friends aligns with the findings of Van der Leeuw and Dirks (2024), who noted that individuals often blend personal knowledge with social influences when making investment decisions. These findings also reflect the core tenets of behavioral finance theory, which explains how investors' decision-making processes are shaped by both rational analysis and emotional factors such as trust in family and friends' advice (Ong'eta and Nasution, 2021).

4.5 Inferential Statistics

The inferential statistics consisted of correlation analysis and multiple regression analysis that established the correlation between variables.

4.5.1 Diagnostic Tests

4.5.1.1 Normality Test

The test of normality for the various variables was conducted and displayed in the table below. The study reported the Kolmogorov-Smirnov test which is the most appropriate for sample size above 50 respondents. The study attained a total of 62 respondents making it appropriate to utilize the Kolmogorov-Smirnov test for interpretation.

Table 4.7: Tests of Normality

Kolmogorov-Smirnov ^a	Shapiro-Wilk
---------------------------------	--------------

	Statistic	df	Sig.	Statistic	df	Sig.
Anchoring Bias	.125	63	.016	.947	63	.008
Illusion of Control Bias	.118	63	.029	.958	63	.032
Loss Aversion Bias	.155	63	.001	.945	63	.007
Investment Decisions	.201	63	.000	.934	63	.002

a. Lilliefors Significance Correction

There was a normally distributed for null hypothesis data is since the p values for Kolmogorov-Smirnov test are than α (0.05). Therefore, the null hypothesis was rejected to conclude that the data is not normally distributed which is an assumption when conducting the analysis.

4.5.1.2 Multicollinearity

The Multicollinearity test for of data carried out using variance inflation factors (VIF) and Tolerance and the results are displayed on Table below.

Table 2.8: Multi-Collinearity Statistics

Variables	TOLERANCE	VIF
Anchoring Bias	.812	1.122
Illusion of Control Bias	.567	1.392
Loss Aversion Bias	.756	1.433

The tolerance values were more than 0.1 and VIF figures were found to be less than 10 and greater than 1. This meant that there was no presence of Multicollinearity between the predictor variables that were incorporated in the model.

4.5.1.3 Test of Heteroscedasticity

The test of homoscedasticity was done and results presented in the Appendix IV section where the scatter plots indicate the plotted points for the predictor variables. The scatter plot indicates that no linear association among the variables and residuals, they did not merge along the line

of best fit. Therefore, the data exhibited homoscedastic therefore the assumption of Ordinary Linear Square exists.

The table below shows the ANOVA table from the linear regression model, which shows the significance level. The p value of 0.540 is which is greater than α (0.05) thus indicating that the data exhibited homoscedastic.

Table 4.9: Tests of Heteroscedasticity (ANOVA)

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	.002	3	.001	.727	.540 ^b
Residual	.044	59	.001		
Total	.045	62			

a. Dependent Variable: resid_sq

b. Predictors: (Constant), Loss_Aversion_Bias, Illusion_of_Control_Bias, Anchoring_Bias

4.6 Correlation Analysis

The Pearson correlation coefficient (r) was used to evaluate both the strength and direction of the linear relationships among the study variables. A higher correlation coefficient indicates a stronger association between the variables. The interpretation of the correlation values was as follows: a weak association is reflected by values between 0.10 and 0.29, a moderate association falls within the range of 0.30 to 0.49, and a strong association is signified by values of 0.50 or higher. In this analysis, the independent variables (anchoring bias, illusion of control bias, and loss aversion bias) were examined in relation to the dependent variable (Investment decisions). The table below presents the findings.

Table 4.10: Correlations

		Anchoring Bias	Illusion_of_Control_Bias	Loss_Aversion_Bias	Investment Decisions
Anchoring Bias	Pearson Correlation	1	.339**	.363**	.819**

	Sig. (2-tailed)		.007	.003	.000
	N	63	63	63	63
Illusion_of_Control_Bias	Pearson Correlation	.339**	1	.200	.473**
	Sig. (2-tailed)	.007		.117	.000
	N	63	63	63	63
Loss_Aversion_Bias	Pearson Correlation	.363**	.200	1	.457**
	Sig. (2-tailed)	.003	.117		.000
	N	63	63	63	63
Investment Decisions	Pearson Correlation	.819**	.473**	.457**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	63	63	63	63

From the findings presented in Table 4.11, demonstrated the existence of significant correlation between the cognitive biases and investment decisions. Anchoring bias indicated a strong positive correlation with investment decisions ($r=0.819$, $p = 0.00$), this suggested that these two variables tend to move together in the same direction and with a considerable strength. Illusion of control bias had a moderate positive correlation with investors' investment decisions ($r = 0.473$, $p = 0.007$), this points out that the two variables have a moderate tendency to co-vary. Loss aversion bias had a moderate positive correlation with investors' investment decisions ($r = 0.457$, $p = 0.00$).

The correlation analysis provided valuable insights into how these behavioral biases co-varied with investment decisions among the study participants. The strong correlation between anchoring bias and investment decisions particularly stood out, while both illusion of control and loss aversion biases showed moderate but significant correlations with investment decisions. These findings aligned with behavioral finance theory, which posits that psychological factors may be associated with investment behavior. However, the correlation coefficients only indicated the strength and direction of relationships between variables and could not establish which variable influenced the other. Further regression analysis was

necessary to explore the potential predictive relationships between these behavioral biases and investment decisions while controlling for other factors.

4.7 Multiple regression Analysis

Multiple regression analysis models were fitted to the data to establish the influence of independent variables on the dependent variable. Multiple regression model was relevant in establishing the relationship between the study variables and establish the causal relationship. The regression model was:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where, Y = Investment decisions,

β_0 = Constant,

X1= Anchoring bias.

X2 = Illusion of control bias.

X3 = Loss aversion bias.

ε = error term.

Regression analysis results were discussed in the three tables below.

4.7.1 Model Summary

The study attained the model summary to establish the amount of variation in the dependent variable that can be explained by changes in the independent variables. The model summary was used to establish the amount of variation in retail investors' investment decisions because of changes in anchoring bias, illusion of control bias, loss aversion bias.

Table 4.11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.859 ^a	.737	.724	.1333	.737	55.144	3	59	.000

a. Predictors: (Constant), Loss_Aversion_Bias, Illusion_of_Control_Bias, Anchoring_Bias

The outcomes obtained indicated that the value of R Square is 0.737 which indicates that 73.7% variation in investment decisions can be attributed to changes in anchoring bias, illusion of control and loss aversion bias. The remaining 26.3% suggest there are other factors that contribute to changes in retail investors' investment decisions that were not included in this model. The findings further indicated that the variables under study were strongly and positively correlated as indicated by the correlation coefficient (R) value of 0.859.

4.7.2 Analysis of Variance (ANOVA)

An analysis of variance was conducted to establish if the model was a perfect fit for the data. The model was tested at the level of significance of 5% to determine its significance.

Table 4.12: Analysis of Variance (ANOVA)

ANOVA ^a		Sum	of			
Model		Squares	df	Mean Square	F	Sig.
1	Regression	2.942	3	.981	55.144	.000 ^b
	Residual	1.049	59	.018		
	Total	3.991	62			

- a. Dependent Variable: Investment_Decisions
- b. Predictors: (Constant), Loss_Aversion_Bias, Illusion_of_Control_Bias, Anchoring_Bias

From the results presented in the table, the p-value (0.000b) was less than the selected level of significance (0.05). which suggests that the model was significant. Further, the F-calculated value from the ANOVA table, (55.144) was greater than the F-critical value from the f-distribution tables (F 3, 59 = 2.76). This, therefore, suggests that anchoring bias, illusion of control bias and loss Aversion bias can be used to predict retail investors' investment decisions in the Nairobi Securities Exchange (NSE).

4.7.3 Beta Coefficients of the Study Variables

The regression model for the study was as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

The beta coefficients were fitted in the model to determine their influence on the dependent variable.

Y = Investment decisions, β_0 = Constant, X1= Anchoring bias; X2 = Illusion of control bias; X3 = Loss aversion bias; ε = error term.

Table 4.13: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error				Lower Bound	Upper Bound
1 (Constant)	1.232	.727		1.694	.001	-.223	2.687
Anchoring_Bias	.288	.085	.384	3.404	.001	.119	.457
Illusion_of_Control_Bias	.193	.094	.229	2.043	.046	.004	.381
Loss_Aversion_Bias	.298	.133	.253	2.245	.029	.032	.563

a. Dependent Variable: Investment_Decisions

From the table of coefficients above, the regression model was fitted as follows:

$$Y = 1.232 + 0.288X1 + 0.193X2 + 0.298X3$$

The regression equation shows that while other factors are held constant at zero, investment decisions was at a constant value of 1.232. The first objective of the study was to determine the effect of anchoring bias on retail investors' investment decisions at the NSE, Kenya. From the findings, anchoring bias had a positive influence on retail investors' investment decisions in the Nairobi Securities Exchange (NSE) ($\beta = 0.288$). Further, anchoring bias was significant as indicated by p-value (0.001) less than selected level of significance (0.05). Therefore, anchoring bias is seen to have a positive significant influence on retail investors' investment decisions in the Nairobi Securities Exchange (NSE). The findings imply that a unit change in anchoring bias resulted in an increase in retail investors' investment decisions by 0.288 units.

The second objective of the study was to examine the effect of illusion of control bias on retail investment decisions at the NSE, Kenya. From the findings, the illusion of control bias had a positive influence on retail investors' investment decisions in the Nairobi Securities Exchange

(NSE) ($\beta = 0.193$). Further, the illusion of control bias was significant as indicated by p-value (0.046) less than selected level of significance (0.05). Therefore, illusion of control bias is seen to have a positive significant influence on retail investors' investment decisions in the Nairobi Securities Exchange (NSE). The findings imply that a unit change in illusion of control bias resulted in an increase in retail investors' investment decisions by 0.193 units.

The third objective of the study was to evaluate the effect of loss aversion bias on retail investment decisions retail at the NSE, Kenya. From the findings, loss aversion bias had a positive influence on retail investors' investment decisions in the Nairobi Securities Exchange (NSE) ($\beta = 0.298$). Further, loss aversion bias was significant as indicated by p-value (0.029) less than selected level of significance (0.05). Therefore, loss aversion bias is seen to have a positive significant influence on retail investors' investment decisions in the Nairobi Securities Exchange (NSE). The findings imply that a unit change in loss aversion bias resulted in an increase in retail investors' investment decisions by 0.298 units.

4.8 Chapter Summary

This Chapter Four presents the results of the study on behavioral biases affecting retail investors' decisions at the Nairobi Securities Exchange. The study achieved an 70.5% response rate from participants who were predominantly female (65%), with most respondents having bachelor's degrees (48.75%) and earning above KSHs 200,000 monthly (38%). Reliability analysis confirmed good internal consistency. The findings revealed that all three behavioral biases examined anchoring bias, illusion of control bias, and loss aversion bias positively and significantly influenced investment decisions. The regression model showed that these biases collectively explained 73.7% of variation in investment decisions, with loss aversion having the strongest impact, followed by anchoring bias and illusion of control bias.

CHAPTER FIVE

DISCUSSION, SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter has summary of the key findings, the conclusions derived from those findings, and the recommendations made based on the study. The conclusions and recommendations are aligned with the research's objective, which was to investigate the effect of specific cognitive biases on retail investors' investment decisions in the Nairobi Securities Exchange (NSE).

5.2 Summary of main results

This section of the study presents a summary of findings based on specific objectives of the study. It provides a discussion for the findings of the study. The section is structured into four sub-sections that are linked with the study objectives. The study's specific objectives of were to determine the effect of anchoring bias on retail investors' investment decisions at the NSE, Kenya; to examine the effect of illusion of control bias on retail investment decisions at the NSE, Kenya; to evaluate the effect of loss aversion bias on retail investment decisions retail at the NSE, Kenya.

The descriptive analysis showed that there was there was the existence of anchoring bias tendencies that affected Retail investors at the Nairobi securities exchange. Respondents demonstrated that their initial investment research significantly influenced their final investment decisions as well as their heavy reliance on past securities prices in investment decision-making. Investors also experienced difficulties in changing investment prospect even when market information was availed in the market while still evaluating securities based on their initial purchase prices. Furthermore, the results from the regression model supported the anchoring bias did have a positive and significant effect on investment decisions as an increase in anchoring bias resulted in increase in investment decision made by retail investors at the Nairobi securities exchange.

Descriptive statistic findings indicated that retail investors assumed that that it was easy for them to assess and evaluate market information while relying on market statistics available in the public. Retail investors also displayed confidence that their knowledge, experience and skills would give them an advantage in manipulating investments in their favour and outperform the market benchmarks. It was established that illusion of control bias had a

positive and significant effect on investment decisions. This represented that an increase in illusion of control bias would result in increase in investment decisions.

The descriptive statistics pointed out that investors found it more painful to lose money than it was enjoyable to gain the same amount. It was observed that investors tended to hold onto losing stock for a longer period that it was beneficial to them and become more cautious in making future investment decisions after experiencing losses. They displayed a contrary behaviour by not holding on to winning stocks to take advantages on capital gains. Loss aversion bias had a positive and significant effect on investment decision with an increase in loss aversion resulting in increase in investment decisions.

5.3 Discussion

5.3.1 Anchoring Bias and investment decisions among retail investors

The study established that investors at the Nairobi Securities Exchange are significantly influenced by anchoring bias when making investment decisions. Respondents reported that they regularly assess their stocks based on the initial purchase prices and rely heavily on past stock prices to inform them of their current decisions. Initial research also significantly shaped their final investment choices. Moreover, investors found it difficult to adjust their investment outlook when presented with new market information. These results suggest that historical price points play a central role in shaping investor behavior, regardless of changing market dynamics. The consistency in the responses implies a strong cognitive bias towards initial information or reference points.

The findings align with Behavioral Finance Theory, which posits that investors often rely on heuristics such as anchoring when making decisions under uncertainty. Rather than objectively evaluating new information, investors tend to fixate on initial purchase prices or previous stock values, using them as reference points even when they are no longer relevant. This leads to inertia and resistance to updating investment strategies in response to market dynamics. Such behavior highlights a clear departure from the rationality assumed in traditional financial models.

The findings align with prior studies by Strack and Mussweiler (2017), and Chapman and Johnson (2018), observed that investors tend to rely on anchors, such as previous prices or initial estimates, when making judgments. Barno et al., (2021) also established similar trends in the Kenyan market, where investors' decisions were often grounded in past data even when

better information became available. This behavior is explained by behavioral finance theory, which asserts that psychological influences significantly affect financial decision-making, leading to sub-optimal outcomes when investors fail to incorporate new data due to cognitive anchoring.

5.3.2 Illusion of Control bias and investment decisions among retail investors

The study established that investors at the Nairobi Securities Exchange exhibited a significant presence of illusion of control bias, as confirmed by the statistical results where the p-value was found to be significant. Respondents indicated a tendency to make investment decisions independently without consulting others and expressed high confidence in their ability to outperform the market through their investment skills and knowledge. Many believed that their experience gave them an edge in manipulating investment outcomes, while others affirmed that they could easily analyze market information and forecast successful investments based on their education and familiarity with the market. The low standard deviations in the responses suggest a shared perception among investors that they are capable of controlling or predicting market outcomes.

These findings agree with previous studies by Van der Leeuw and Dirks (2024), and Ong'eta and Nasution (2021), who also observed a widespread illusion of control among investors. The significant p-value further reinforces the notion that this bias is not a random occurrence, but a meaningful and impactful cognitive pattern in investor behavior. According to behavioral finance theory, these bias leads investors to overestimate their abilities and underestimate risks, often resulting in overtrading, poor diversification, or ignoring expert advice. The findings highlight how psychological confidence cloud objective judgment and lead to risky financial decisions that deviate from principles espoused in Modern Portfolio Theory.

The findings align with Behavioral Finance Theory, which explains that investors often exhibit overconfidence and an illusion of control, leading them to believe they can influence or predict market outcomes through personal skill and intuition. This psychological bias encourages riskier behavior, such as overtrading and ignoring expert advice, based on a false sense of mastery over market forces. From the perspective of Modern Portfolio Theory, this behavior contradicts the principle that investors act rationally and understand that consistent market outperformance is improbable without additional risk. The illusion of control thus illustrates how psychological factors disrupt optimal portfolio management.

5.3.3 Loss Aversion bias and investment decisions among retail investors

The study further found that investors at the Nairobi Securities Exchange are strongly influenced by loss aversion. Respondents noted that the pain of losing money outweighed the pleasure of gaining an equivalent amount. This bias led them to hold onto losing stocks longer than advisable and to become overly cautious in future investments following a loss. Additionally, they admitted to selling winning stocks prematurely to avoid future losses. These behaviors indicate a deep-rooted fear of loss that significantly affects decision-making processes.

These findings echo the pioneering work of Kahneman and Tversky (1979), who highlighted loss aversion as a core principle of prospect theory. Kirera and Mburungu (2019) also noted similar tendencies among Kenyan investors, where emotional reactions to losses distorted rational investment decisions. Within the framework of behavioral finance, this bias helps explain why investors may act irrationally choosing to avoid losses at all costs rather than pursuing potential gains. The study's results demonstrate the pervasive impact of psychological and emotional factors on investment decisions.

The findings are consistent with Behavioral Finance Theory, particularly Prospect Theory, which argues that investors respond sensitively to losses than to gains of the same amount. This emotional response causes investors to retain losing investments for too long and sell winning stocks prematurely, seeking to avoid the psychological pain associated with losses.

5.4 Conclusions

The first objective of the study was to determine the effect of anchoring bias on retail investors' investment decisions at the NSE, Kenya. The study found that anchoring bias had a positive influence on investors' investment decisions. Further, the influence of anchoring bias on investors' investment decisions was found to be significant. Therefore, the study concludes that anchoring bias has a positive influence on investors' investment decisions in the Nairobi Securities Exchange (NSE). This means that a unit increase in anchoring bias resulted in an increase in investors' investment decisions.

The second objective of the study was to examine the effect of illusion of control bias on retail investment decisions at the NSE, Kenya. The study found that the illusion of control bias had a positive influence on investors' investment decisions. Further, the influence of the illusion of control bias on investors' investment decisions was found to be significant. Therefore, the study concludes that the illusion of control bias has a positive influence on investors' investment

decisions in the Nairobi Securities Exchange (NSE). This means that a unit increase in the illusion of control bias resulted in an increase in investors' investment decisions.

The third objective of the study was to evaluate the effect of loss aversion bias on retail investment decisions retail at the NSE, Kenya. The study found that loss aversion bias had a positive influence on investors' investment decisions. Further, the influence of loss aversion bias on investors' investment decisions was found to be significant. Therefore, the study concludes that loss aversion bias has a positive influence on investors' investment decisions in the Nairobi Securities Exchange (NSE). This means that a unit increase in loss aversion bias had resulted in an increase in investors' investment decisions.

5.5 Contribution of the Study

This research contributes to the policy development and formulation in the Kenyan financial markets as it helps in clearly identifies how cognitive bias such as anchoring bias, illusion of control bias and loss aversion bias significantly influence the investment decisions made by retail investors at the Nairobi securities Exchange (NSE). These findings provide industry regulators such as the Capital Market Authority (CMA) and NSE with insights in how investor decisions are influence by behavioral biases such cognitive biases and help develop effective market regulations. These findings can be used by policymakers in design disclosure requirements that specifically address these biases, that would require investment firms to include bias warnings in their communications and educational programs with retail investors. Additionally, the results support the need for policies promoting mandatory cooling-off periods for investment decisions to mitigate impulsive trading driven by these cognitive biases.

This research would be also useful to investment professionals and financial advisors in providing valuable insights for their investment clients and especially, retail investors. They will be able to provide their clients with educational programs and tools to help them address, mitigate and minimize these biases. Availing to retail investors an objective performance metrics as well as helping framing investment choices in ways that reduce loss aversion and contextualize historical price information.

This study contributes to the field of behavioral finance by adding into the existing literature and more so in the context of African emerging market which has been underrepresented in behavioral finance literature. This research has confirmed that cognitive biases significantly impact investment decisions made by retail investors in the Nairobi Securities Exchange. This is shown by findings from regression model explaining 73.7% of variation in investment

decisions. This high explanatory power challenges traditional finance theories that assume investor rationality and supports the growing body of behavioral finance literature.

5.6 Recommendations

Based on the findings of the study, it is recommended that investor education programs be intensified to address behavioral biases such as anchoring, illusion of control, and loss aversion, which were found to significantly influence investment decisions at the Nairobi Securities Exchange. Regulatory bodies, financial advisors, and market participants should collaborate to develop structured training that emphasizes rational investment approaches and the risks of overreliance on personal judgment or historical price patterns. Investors should be encouraged to diversify their sources of information, consult with professionals before making major decisions, and adopt disciplined investment strategies aligned with Modern Portfolio Theory. Additionally, behavioral awareness should be incorporated into financial literacy campaigns to help investors recognize and mitigate the impact of psychological biases on their financial choices.

5.7 Limitations of the Study

The study had relied questionnaires that were administered online and hence had on self-reported data, which may be subject to bias in social desirability or inaccurate self-assessment. This was mitigated by assuring respondents of confidentiality and anonymity to encourage honest and objective responses. Another limitation was the study's focused on individual investors at the Nairobi Securities Exchange, which may limit the generalizability of the findings to institutional investors or investors in other markets. To address this, the study included a diverse sample of retail investors from various backgrounds and investment experiences to enhance the reliability and applicability of the results within the local context. The study used cross-sectional descriptive research design to capture retail investor's behaviors and perceptions at a single point in time, this creates a limitation as the research does not consider how these cognitive biases influence investors in different time periods and market conditions. The market volatility during the data collection period may have temporarily heightened certain biases, particularly loss aversion, potentially affecting the generalizability of findings across different market cycles.

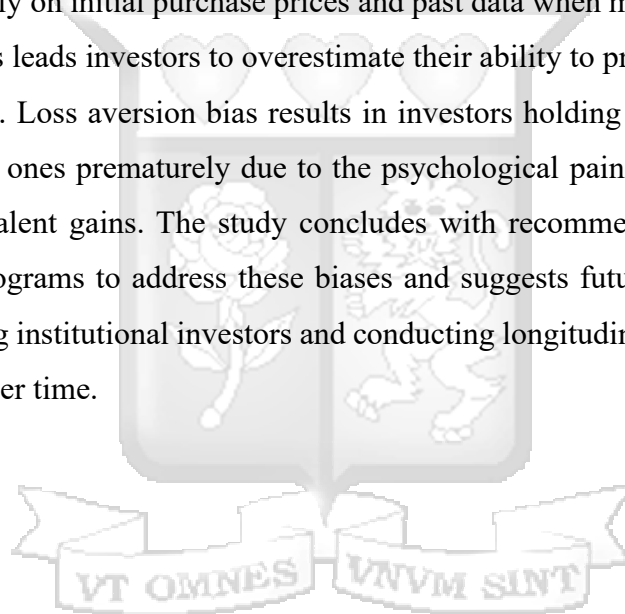
5.8 Suggestions for Further Studies

Future studies could explore the impact of behavioral biases on investment decisions among institutional investors or in different stock markets beyond the Nairobi Securities Exchange to

allow for broader generalization and comparative analysis. Additionally, longitudinal studies could be conducted to assess how behavioral biases evolve over time and how investor behavior adjusts in response to market changes or financial education interventions. Including qualitative methods such as interviews could also provide deeper insights into the psychological drivers behind investor decisions.

5.9 Chapter Summary

Chapter 5 presents the findings, conclusions, and recommendations from a study on cognitive biases affecting retail investors at the Nairobi Securities Exchange. The research identified that the three cognitive biases that are anchoring bias, illusion of control bias, and loss aversion bias have positively and significantly influence retail investment decisions. Anchoring bias causes investors to rely heavily on initial purchase prices and past data when making decisions, while illusion of control bias leads investors to overestimate their ability to predict market outcomes through personal skill. Loss aversion bias results in investors holding losing stocks too long while selling winning ones prematurely due to the psychological pain of losses outweighing the pleasure of equivalent gains. The study concludes with recommendations for enhanced investor education programs to address these biases and suggests future research directions, including investigating institutional investors and conducting longitudinal studies to track how these biases evolve over time.



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APPENDICES

Appendix I: Letter of Introduction

Dear Sir/Madam,

RE: Letter of Request for Permission to Collect Data

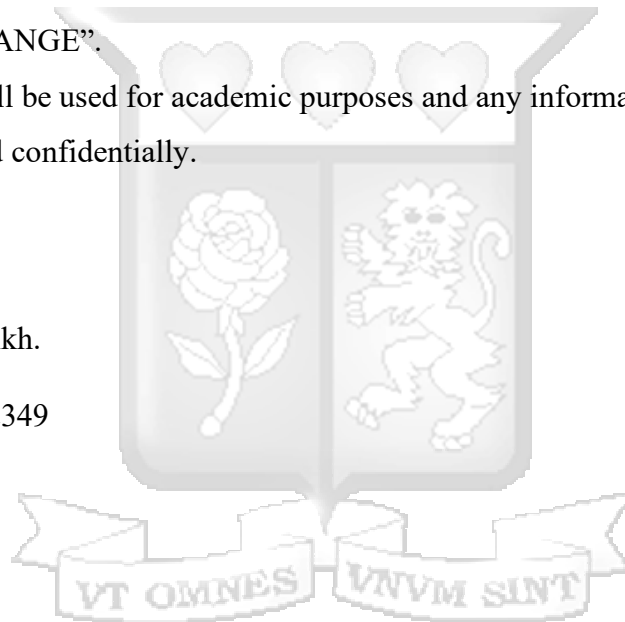
I am currently a student undertaking the Master of Commerce in Finance at Strathmore University. I am kindly requesting for your support in providing data on for my research titled ‘EFFECT OF COGNITIVE BIASES ON INVESTMENT DECISIONS OF RETAIL INVESTOR AMONG FIRMS LISTED IN NAIROBI SECURITIES EXCHANGE’.

The data requested will be used for academic purposes and any information that you provide was be treated confidentially.

Yours Sincerely,

Saadia Abdikadir Sheikh.

Student Adm. No. 102349



Appendix II: Questionnaire Consent Form

Title of Study: EFFECT OF COGNITIVE BIASES ON INVESTMENT DECISIONS OF RETAIL INVESTOR AMONG FIRMS LISTED IN NAIROBI SECURITIES EXCHANGE.

Researcher: Saadia

Abdikadir Sheikh. Institution:

Strathmore University.

Contact: +254715840702.

Purpose of the Study: This study's purpose is to investigate the combined effect of specific cognitive biases on retail investors' investment decisions in the Nairobi Securities Exchange (NSE). The specific objectives of the study will be to investigate the effect of anchoring, illusion of control and loss aversion on retail investment decisions retail at the NSE, Kenya. The study was focused on the NSE investors in the securities counter, as provided by the twenty-three registered security firms operating within Nairobi County, who appear in their registers and databases at the time of the study.

Study Procedure: If you give your consent to participate in this study, you will be requested to respond to all the questions listed in the questionnaire. The questionnaire consists of investor profile and Likert scale questions that focus on effects of cognitive biases on investment decisions. The questionnaire should take about 20 minutes to complete.

Confidentiality: The information you provide was solely be utilized to analyze data relating to the study's objectives. The findings of the study shall be used for academic research purposes and to enhance knowledge in the field of behavioral finance and stock market investment. The information you provide was kept in the utmost confidentiality. Your personal information and identity data will not include in the study's reports or publications.

Consent Statement:

By signing below, I acknowledge that:

My participation in this research is entirely voluntary.

I am aware that my answers will be kept private and that I am free to stop participating in the research whenever I choose.

Participant's Signature: _____

Date: _____

If you have any further questions, feel free to contact the researcher

Thank you for your cooperation



Appendix III: Questionnaire

Instructions

I am an MCOM (Finance) student at Strathmore University and currently undertaking a thesis study on the effect of cognitive biases on investment decisions of retail investors in firms listed in NSE. This questionnaire is made up of five sections that should take only a moment of your time. Kindly complete the following questionnaire using the instruments provided for each set of questions. Please tick appropriately or write in the space provided.

Section A: Demographic Details

Gender:

Female ()

Male ()

Age

18-30 () 31-40 () 41-55 () Above 56 ()

The highest level of education attained.

College diploma () Bachelor's degree () Master's degree ()

Doctoral Degree ()

Monthly Income range (KSHs.)

Below 50,000 () 50,000-100,000 () 100,001-200,000 () Above 200,000 ()

Years of experience in trading securities.

0-3 () 4-7 () 7-10 () over 10 ()

Section B: Assessment of Anchoring Bias

For each of the following questions below, select the appropriate response that best describes how you feel about the given statement, where: 1=Strongly disagree, 2=Disagree, 3=Neutral, 4= Agree, 5=Strongly agree. This Likert scale was used for questions six to ten of the questionnaire.

	1	2	3	4	5
6) I regularly assess my stocks based on their initial purchase price.					
7) When making investment decisions, I depend on heavily on past stock prices.					
8) I find it hard to change my investment prospects when new market information becomes presented					
9) My initial investment research tends to significantly influence my final investment decision.					
10) I frequently compare current stock prices to their historical performance when deciding to buy or sell.					

Section C: Assessment of Illusion of Control Bias.

For each of the following questions below, select the appropriate response that best describes how you feel about the given statement, where: 1=strongly disagree, 2=Disagree, 3=Neutral, 4= Agree, 5=Strongly agree. This Likert scale was be used for questions eleven to fifteen of the questionnaire.

	1	2	3	4	5
11) I make my investment decisions by myself without consulting others.					
12) I am confident that my investment skills and knowledge in the stock market was enable me to outperform the market and predict price movements					
13) I believe that my knowledge and experience give me an advantage in manipulating the investments in may favour					

14) It is easy for me to analyze market information and rely on available investment statistics					
15) I feel that my education and experience in investments enable me to forecast winning investment					

Section D: Assessment of Loss aversion Bias.

For each of the following questions below, select the appropriate response that best describes how you feel about the given statement, where: 1=strongly disagree, 2=Disagree, 3=Neutral, 4= Agree, 5=Strongly agree. This Likert scale was be used for questions sixteen to twenty of the questionnaire.

	1	2	3	4	5
16) I find it more painful to lose money than enjoyable to gain the same amount.					
17) I tend to hold onto losing stocks longer than I probably should.					
18) After experiencing an investment loss, I become more cautious in my future investment decisions.					
19) I am more likely to sell a winning stock quickly than a losing stock.					
20) The fear of potential losses prevents me from making certain investments.					

Section E: Assessment of Investment decision.

For each of the following questions below, select the appropriate response that best describes how you feel about the given statement, where: 1=Strongly disagree, 2=Disagree, 3=Neutral, 4= Agree, 5=Strongly agree. This Likert scale was be used for questions twenty-one to twenty-five of the questionnaire.

	1	2	3	4	5
21) I frequently trade in stock market securities					
22) I tend to hold an investment portfolio that is well diversified with multiple stocks from different industries					
23) My primary investment objective is long term wealth creation					
24) When making investment decisions, I rely on recommendations from family and friends					
25) I do extensive personal research before making investment decisions					

Thank you for participating.



14th April 2025

Ms Sheikh Saadia,
abdikadir.sheikh@strathmore.edu

Dear Ms Sheikh,

RE: Effect of Cognitive Biases on Investment Decisions Among Retail Investors at the Nairobi Securities Exchange

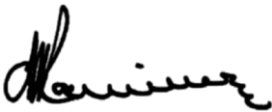
This is to inform you that SU-ISERC has reviewed and **approved** your above **SU-masters** proposal. Your application reference number is **SU-ISERC2889/25**. The approval period is from **14th April 2025 to 13th April 2026**.

This approval is subject to compliance with the following requirements:

- i. Only approved documents including (informed consents, study instruments, MTA) was be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-ISERC.
- iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-ISERC within 72 hours of notification.
- iv. Any changes anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU- ISERC within 72 hours.
- v. Clearance for the export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to the expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days of completion of the study to SU- ISERC.

Before commencing your study, you was be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke/> and obtain other clearances needed.

Yours sincerely,



Mr Ambrose Rachier,
Chairperson; SU-ISERC



REPUBLIC OF KENYA

Ref No: 639980

RESEARCH LICENSE



This is to Certify that Ms., Sandia Abdikadir of Strathmore University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: Effect of Cognitive Biases on Investment Decisions Among Retail Investors at the Nairobi Securities Exchange for the period ending : 15/April/2026.

License No: NACOSTI/P/25/4172917

639980 Applicant Identification Number



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Date of Issue: 15/April/2025

Walter Wambui

Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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Legal Notice No. 108: The Science, Technology and Innovation (Research Licensing) Regulations, 2014

The National Commission for Science, Technology and Innovation, hereafter referred to as the Commission, was established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

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2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way:
 - i. Endanger national security
 - ii. Adversely affect the lives of Kenyans
 - iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
 - iv. Result in exploitation of intellectual property rights of communities in Kenya
 - v. Adversely affect the environment
 - vi. Adversely affect the rights of communities
 - vii. Endanger public safety and national cohesion
 - viii. Plagiarize someone else's work
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13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

National Commission for Science, Technology and
Innovation(NACOSTI),
Off Waiyaki Way, Upper Kabete,
P. O. Box 30623 - 00100 Nairobi, KENYA
Telephone: 020 4807000, 0713788787, 0733404245
E-mail: dg@nacosti.go.ke
Website: www.nacosti.go.ke