EFFECT OF COGNITIVE BIASES ON INDIVIDUAL INVESTMENT DECISION IN STOCK MARKET AMONG TEACHERS IN VIHIGA SUBCOUNTY, KENYA

BY

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A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTFOR THE AWARD OF DEGREE OF MASTER OF SCIENCE IN FINANCE

SCHOOL OF BUSINESS & ECONOMICS

MASENO UNIVERSITY

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ACKNOWLEDGEMENT

I owe my indebted appreciation to the Department of Accounting and Finance, Maseno University for their support and assistance. Specifically, I wish to appreciate the tireless effort put into this work by my supervisors, Dr. Robert Mule for his constant reviews and consistent support, push and correction through my studies and Dr. Benjamin Ombok for the opportunity given to conduct my course while instilling the importance of research skills in me. To the education departments of the County Government of Vihiga, themany school principals and administrators who gave me an opportunity and chance to interact with teachers of whom even coordinated data collection on my behalf; this work might not have been a success without your input, and many thanks goes to you in this regard. Similarly, to the staff at the Maseno University School of Business and Economics Library and the School of Graduate Studies who stopped at nothing to avail tome any necessary information: much appreciation accorded to you.

DEDICATION

This work is dedicated to The Almighty God for the strength and wisdom He has granted me at no cost during this entire period. To my mother, Mrs. Florence A. K. Ludenyo, for her unmatched support and companionship. My father, Mr. John. I. Ludenyo for his excellent guiding wisdom.

ABSTRACT

Globally, investment in the stock market is paramount to the establishment of a vibrant economy and personal wealth building and in some instances is influenced by behavioral factors such as cognitive biases. According to Cambridge Analytica, stock market investment among individual investors in the UK has been declining, to average at 13.5 % from 1970 to 2019. The same trend is also reported among Kenyan's individual investors stagnating at 5.5% in 2019 according to Capital Market Authority report, of whom teachers are a part of. Even though behavioral finance contends that cognitive biases explain this declining participation in stock market investment, previous studies mainly used descriptive research design in investigating factors affecting investment participation among lawyers and financial managers among others. The main purpose assesses the effect of behavioral cognitive biases on teacher investment decision in stock market. Objectives of the study were to: determine the effect of financial literacy bias; cognitive dissonance bias and herd-perception bias on teacher investment decision in stock market investing in Vihiga Sub-County. The study was guided by behavioral finance and efficient market theories. The study adopted correlation research design through binary logistic regression analysis. The target population of the study was 1,126 teachers where stratified random sampling was used to select the sample size of 257 teachers. Primary data was collected through structured questionnaires. The research instrument reliability test yielded alpha coefficients of more than 0.7 implying the instrument elements were consistent and reliable whereas validity was done using two expert reviewers and an average score of 80%. Results revealed that there exists significant effect on individual investment decision of financial literacy bias measured by investment knowledge awareness (β =0.623; Odds Ratio=1.865, p=0.021) and investment services access (β =0.828; Odds Ratio=2.288, p= 0.015); cognitive dissonance measured by teacher perceptions (β =-1.361; Odds Ratio=0.256, p=0.042) and teacher risk averseness (β= 0.984; Odds Ratio=0.374, p= 0.033) and herd- instinct bias by family influence (β= 0.576; Odds Ratio=1.779, p= 0.02) and peer influence(β= 0.432; Odds Ratio=1.5403, p= 0.031). This meant that access to investment services; investment knowledge, family and peer influence increased the log odds of teachers having invested in the stock market while teacher perceptions and risk averseness decreased the odds. Based on the overall relationship financial literacy bias and herd-instinct bias had a positive effect on investment decision while cognitive dissonance bias had a negative effect. Therefore, cognitive biases had significant effect on individual investment decision among teachers in Vihiga Sub- County. Aside from improvement in financial literacy among teachers, the study recommended that more cognitive skills need to be enhanced among teachers and individual investors in Kenya in order to counter the negative effect of cognitive dissonance bias. Study is significant in adding value to existing knowledge in behavioral finance among individual investors in Kenya.

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LIST OF ACCRONYMS AND ABBREVIATIONS

ASEA	African Securities Exchange Association
CAPM	Capital Asset Pricing Model
CDS	Central Depository System
CEO	County Education Officer
CMA	Capital Markets Authority
GDP	Gross Domestic Product
EMH	Efficient Market Hypothesis
EM	Expected Maximisation
IPOs	Initial Public Offerings
ICIFA	Institute of Certified Investments and Financial Analysts
JSE	Johannesburg Stock Exchange
KNBS	Kenya National Bureau of Statistics
KPMG	Klynveld Peat Marwick Goerdler Company (Audit Firm)
NSE	Nairobi Stock Exchange
OECD	Organisation for Economic
OR	Odds Ratio
SACCOS	Savings and Credit Cooperative Societies
TSC	Teachers Service Commission
UAE	United Arab Emirates
UW	MADISON- University of Wisconsin- Madison

OPERATIONAL DEFINITION OF TERMS

Capital Market- Capital markets are markets for the selling and buying of assets that are capital in nature. They facilitate the transfer of capital from capital owners to seekers. Includes stock market which in Kenya is the Nairobi Securities Exchange.

Cognitive Biases- Cognitive biases are psychological systemic errors in thinking that occur when individuals lack or are processing and interpreting information and affects the decision and judgments they make. It stems from individual behavior and may influence teacher investment decision.

Cognitive Dissonance Bias- Cognitive dissonance refers to the conflict caused by holding negative perceptions about investment which need to be corrected. It is achieved when an individual investor adopts certain perceptions based on previous experience in investing or fear of risk causing them to avoid investing whereas they abhor benefits that come with investing.Also referred to as Cognitive Bias.

Formal Income- Income that includes recognized income sources for paying income taxes based on all 40-hour, regular wage jobs.

Herd-instinct Bias- Situation where everyone acts like everyone else without considering the reasons why. Investment decisions are made on the influence of the investor's immediate environment. Also called Herding bias or herding behavior.

Investment- A commitment of funds for a period of time in order to derive a rate of return that will compensate the investor for the time during which the funds are invested, for the expected rate of inflation during the investment horizon and for the uncertainty involved. For the purposes of this study, it shall involve investment in equity securities in the stock market.

Investment Decision- Determination, with respect to the choice to or not participate in investment opportunities such as equity securities at the Stock exchange, by investors in orderto generate profit.

Individual Investor- Individual who purchases or is capable of purchasing small amounts of securities for him/herself as opposed to through a collective scheme based on their income or savings. They originate from a wide range of sectors or careers including professional and non- professional. In this study a teacher is an individual investor. Those who have invested are active while those who haven't are passive.

Individual Investment Decision- The determination made by a teacher so set aside funds generated from personal income and purchase shares or other investment products in the Nairobi Securities Exchange.

Teacher Financial Literacy- The ability to access investment services for example manipulating investment platforms, broker-client relationship, investment accounts and awareness about investment knowledge by a teacher. Generally, it is financial literacy or Individual financial literacy.

Securities Market/Stock Market- Are the markets for financial securities held by different investors over time. In most countries, there is only one stock market and in Kenya, it is the Nairobi Securities Exchange.

Stable income- Permanent and pensionable

Teacher- Teachers' Service Commission (TSC) (2005) defines 'teacher' as a person who has been registered by the commission in accordance with section 7 of the Teachers' Service Commission Act. They are the individual investors used in the study.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

This section shows how cognitive biases and individual investment decision in the stock market are related. It builds a case for the stock market giving background statistics and theories guiding the study. By reviewing both theoretical and empirical evidence, three gaps in knowledge are identified warranting the study.

Riley and Brown (2012) define investment as a commitment of funds for a period of time in order to derive a rate of return that will compensate the investor for the time which the funds are invested, for the expected rate of inflation during the investment horizon and for uncertainty involved. They further add that investment decision as the decision made by the individual investors with respect to decision to invest, amount of funds to be deployed, and duration to take in the investment opportunities. Shefrin (2005) also defines investment to mean the process of putting funds into purchase of shares with the expectation of getting a profits or growth in the worth of the money employed. It therefore implies that investment is the deployment of funds today, acknowledging delayed gratification of enjoying maximum satisfaction from utilizing these funds, in order to receive a greater value of the funds at a later time. Investments can be classified into traditional investments and alternative investments. Traditional investments are the readily accessible products in the market that include stocks and bonds while alternative investments consist of investments outside of the traditional investments such as real estate, structured products and fund investing (Weru, 2019).

Individual investment decision in the stock market constitutes the decision to invest by purchasing shares by an individual. Individual investors execute their trades through traditional or online brokerage firms or where they open investment accounts called Central Depository System (CDS) accounts and purchasing securities for their own personal accounts, often in dramatically smaller amounts as compared to institutional investors, (Wendo, 2015). In the context of investment in the stock market, investors are majorly categorized into two; local and foreign investors. These two can either be actively investing or passive, not investing. Local investors are further categorized into retail investors or institutional investors and the retail investors further sorted into individual or group investors. Teachers, who are a part of many other local investors form individual investors category in this study.

The decision to invest in stock market is generally propagated through purchase of tradable securities offered in a Securities Exchange, according to the World Federation of Exchanges (WFE). Examples of such markets include; The New York Stock Exchange (NYSE), London Stock Exchange (LSE) and Nairobi Securities Exchange (NSE), (Wendo, 2015). According to Hede (2011), stock markets have a close interdependent and perpetual relationship with the economy and they play a significant role in economic development particularly in; enabling companies to raise equity capital to fund growth requirements; providing governments with a platform to raise debt funding for developmental projects through the issue of bonds; providing companies with a currency, in the form of listed shares, that they can utilize to make acquisitions; facilitating investment by the public into fast growing and high yielding economic sectors while enabling individual investors grow their portfolio and future wealth as they plan for retirement.

Thus, stock price reflects true investor sentiment, thoughts and emotion and stock market becomes an indicator of National performance in the global perspective. By virtue of the positive relationship between stock market and economy, it is encouraged that as many local individual investors take up investing, not just for the good of the economy, but also for self-wealth growth. The aggregation of individual investors in the stock market leads to an ingrown pool of stable locally available capital that engineers' local companies into executing their various expansion plans. This direct correlation of stock market with economic performance presents the investment in stock market the best estimate of measuring both individual investment and economic performance of a country (CMA 2013).

Globally, individual investment trends have been on the decline with minor upsurges in 2014 to 2019 largely attributed to financial technology advancement leading to easier accessibility to financial services, according to statistics by Statistica. In extensive research, their 2019 publication displays a decline of over 10% in individual investment in the US in the period between 2007 and 2013, and from then on, a slight unstable increase of 3%. Bloomberg intelligence further analyses investors share of the stock market between 2013to 2019 averaging it at a stagnant 15%.

Share of Americans investing money in the stock market 1999-2020
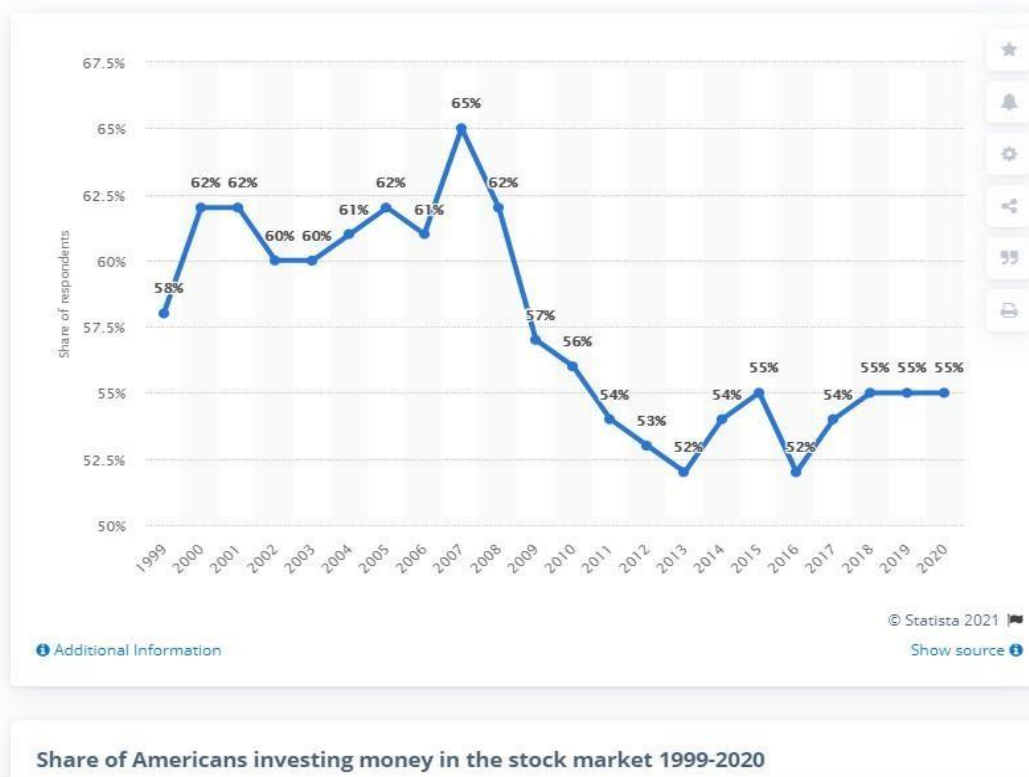
Figure 1.1: Individual Investor trends in the United States of America.
Source: Statistica (2021)

Similar trends are observed among investors in the UK stock market, according to Cambridge research, where in 2010, individual investors owned only 10% of the UK stock market. A slight but unsteady improvement was noted thereafter between 2010 and 2019, capping it at 13.5%, and was being attributed to the combined effects of deepening financial technology and millennial population growth according to Cambridge research. However, in their extensive study of the individual investor in the UK categorizing them by household income, race and age. Their results indicated that in total 33% of Britons owned share and individual investors above the age of 65 with the highest shareholding in the stock market followed by those between the ages of 55 and 64.

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UK stock market owned by individual investors (%)
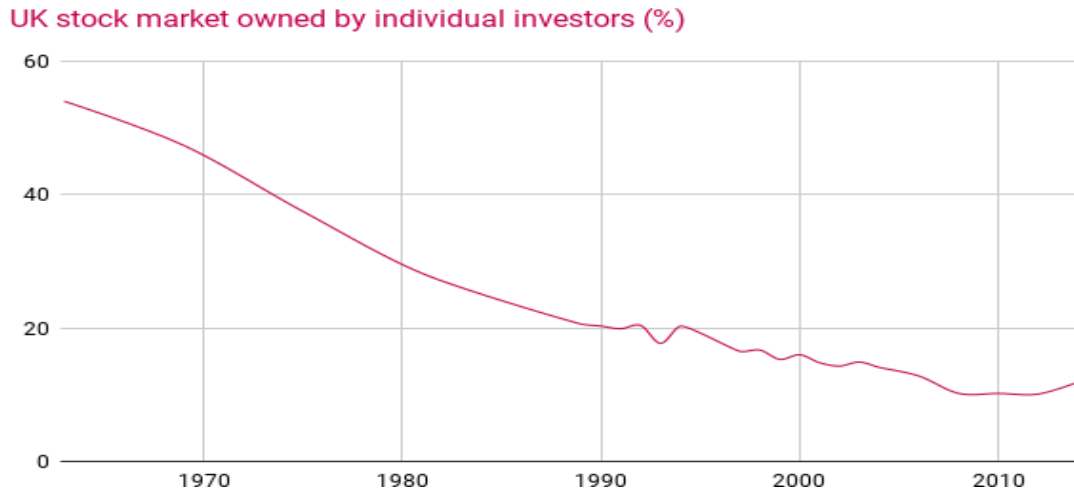
Figure 1.2: Individual Investor trends in the United Kingdom

Source: Cambridge Analytica (2019)

In sub-Saharan Africa, there is scarcity of research on individual investment in Stock market. Gumbo (2018) reports that participation of individual investors at the Zimbabwe Stock Exchange (ZSE) is very low with 40% of the population in Zimbabwe being financially excluded, and 22% relying only on informal financial products or services, 38% of Zimbabweans formally served, 24% have or use bank products or services such as the stock market and 14% have or use non-bank formal products or services but not commercial banking products. The reasons for the low participation rate are not well known.

In Kenya, statistics by the Capital Markets Authority reveal that East African individual investment was on the decline the period between 2004 to 2019, not being at all commensurate with foreign investors. In 2019, individual investment in NSE stood at 11.6% as compared to foreign at 19.98%. This, as CMA reports, being the year when foreign investors withdrew Ksh.11.2 billion from the Nairobi Securities Exchange leading to a sharp fall in value of especially the blue-chip stocks like Safaricom and equity. Foreign investors have additionally been known to be cyclical, withdrawn huge amounts of capital from the NSE during election periods, despite the fact that NSE plays a critical role not only in contributing to Kenya's economy, but also in achieving Sustainable Development Goals and the vision 2030.

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Table 1.1: Trends in Individual Investor holdings in Nairobi Securities Exchange

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Individual Investors%	15.7	13.8	12.23	12.01	12.89	14.58	12.84	12.49	11.47	11.54	11.60
Foreign individual Investors%	10.1	12.6	19.44	21.29	22.53	21.26	21.48	21.13	20.17	19.97	19.98

Source: CMA Quarterly Statistical Bulletin 2020

The number of new CDS accounts opened also dramatically reduced over the years from 31,607 in 2011 to 3,570 in 2019 with local individual participation in NSE reducing to a paltry 10% by 2015 which has since maintained below 10% according to Capital Markets Authority.

Table 1.2: CDS Account opening trends

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Individual Investors	45,656	31,607	19,473	23,569	37,141	31,739	17,337	14,071	14,442	3,570

Source: Capital Markets Authority
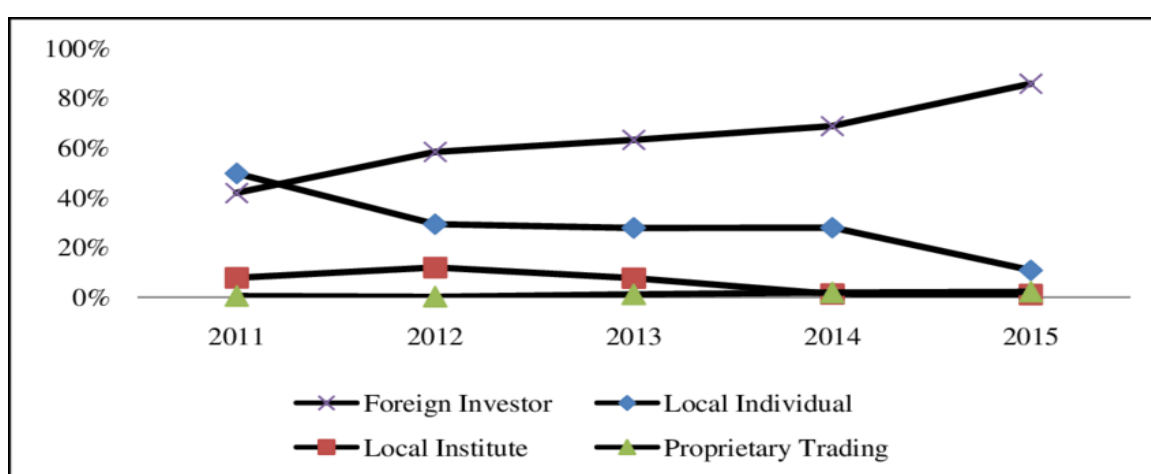
Figure 1.3: Individual investors % of investment in stock market comparison with Foreign Investors

Source: CDSC Quarterly Statistical Bulletin as at March 2019

These trends portray a problem, mainly that individual investment is failing to contribute its

value to the stock markets and therefore declining its contribution to economies. This is a dangerous indicator specially to developing economies like Kenya since such economies may not be able to sustain shocks as good as those in developed countries such as the US and UK.

Empirical literature confirm that Individual investors draw their income and come from many sectors in the economy in both formal or informal setups and may include health sector(doctors), lawyers, jua-kali sector, private sector e.g., banking and education sector(teachers). Most empirical studies focusing on individual investment globally and nationally focused on investors in general with lack of sufficient research targeting specific groups of individuals and none researching on stock investment in rural setups.

Wendo (2015) researched on factors influencing individual investment decision in stock market by advocates in Nairobi County. Nyakundi (2017) studied behavioral biases on ranking of financing decisions by financial managers of NSE firms. They both agreed that individual investors with regular monthly income present an ingrown pool of stable locally available capital that can be used by the stock market and that most individuals with such stable and regular monthly income stem from professional backgrounds and carry unmatched potential to individually invest in the stock market. In creating this pool of capital for the stock market, teachers as local individual investors are justified in investing in the stock market due to their formal, stable and regular monthly income. It is also at their disposal to invest in the stock market to grow their own capital and generate wealth to be enjoyed at a future time.

Teachers as individual investors in stock market are important because aggregatively they can contribute significantly to this local pool of capital in the stock market. Teachers, by virtue of their practice are represented in every fabric of society and community, from urban to rural. A teacher is not only knowledge operator, creator and disseminator in the society, but an opinion holder in the greatest portion of the Kenyan populous. They are likely the best targets among individual investors since they can disseminate investment knowledge to other sectors of individual investors, and to the next generation. Statistics by KNBS 2019 show that in Vihiga Subcounty, teachers form the highest number of formal income earners (65%), followed by those in the health sector (nurses, clinicians). Teacher income is standard across the country in both urban and rural areas, only differentiated according to job groups. In

efficient capital markets, it is expected that majority of them should be investing in the stock market, contrary to observed trends among individual investors. Basing on a technical analysis of the NSE all share index carried out by this study (attached to appendix XI), if a teacher, or any other individual investor for that matter, bought a share at an average of ksh.55 in 2009, they would be able to sell it at ksh.165 in 2021. This means that a minimum value of 100 shares would yield total value of 11,000 shares by 2019 which further implies a capital appreciation of 153.8%.

Of the employed workforce in Vihiga, teachers represent the highest economic contributors to the county at 14% followed by medical personnel at 8% according to KNBS 2019 statistics. Farmers out as the highest contributors to the county's economy generally, that is including both employed and non-employed, but the sector has reported major challenges including lack of enough farming space, equipment, and government support which has led to income for most farmers in the county unstable and irregular. For this reason, this thesis focused on measuring logically the effect of financial literacy bias, cognitive dissonance bias and herd-instinct bias on teacher investment decision. It included an initial background survey in 2019 of different sectors of individual investors in Vihiga county with an aim of finding out the percentage of current investors in the stock market.

The survey targeted individuals with stable, regular monthly income such as education sector (teachers), health sector (nurses, clinicians, doctors), civil service (public servants in both national and county) and private sector (bankers and NGO personnel). These sectors were selected because generally their professional population in rural setups are higher than any other professionals. With purposive sampling targeting 40 respondents in each category, results revealed that generally, the number of CDS accounts owned by investors was not commensurate with number of bank accounts, with only 10% of teachers having invested in the stock market. Teachers were among the poorest category of investors who had invested in the stock markets (attached to appendix XI figure 1.3).

They also formed the weakest category of investors who would choose to invest in the stock market with only 8%, with the leading investment options of choice among all respondents' being real estate and retail business. As much as teachers and other individual investors in Vihiga subcounty would prefer investing in real estate, agriculture and other avenues, KNBS

(2019) statistics report that among the economic challenges facing Vihiga Sub- County as a rural area are; Inadequate land for economic production- tea farming, large scale dairy farming, mechanized farming systems, low real estate investment due to high costs and limited access to credit facilities. This subsequently means that teachers' investment in these areas may be time consuming, capital intensive consequently compromising performance and attention at school, yet the stock market provides an alternative because investors do not directly generate (attached to appendix X figure 1.4).

This mis-link in stock market individual investment data posed questions that needed to be explained. For example, it could be due to cognitive biases in teacher investment decision that explain these trends and specific effects of theses cognitive biases need to be measured.

In a gest to explain these investment trends, theoretical literature, (Malkiel, 1973 and Schleifer, 2000) opined that various factors such as high transaction costs, perception, fear of losing money, influence of environment (friends and family), risk profiling and especially lack of awareness about the market and associated investment opportunities, influence individuals investment decision in stock market. They group these factors into economic and market factors based on traditional finance theory which assumed full information, rationality and active investing by all individual investors.

Behavioral finance theory however grouped these factors into behavioral cognitive biases that influence investment decision. Riley and Brown (2012) define behavioral finance as the study of investor behavior while making investment decision adding that in making the investment decision, individual investors are vulnerable to behavioral cognitive biases because they do not have the knowledge, discipline, or expertise to research their investments, therefore there cannot be full information, rationality and not all individuals are actively investing. For instance, fear of losing money has been explained by regret- aversion bias, influence of family and friends is explained by herd-instinct bias, different perceptions explained by cognitive dissonance bias and access and awareness on financial knowledge explained by financial literacy. Therefore, behavioral finance is a field of finance that uses psychology to understand and explain investor trends in the stock market.

Financial literacy bias is an important aspect in measuring investment decision and behaviour (Hede, 2012). It has been the focal point of investigation by many studies, in trying to explain

individual investment decision trends in the stock market. The easiest possible explanation to lack of investment in stock market is the lack of knowledge of it. Theoretical literature recognizes that financial literacy is positively related to reduction of cognitive biases effect and increased investment in the stock market (Hede, 2012 and Riley & Brown, 2012). Whereas these theoretical studies acknowledge cognitive biases as influencers of investment decision, they assume efficiency of the market and therefore full information or literacy among investors. This assumption has brought conflicting arguments on measurement of financial literacy.

Empirical findings of investigations into the relationship between financial literacy bias and investment decision have yielded mixed results due to the theoretical assumptions (Kosgei, 2014, Wendo, 2015, Toor, 2014, Muchiri, 2015, Onyango, 2014 and Aroni, 2014). Kosgei (2014) used descriptive design to study factors influencing development of capital markets in a developing economy, a case on Nairobi Securities Exchange. The study uses a single line question item in the questionnaire to measure whether the respondents, who were managers of investment firms, staff of NSE and Ministry of Finance, are financially literate. On the contrary, Wendo (2015) also using descriptive survey design measured factors that influence participation in NSE among advocates in Nairobi County. Unlike Kosgei (2014), she uses a more structured format to measure financial literacy in the sense that she measures level of awareness and investor education in her sample of 105 advocates. The respondents in both Kosgei's and Wando's study were already investors in the stock market(active), therefore none focused on new, non- investing individuals(passive), therefore financial literacy bias may not have been sufficiently exposed. They both however agree in their recommendations that given current investors in the NSE are high net worth individuals, success of the NSE depends on how other non-investing individuals can be empowered to invest through financial literacy. Wendo (2015) adds that individual investors need to be studied more closely and different categories should be studied aside from advocates.

This study measured financial literacy bias based on two perspectives used in practice by the CMA and KNBS in assessing individual investment trends in the country. This is because whereas financial literacy has been investigated in empirical studies, it has not been researched in a way that seems viable and consistent with the CMA research targets in a way as to inform policy and set mitigating measures. The Capital Markets Authority and Kenya National Bureau

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of Statistics, in their annual reports, research individual investment trends based on Access to financial and investment services and awareness of financial services. These two aspects provide light into ability of individual investors to access brokers, online investment services, opening CDS accounts, information penetration through media and career information access among other important factors.

Reviewed studies also conflict on cognitive biases measured depending on objective of research and target population. While behavioral finance theory proposes several cognitive biases that influence individual investment decision, empirical studies have approached them differently. Firstly, because cognitive biases reflect differently among both active and passive investing individuals and secondly some are more dominant among all investors than others and thirdly, they produce varying effects on individual investment decision, both positive and negative. Theoretical literature shows that cognitive dissonance bias is an important bias to be examined when studying individual investors. According to (Hede, 2012) cognitive dissonance bias brings out investor perceptions about investing based on previous experiences and which prevent one from investing in the stock market. These experiences may affect an investor's trust in terms of willingness and ability to risk and risk profile in terms of risk averseness and risk appetite. In investment practice currently, before a client invests, financial analysts and brokers are expected to measure client's willingness and ability to invest (return objectives or perceptions) and risk averseness or appetite (risk objectives or tolerance) in the investment policy statement.

Global and continental empirical studies, in their disparities fail to clearly enumerate cognitive dissonance bias in these foundations, fail to measure their specific effect and therefore fail to produce practice-oriented results that can inform brokers and financial analysts on the true characteristics of individual investors. Gumbo (2018) used statistical differences in means to identify differences in age and educational background about the effect of trust, awareness, transaction costs, perception cognitive skills and access to internet among individual investors in Zimbabwe Stock Exchange evidently measuring them as factors not cognitive biases. Besides, his study was focused on finding differences in groups and the specific effects of the factors were not measured. Matthew (2017) elevates above general factors to measure impact of cognitive biases on investment decision of individual investors in India using descriptive research design specifically means and standard deviations. He studies representativeness bias,

illusion of control bias, Hindsight Bias, Cognitive Dissonance Bias, Self-attribution Bias, Loss Aversion Bias, Regret-Aversion Bias, Over-optimism Bias and Herd instinct Bias. However, he measured them as single statements for each bias in the questionnaire which was more general and since he was using descriptive statistics, their specific effect was not measured. Additionally, the potential causes of cognitive dissonance bias among individual investors were not explained.

Locally, Jagongo and Mutswenje (2014) employ factor analysis techniques and friedman tests to survey factors influencing investment decision of individual investors in NSE, however, they only consider correlation of factors which he terms as external factors as opposed to cognitive biases enumerated through behavioral finance theory. Moreover, the most important factors according to their study were firm reputation, firm status, industry, expected corporate earnings and profit condition which meant that general random factors were considered and they did notcover the extent of cognitive dissonance bias and its effect.

The association between herd-instinct bias and individual investment decision is an important one as it underpins the link between groups influence and investing in the stock market. Consequently, theoretical literature acknowledges that herd-instinct bias is present in every caliber of individual investors (Shiller, 2012 and Daniel Kahenman, 2011). It recognizes that individual investors who possess herd-instinct bias act the same way as pre-historic men who had little information about their surrounding environment and gathered around each other for support and safety. Herd-instinct bias is however unavoidable since individuals interact with each other as a matter of fact from friends to family and information is disseminated. However specific effect of herd-instinct bias especially in terms of peer and family influence is not defined in theoretical literature and empirical studies have not measured its effect among teachers.

Empirical evidence (Weru, 2019, and Karanja, 2017) show mixed relationships between herd-instinct bias and individual investment decision. Karanja (2017) uses snowball sampling and Stata analysis and multiple linear regressions to examine effect of behavioral finance factors on individual investors at the NSE. Herd-instinct bias, termed as herd factors in his study, had a positive significant effect on individual investment decision. Consequently, Weru (2019) uses descriptive research design, correlation analysis and logistic regressions to investigate the

effect of behavioral biases on investment decision for structured products by investors in the NSE. Results show insignificant herd-instinct bias but however assumes linearity of herd-instinct bias in relation to investment decision. The study also focused only on structured products. Important facets of herd-instinct bias did not come out clearly in these studies. Theory has opined areas where herd-instinct bias stems from in individual decision making namely; family, friends and colleagues or social groupings among others which have not been studied. In addition, studies assume linearity condition of cognitive biases with investment decision with linear logistic regressions being adopted. This study did not make the assumption of a linear relationship and adopted logistic regressions to clearly explain effect the cognitive biases without restrictions.

1.2 Problem Statement

Stock Markets are expected to be efficient in their role of capital allocation which is a scarce resource. However current markets have proven not to be efficient since there is low investment in stock market especially in developing economies such as in the Nairobi Securities Exchange. In Kenya, individual investors market share has declined to a near bottom of 5.5% in 2019 according to CMA 2017 report. This has led to massive underfunding of the stock market leaving Kenya's stock market funded 80% by international investors who are disposed to pull out their investment at any moment of choice leaving the economy deflated and unable to perform its role of information dissemination, capital allocation. Studies in behavioral finance have enumerated general factors affecting investment decision such as cost of investment, financial knowledge and ability to invest without behavioral biases. Studies have also focused on all investors, especially those participating in investment. This study emphasized on specificity of and segregation of investors. Individual investors are scattered across the country in both urban and rural populous and teachers in Vihiga Subcounty are typical group of investors in the stock market. A survey in Vihiga Subcounty done by this study reveals low individual investment in stock market with lowest being with teachers and medical services personnel Investing in the stock market is the best alternative for anyone looking to invest into the future, especially occupied professionals. As such the role cognitive biases play in influencing individual investment decision in stock market needed to be studied. This study uses teachers as a case sample.

1.3 Objectives of the Study

The general objective of this study was to assess the effect of Cognitive Biases on Vihiga sub-county teachers' individual investment decision in the Kenyan stock market.

The specific objectives of this study included;

i. Determine the effect of financial literacy bias on stock market investing decision of teachers in Vihiga Sub-County.

ii. Establish cognitive dissonance bias effect on teacher investment decision in stock market Vihiga Sub-County.

iii. Determine the herd- perception bias effect on teacher investment decision in stock market in Vihiga Sub-County.

1.4 Hypothesis of the Study

H_{01}: There is no significant effect of financial literacy bias on teacher investment decision in Vihiga Sub- County

H_{o2}: There is no significant effect of cognitive dissonance bias on teacher investment decision in stock market in Vihiga Sub-County

H_{03}: There is no significant effect of herd instinct bias on teacher investment decision in stock market in Vihiga Sub-County

1.5 Scope of the Study

This study narrowed its scope to registered teachers in Vihiga Sub- County in the belief that the representative sample was a reflection of general population of teachers as an embodiment of individual investors in the stock market. For the purposes of this study, teacherssample comprised of those currently in the service of the commission. Vihiga County bordersNandi County to the East, Kakamega County to the North, Siaya County to the West and Kisumu County to the South. It lies between longitudes 34^{0}' and 35^{0}' E and latitudes 0and 015' N (GOK, 2010). The county covers a total area of 531 Km^2 with equator cutting across the southern part of the County (GOK, 2010). Vihiga Sub- County is one of the four sub- counties in Vihiga County. It is centrally located on the County's map and also has the privilege of hosting the County headquarters. It has about 28 secondary schools comprised of both public and private schools with teacher to pupil's ratio of 1:31(Subcounty Director of Education, 2020). The list of target population is attached to Appendix IV.

This study limited itself to stock market investing since through literature and practice, the stock market is the single most significant measure of economic performance for a country, besides being the connection between a country's performances with the rest of the world.

1.6 Justification of the Study

This research built on the knowledge that Kenya's stock market is underfunded by local individual investment hence it intended to find out the contribution of cognitive biases to this trend. Stock Brokers and Capital Markets regulators can use this research to effectively assist in their market segmentation mechanism in order to engage more focus on particular target groups of individual investors such as teachers. The regulatory authorities should be able to, as a result of this writing, provide more information to investors across the country, basing on the concept of financial information. Teachers can be able to use this research to re-evaluate their investment options, increase their knowledge and possibly be able to skew their investment decisions towards a more informed chain of thought.

This study adds to the fountain of knowledge in behavioral finance. It has examined biases in a select group of investors and elaborately exposed their effect. It has enlightened on the relationship between this biases and lack of investment and discussed various methods of mitigating cognitive biases. It has expounded on the relationship between traditional and behavioral finance theories and resonated why the latter is an effective theory that explains investment decision trends. It has dissected recent trends in investment, surveyed a rural population targeted a niche in finance practice and recommended appropriate mitigating factors. Extrapolated to any other group of individual investors, this research model can be used to closely study a specific group and trigger brainstorming discussions around creating customized investment products for individual investors.

1.7 Conceptual Framework

The theoretical foundation was guided by the Behavioral finance theory, a concept well explained by Kahenman (2011). This theory is critical to the study as it brings to light the fundamental facets that underlie the concepts of both the dependent and independent variables. This study took a further step to explore theories running individual investment decision and investor behaviour mainly the Traditional Finance and the Behavioral Finance theories and explain reasons why behavioral finance theory is being used. While Traditional finance assumes rational investors whose decision to invest is not caused by indwelling psychological factors, and which focusses on already existing group participation in the stock market, behavioral finance elucidates all group effect around investment decision; which means that it explains both already investing individual investors and all those not investing. It maintains that measurement of investment decision is important.

Secondly, traditional finance fails to factor in the changing dynamics of individuals in different environments of investment. Behavioral finance gives individualistic traits that inform the individual investment behaviour (Matthew 2017). It uses cognitive biases to measure investment decision; biases do not measure participation because there is no uniformity and therefore no linearity. This is why investment decision is measured against the biases and not participation. This premise gives credence to the adoption of behavioral finance theory over any other theory due to the fact that investment decision varies from individual to individual because of personal, inherent innate traits which needed to be measured. Just as characters are different, so are investment behaviour. (See appendix XI) The conceptual framework for this study was guided and heavily influenced by the ideas and concepts presented in the conceptual model of Ngahu (2017; see Figure1.5). Financial literacy bias is indeed a broad concept, this study narrowed it down to investment literacy. This process was analysed by combining the perspective of two indicators regarding financial literacy as measured in practice by the CMA in Kenya: access to investment services-ability to interact with current investment process or system and awareness about investment- knowledge about investment for personal financial management. These two concepts have however not been measured before in uniformity to explain financial literacy in investment decision making. It measures investment knowledge access and awareness about investment on the same Likert scale with 1 being very little extent of both and 5 being to a very great extent. Sources of constructs were modified from CMA (2013)

and KNBS (2019) reports.

Behavioral finance theory proposes cognitive psychological biases as the main influencers of investment decision. Cognitive dissonance bias is defined as a discordance between already existing perceptions and information about investing. It reflects on perception basing on negative perception of teachers towards investment and risk aversion. Teacher perceptions would include the current state of investment decision among teachers based on already existing information while risk aversion as defined by literature would encompass the ability to risk investment in the stock market. Herd- Instinct bias resonates with teacher environment particularly with respect to family environment and peer influence reflects on influence of various group factors of teacher environment. Measured on scale 1 to 5, 1 showing low extent of these biases and 5 showing great extent. Some questions (CDA12- CDB20, HBA24 and HBB27) needed to be reverse coded to ensure uniformity of scale.

These questions formed the measurement criteria of independent variable. In an endeavour to confirm presence, skills and levels, this data was sought for, obtained and descriptively analyzed to expose financial literacy, cognitive dissonance and herd instinct biases.

Independent Variable   **Dependent Variable**

Cognitive Biases

Financial Literacy Bias
- Awareness about investment
- Access to investment Knowledge

Cognitive Dissonance Bias
- Teacher perception (negative)
- Teacher Risk Averseness

Herd-Instinct Bias
- Family influence
- Peer (Friends and co-workers) influence

Individual(Teacher) Investment Decision
- Invested
- Not invested
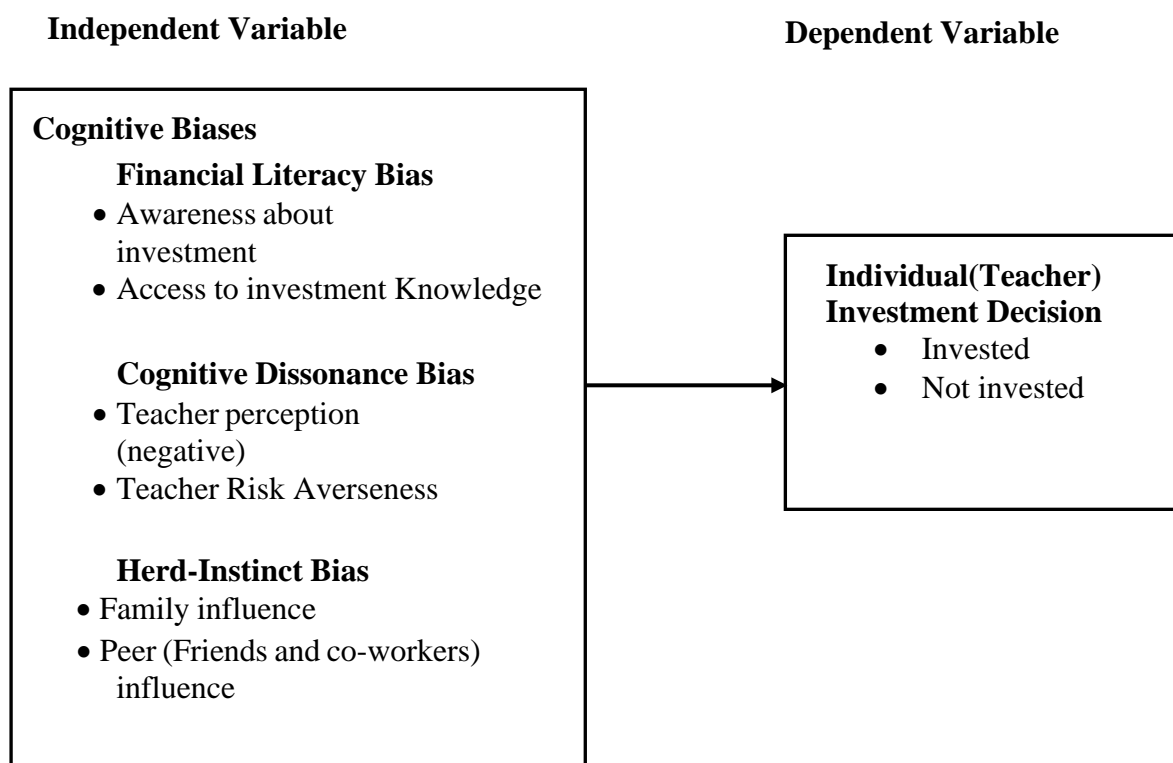
Figure 1.5: Conceptual Framework adapted from Ngahu (2017)

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CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter covers theoretical background guiding investment decision. It shall also examine three frontiers of cognitive bias associated with investment decision in its review of empirical studies in alignment with research gaps associated with such studies. The theories guiding this study was Behavioral Finance Theory and Efficient Market theories derived from Kahneman & Tversky (2011).

2.2 Theoretical Literature Review

Investment Decision in the stock market stems from foundational theories that present two distinct perspectives

2.2.1 Traditional Finance Theory

Investment decision in stock market is pegged on two fundamental pillars of finance; Traditional finance theory, which derives from neo-classical economic theory, suggests that investors are assumed to be rational and Behavioral finance theory. Traditional Finance theory postulated the following traits among investors: that both the market and investors are perfectly rational; Investors truly care about utilitarian characteristics; Investors have perfect self-control and they are not confused by cognitive errors or information processing errors (Schleifer, 2000). Proponents of traditional finance theory such as (Malkiel, 1973) and (Schleifer, 2000) believed that; both the market and investors are perfectly rational, investors have perfect self-control, they are not confused by cognitive errors or information processing errors. In their studies stock market performance and nonperformance was attributed to general market factors as influencers of stock market performance and economic performance. Among some of the factors defined by traditional finance are high transaction costs, stock price, firm reputation, firm goodwill, dividends, year returns and firm position and performance among others.

The rationality of investors assumed by traditional finance theory means that from the advent, they are aware of the financial products and are therefore capable of making decisions not only to invest but also how to invest. For a long time, traditional finance theory was perceived to be accurate, but which was not the case because as time progressed, certain changes in individual investor trends were noticed, which were different from the expectations of

traditional finance, which meant that the traits postulated by traditional finance could no longer be explained (Hede, 2012). For instance, it failed to explain why after losing on investments, investors did not want to invest anymore, a concept well defined by behavioral finance through cognitive dissonance bias. Traditional finance theory focused only on active investors or rather already investing individuals majorly on trading brokers, clients and companies, which was largely a closed setup whereas the intervention of behavioral finance theory opened up the scope so that even individuals not investing could be studied.

Not only were the traditional finance theory factors too general and subjective but were also found to fail to explain the sharp declining trends in individual investment in the stock market which birthed the behavioral finance theory by Dr Daniel Kahenman in 1979. Interest was piqued among finance scholars to try to address the issues that traditional finance could not. Behavioral finance theorists explained that investment or lack of in the stock market can only be better understood from the prism of human individual behaviour that is psychological in nature which influences the way investment decisions are made. Investment decisions encompass the decisions to invest or not to and the selection of investment options in active investing (see appendix XI).

2.2.2 Behavioral Finance Theory

Behavioral finance theory was used to bring to light psychological cognitive biases that influence decision to invest and explain the declining investment trends and NSE performance in a more comprehensive way than traditional finance factors. Riley and Brown (2012) define behavioral finance as the study of investor behavior while making investment decision adding that in making the investment decision, individual investors are vulnerable to behavioral cognitive biases because they do not have the knowledge, discipline, or expertise to research their investments. For instance, fear of losing money has been explained by regret-aversion bias, Influence of family and friends is explained by herd-instinct bias, different perceptions explained by cognitive dissonance bias and access and awareness on financial knowledge explained by financial literacy.

Kahneman's behavioral finance theory names and explains various cognitive biases such as; Overconfidence bias, i.e., when individuals overestimate their knowledge and abilities and are over-optimistic, framing bias or framing the manner of formulating, framing and presenting a problem or a situation affects the ultimate outcome or final decision of an

individual, heuristics mental shortcuts, i.e. rules of thumb employed by individuals in order to find a satisfactory solution to the problem in a short period of time, information availability bias or financial literacy bias, i.e. individuals ability to access information therefore becoming financially literate, Herd behaviour, i.e. herd mentality or crowd psychology the behaviour of individuals, who rather than making their own estimations and moves opt to follow the crowd or a group, believing that the view of the majority is always right and Cognitive dissonance bias which refers to the psychological discomfort that arises when individual views and ideas are not consistent with their behaviour.

Literature shows that while studying cognitive biases and investment decision, it is imperative to include financial literacy of individual investors because the cognitive nature of these biases depends on the financial literacy bias. Financial literacy is at the core of information availability and presents itself as a bias encompassing how individuals' access and interpret investment knowledge at their disposal (Hede, 2012). Its relevance cuts across both cognitive dissonance bias and herd-instinct bias and it is also called information availability bias. Cognitive biases were initially measured among market participants such as stock brokers and traders. Previous theoretical studies have shown strong evidence of these biases among these individuals. However, among non-investing individuals, cognitive biases have hardly been studied whereas financial literacy, cognitive dissonance and herd-instinct bias have been noted to be most common (Hede, 2012).

Subsequent theoretical literature directly links behavioral finance theory to individual investment decision in the stock market which is why this study was guided by behavioral finance theory. Graham, Harvey and Huang (2009) investigated comparable ideas stating that behavioral finance attributes psychological (cognitive biases), social and emotional factors to the investment decisions of individuals and the consequences for market prices, returns, and resource allocation and the impact of different kinds of behaviour, in different environments. To be successful in both value and security markets one needs to possess the ability to restrain or suppress emotions within proper limits and to focus on long term results (Graham, Harvey and Huang, 2009).

Reviewed literatures show that cognitive dissonance bias and herd-instinct bias are prominent in influencing investment decision into the stock market among individuals who have never invested before. They recognize that the other biases portray themselves more dominantly

among floor traders and active investors in the market. For instance, according to Hede (2012), cognitive biases play a critical role in influencing the decision to invest by new investors. They adopted behavioral finance theory in their study stating that human decisions often depend on their nature, intuitions, and habits, cognitive or emotional biases hidden deeply at the back of one's mind and investors may be inclined toward various types of behavioral biases, which lead them to make errors.

Hede (2012) abstractly defines cognitive dissonance bias as systematic errors are in individual's judgment People may make predictable, non-optimal choices when faced with difficult and uncertain decisions because of previous experiences and skewed perceptions. Consequently, due to the positive correlation between stock market and economy, the rise of stock market will positively affect the development of the economy and vice versa, thus, the decisions of investors on stock market play an important role in defining the market trend, which then influences the economy, (Hede, 2012).

Individual investor previous experiences may affect an investor's trust in terms of willingness and ability to risk and risk profile in terms of risk averseness and risk appetite. In investment practice currently, before a client invests, financial analysts and brokers are expected to measure client's willingness and ability to invest (return objectives or perceptions) and risk averseness or appetite (risk objectives or tolerance) in the investment policy statement.

Mauboussin (2012) argues that presence of cognitive dissonance bias automatically signifies negative chances of investing by and individual thereby advocating a negative relationship between cognitive dissonance bias and investment decision. His arguments largely lean on negative association of cognitive dissonance bias and investment decision, though not conclusively determined because foundational theoretical studies by Kahenman (2011) do not ascribe to specific relationship between them. However, he agrees on the fact that cognitive dissonance bias is founded on investor general perception and also their perception about risk. Risk, both in theory and practice is defined by the ability and willingness to decide to invest.

Kahenman (2011) defined herd-instinct bias as a situation where everyone acts like everyone else without considering the reasons why. Investment decisions are made on the influence of the investor's immediate environment. Shiller (2012) however defines it as a condition where

noise traders tend to follow newsletter writers, who in turn tend to "follow the herd." These writers and "the herd" are almost always wrong, which contributes to excess volatility in the stock market. In other words, it means that individual investors copy the decision of others in their surrounding and end up making decisions based on that.

Shiller (2012) in his book acknowledges herd-instinct bias as conceptualized by behavioral finance theory is present in every caliber of individual investors and states recognizes that individual investors who possess herd-instinct bias act the same way as pre-historic men who had little information about their surrounding environment and gathered around each other for support and safety. He adds that the relationship between herd-instinct bias and individual investment decision is unavoidable when studying investor behaviour groups influence and investing in the stock market. Herd-instinct bias is therefore unavoidable since individuals interact with each other as a matter of fact from friends to family and information is disseminated. In relation to specific effect, Kahenman (2011) contends that herd- instinct bias is more environmental to the individual. In other words, depending on available information circulating among herd groups, individuals can be influenced positively or negatively when investing in the stock market. That is established among active investors and already established market players.

Additionally, he underpins those academic researchers pay their attention to herd-instinct bias because its impacts on stock price changes can influence the attributes of risk and return models and this has impacts on the viewpoints of asset pricing theories. In the perspective of behaviour, herding can be related to some emotional biases, including conformity, congruity and cognitive conflict, the home bias and gossip. Also Shiller (2012) states that herd-instinct bias and cognitive dissonance bias tend to be more prominent among investors who are less informed and not investing. This was why this study found it important to research herd-instinct bias.

Thaler (2005) defines herd-instinct bias as a behaviour that consists in imitating other agents' actions and although it is referred to in many fields of economics, herding is particularly often invoked to explain financial market anomalies such as the excessive volatility of asset prices or the emergence of financial bubbles. Investors may prefer herding if they believe that herd-instinct can help them to extract useful and reliable information. Whereas, the

performances of financial professionals, for example, fund managers, or financial analysts, are usually evaluated by subjective periodic assessment on a relative base and the comparison to their peers, in this case, herd-instinct bias can contribute to the evaluation of professional performance because low-ability ones may mimic the behaviour of their high-ability peers in order to develop their professional reputation (Thaler, 2005).

Existing theoretical literature that adopted behavioral finance theory show diverse relationships exist between cognitive dissonance bias, herd-instinct bias financial literacy bias and investment decision but none relates these concepts to new investors or non-investing potential investors. Theoretical literature, in their definitions and scope of cognitive biases, put a lot of focus on market players and existing investors and traders such as stock brokers, investment analysts among others (Kahenman, 2011, Hede, 2012 and Mauboussin, 2012). They recognize that investment decision in favour of the stock market is positively related to improved stock market performance and economy. They also accept the premise that cognitive biases play a role in individual investment decision (Kahneman, 2011 and Hede, 2012) but do not go ahead to measure and specify effect.

2.2.3 The Efficient Market Hypothesis

Riley and Brown (2006) define investment as a commitment of funds for a period of time in order to derive a rate of return that will compensate the investor for the time which the funds are invested, for the expected rate of inflation during the investment horizon and for uncertainty involved. They further add that investment decision as the decision made by the individual investors with respect to decision to invest, amount of funds to be deployed, and duration to take in the investment opportunities. Hede (2012) also defines an investment decision as the determination made by the investor on the amount of funds to invest in a particular product and that in making of the investment decision; an investor assigns value to the product then proceeds to make an investment that matches the value assigned.

Riley & Brown (2006) and Hede (2012) describe individual investors as ones who do not have the knowledge, discipline, or expertise to research their investments. As a result, they undermine the financial markets' role in allocating resources efficiently; and through crowded trades, cause panic selling. These unsophisticated investors are said to be vulnerable to behavioral biases and may underestimate the power of the masses that drive the market.

Behavioral finance theory clarifies an efficient stock market as one that is efficient in processing information leading to its advent of the Efficient Market Hypothesis. Essentially, the evidence of an efficient market is where there is an equilibrium between what buyers are willing to pay for a share and what sellers are willing to sell for the same share; the market should therefore be quick and accurate (correct) to adjust new information. The Efficient Market Hypothesis postulates that stock markets should have readily available information and investors can act that information on real time and immediately and due to this, the prices at any instance are unbiased and they reflect all the available information based on the stock's expected future cash flows as well as the risk involved in holding such a security. Hede (2012) further stated that with sufficiency of information investment is highly active therefore more investing individuals and consequently better allocation or transfer of capital from capital owners to capital seekers.

Investor perception and risk averseness can be linked to the efficiency of financial markets. Behavioral finance theory conceptualizes the efficient market hypothesis as a theory that security prices correctly measured the firm's future earnings and dividends and that those investors should consistently outperform the market on a risk-adjusted basis. In an operationally efficient stock market, there is little or no friction in the trading process and information on prices and volumes of past trades was easily and widely available. Such markets are very liquid, their participants enjoy the benefits of buying and selling real-time at prices that are closer to the previous (last traded) price and also have price continuity since prices do not vary greatly, unless new and significant information was introduced into the market (Riley & Brown, 2006).

There is much incongruity in literature on whether investment decision environment contributes to behavioral biases among individual investors. Much of this incongruity is due to the overconcentration of researches around already investing individuals. Since stock markets are located in urban cities, it goes without saying that large aggregates of the investors belong to urban populous, where also information access and awareness levels about investing are disproportionately higher as compared to their rural counterparts. According to Riley and Brown (2006), when encountered with inferior information, information users spent more time and effort acquiring and processing information to expand their analysis to additional items and private data. However, when investors are uncertain about financial information they rely on non-financial information, thereby biased in their decision.

2.2.4 Behavioral Finance Theory and The Efficient Market Hypothesis

Behavioral finance has defined various biases that influence individual investment decision in the stock market with financial literacy bias, cognitive dissonance bias and herd-instinct bias being the most quotidian in that they tend to be present in both individuals who are investing and those who are not. Behavioral finance theory stipulates those behavioral biases are evident in every individual in one form or another, that behavioral biases are innate in humanity and it would be impossible to undo or remove them. They encompass every individual investment decision. However, the belief is that they can very much be observed, understood, controlled and in exemplary situations, used positively to influence correct decision making not only to invest but also how to invest (Hede, 2012). It therefore defines the efficient market hypothesis as a model scenario for stock markets and expectations in terms of functionality and performance, when behavioral cognitive biases are controlled and used positively.

Explaining further, it elucidates that financial information should be readily available to all individuals, reducing the negative impact of financial literacy bias or information unavailability and prices of stocks will correctly reflect the investor sentiment, emotions, thoughts and expectations. Low friction in trading process is also hypothesized in easing access to investment services and awareness and reducing dependance on herd-instincts and creating the right perceptions about investing.

2.3 Empirical Literature Review

2.3.1 Financial Literacy and Individual Investment decision

Loibl (2008) investigated the scope, determinants and nature of personal finance instruction in Ohio high schools. A sample of 710 high school teachers completed an online survey consisting of 54 questions, which included items relating to teacher financial literacy levels and attitudes towards financial literacy. He found that in most schools, Business education teachers were more likely to have completed formal education in finance areas, and attached great significance to teaching financial literacy compared with their colleagues. The study further reveals the variability in teachers' approaches to financial literacy education and highlights the need for improved teacher education to build teacher capability.

Whereas Liobl (2008) used descriptive analyses to investigate teachers' financial literacy skills and levels in the USA, he did not investigate financial literacy with respect to investment decisions of teachers in the stock market. His study generalized its measurement of financial literacy and investment decision and stock market investing with regards to teachers was not measured. However, he concurs that teachers are considered the custodians of knowledge and literacy skills in modern day society, although, financial literacy may not be an acquaintance to most of them.

Locally, teachers as examples of individual investors have been hardly studied. Onyango (2014) studied the effects of financial literacy on management of personal finances among employees of commercial banks in Kenya. Purposive sampling was used to select the major banks in Nairobi while simple random sampling technique was used to select 100 respondents from five commercial banks in Nairobi. A self-administered questionnaire was delivered to the respondents and collected after completion. The student t-test was used to examine the data with the objective of determining whether there is a significant relationship between financial literacy and personal financial management practices. The findings shows that most respondents had financial literacy acquired through training or work experience andthat it affects personal financial management among the commercial banks in Kenya. The researcher also sought to establish effects of gender, age, level of education and specialization on personal financial management, which are general factors tabled by traditional finance, not cognitive biases.

Aroni, Namusonge, & Sakwa (2014) studied the effects of financial information on investment in shares in Kenya. The main objective of this study was to examine the effect of financial information on investment in shares for Kenyan retail investors, applying the behavioral finance theory. Primary data was collected from 311 respondents randomly sampled from the population of 836,250 investors participating at the Nairobi Securities Exchange as at March, 2013. Data analysis was done applying descriptive and linear regression statistical data analysis. The results revealed that financial information variable had significant influence (p<0.05) on decisions to invest in shares. Acquiring financial information therefore has the potential to improve investors" decision making resulting in improved overall portfolio performance. On formulating policy, he recommended that both the stock market regulators and financial advisers should make strategic frameworks to educate investors to improve their financial analysis knowledge. However, his descriptive studies did not clearly expose the distinction between individual investors who have invested and those who have not.

Muchiri (2015) descriptively examines the relationship between financial literacy and stock market participation. The population of the study was 46 retail investors at the N.S.E from 5 major stock brokerage firms in Nairobi. To obtain a representative sample of retail investors, the study used purposive random sampling. The study used primary data collected from questionnaires. Data was analysed using descriptive statistics and findings showed that on the aspects of financial literacy, the respondents were "to a great extent" literate. Stock market participation was measured by volume of traded shares the investor has traded over the last year. With a target population of investors drawn from the NSE, he concluded that there appeared to be a certain degree of correlation between the factors that behavioral finance theory and previous empirical evidence identify as the influencing factors for the average equity investor, and the individual behaviour of active investors in the NSE influenced by the overall trends prevailing at the time in the NSE. However, his sample size seems too small to justifiably obtain conclusive results. His study also focused on already investing individuals, not factoring those who have not invested.

Ngahu (2017) uses multiple regressions on data collected on targeted retail investors in the Nairobi Securities Exchange through sixteen stock brokerage firms. Purposive random sampling is used to select 5 retail investors from each firm and specifically measured stocks affordability, financial information and third-party opinion on investment decisions among individual investors in Kenya. Investment decision is measured by speed of buying decision,

amount invested, stocks invested and short to long term plans of the investor. Financial information variable is measured through Results reveal that stock affordability ($\beta = 0.327$, $p < 0.007$) and third-party opinion ($\beta = 0.327$; $p < 0.042$) had significant positive effect on investment decisions among retail investors while financial information ($\beta = -0.07$; $p < 0.395$) had negative insignificant role on investment decision. The study recommended the need for improved information on stock market dynamics.

Empirical evidence (Wendo, 2015, Onyango, 2014, Muchiri, 2015, Liobl (2008) and Ngahu, 2017) show mixed relationships between financial literacy and individual investment decision in the stock market. (Ngahu, 2017, Muchiri 2017 and Aroni, 2014) argue that most individual investors lack adequate financial information on matters of investing and financial products and services. Whereas studies agree that financial literacy through financial information is key to influencing individual investment decision, they lack consensus on the awareness and access to investment knowledge among individual investors.

Ngahu (2017), and Onyango (2014) use purposive sampling and time series data in obtaining samples with Ngahu (2017) obtaining samples from clients of stock brokerage firms. He approached stock brokerages and left the questionnaires with them to be filled by clientele and collected later. However, purposive sampling may not have captured respondents fully while two tiers were broken to get to respondents in the case of Ngahu (2017) which may not have captured the full scope of respondents. The studies also concentrate on general factors majorly demographic such as age, income and economic such as stock affordability, expected dividends and capital appreciation as explained by traditional finance, and therefore focus on investment participation. Given importance of financial literacy in individual investment decisions, the effect of financial literacy bias and effect of cognitive biases, as explained by behavioral finance theory on investment decision is unknown.

Contextually, Aroni, Namusonge, & Sakwa (2014) and Onyango (2014) have focused on individual investors in the capital city, recommending that all income earners in the country comprise of individual investors and need to be investigated. Whereas Onyango (2014) focused on employees of commercial banks as individual investors, Aroni randomly sampled investors at the NSE which shows that they both looked at a wide scope of respondents. Employees of commercial banks are largely expected to be informed on investment in the stock market while other investors such as teachers, doctors whose affinity for financial information is quite low are unresearched.

On the other hand, there is lack of clarity on the specific financial literacy bias constructs, with respect to investment, that affect investment decision and which are used in practice by policy influencers (CMA and NSE) in researching individual investment; financial information access and awareness. (Aroni, Namusonge, & Sakwa, 2014) looked at financial information whereas Ngahu (2017) measures credibility and reliability. Additionally, teachers as individual investors have not been researched. Onyango (2014) studies employees of commercial banks who by default are expected to have more investment knowledge awareness and access. In his study, he recommends that samples for further studies can be drawn from different categories of individual investors, the premise being that it is important to segregate individual investors so that investment products can be customized for them. Therefore, teacher's investment knowledge awareness and services access needed to be measured.

2.3.2 Cognitive Dissonance Bias and Individual Investment decision

Ady (2015) uses phenomenology as a method to understanding the cognitive and psychological behaviour of individual investors in Indonesia; specifically cognitive dissonance bias, loss aversion bias, attribution bias, availability bias and overconfidence bias. He contends that the design was appropriate to understand and explore the biased behavior of investors was the interpretive paradigm. The purpose of the research design was to understand and explore to then interpreted the meaning, not to explain and predict a relationship as in quantitative research. He states that cognitive dissonance could lead to investors holding shares with losses that should be sold, because they want to avoid the heartache associated with the recognition that they have already made a bad decision. Additionally, that cognitive dissonance could lead investors to continue to invest in the securities owned despite dropping prices (average down) and could cause investors to be "copying ducks" (herding behavior). Through conducted interviews, he found that cognitive dissonance bias had a major effect around expected emotions, immediate integral emotions and immediate incidental emotions. Phenomenology approach is quite different because it majors on qualitative research design and not quantitative design used by this study. It is subjective based on interviews and unstructured answers which are difficult to analyse and draw inferences from whereas this study follows an objective method with specific objective to determine effect of cognitive dissonance bias.

Geetha and Vimala (2014) investigated the effect of demographic variables on the investment decisions by performing a sample survey method in Chennai, India since they believed that cognitive dissonance manifests itself on a much more macro-economic perspective. The analysis of results showed, from the investors' point of view, changes in demographic factors such as age, income, education, and occupation had an influence in the investment avenue preference. In addition, the author notes that it makes investors vulnerable to sources of information that confirm their perceptions.

Gumbo (2018) regressed observable factors that significantly affected investment in Zimbabwe Stock Exchange by individual investors. By randomly stratifying 120 respondents, he measured perceptions and trust descriptively observing that shown by the data in the table, trust of stock market had an average value (mean) of 2.43 meaning individual investors lacked of trust in the stock market. The standard deviation of trust was 0.77, lower than the mean value and he thus concluded that the deviations of the data are relatively small. Considering the standardized coefficients, access to internet (β= .270), cognitive skills (β=.094), perceptions (β= -.538), had significant coefficients, with p-values less than 0.05. However, trust (β =-.038) an exhibited a statistically insignificant impact on stock market participation as the p value was greater than 0.05. He recommended that in the context of Zimbabwe, and emerging African markets by extension, there is scope for further research on behavioral finance patterns to incorporate both individual's investors and potential investors who do not hold stocks and future research along this direction should improve his model. (Gumbo, 2018) however used linear regression not logistic regression hence an assumption of linear relationship was made.

Dakane (2013) used descriptive statistics and regression analysis to build a model to investigate effect of behavioral biases on investment decisions of individual investors in Nairobi, Kenya. His measurement of cognitive dissonance bias was through a single questionnaire statement; 'I am holding to my investment because selling them would be painful to me since I would incur loss', which was administered online to 30 respondents sampled through snow-ball method. Results showed that outcomes of individual investor decisions correlated with cognitive dissonance bias (r=.200, p<.01). Descriptively, majority (29%) of the respondents disagreed that they were holding to their investments because selling them would be a painful loss, implying that cognitive dissonance did not underplay their

investment choices.

Wendo (2015) examined factors that influence participation in NSE among advocates specifically measuring individual investment objectives and their risk profile. Using descriptive research design, frequencies and percentages she did well to target advocates practicing within Nairobi County with a sample size of 105 advocates. Most investors are fundamentally risk averse and because of this investment ratios are relatively low with majority of the respondents setting aside only a quarter of their income for investment. This study was based on the efficient market hypothesis in behavioral finance theory in examining risk averseness. The study noted that it is not only important for individual investors to invest but also to actively trade. It recommended that stock market information be made available to individual investors in rural areas in Kenya. Also, other individual investors other than advocates needed to be researched.

Nyakundi (2017) used descriptive and correlational design to study effect of behavioral biases on ranking of financing decisions by financial managers of firms listed in the NSE. He purposively sampled senior and middle level financial managers while focusing specifically on managerial overconfidence, overoptimism, regret aversion, anchoring and mental accounting, all cognitive behavioral biases. Managers predisposed to overconfidence, anchoring, mental accounting were more inclined towards equity then debt to raised capital while those predisposed to overoptimism bias ranked debt highest. The study noted the importance of regular and constant knowledge of the biases since it leads to better quality of financing decision.

On a different perspective, Jagongo and Mutswenje (2014) survey factors influencing investment decisions among individual investors in NSE. They issued questionnaires to 42 randomly sampled individual investors at the NSE and conducted freedman's tests Factor analysis techniques in analyzing the data measuring factors; firm reputation, firm status, risk averseness and past performance. They found that risk averseness decreases as investor wealth, age, income and education increase. In addition to that, that individual express different degree of emotion towards gains than losses. Binary Logistic regressions needed to be employed to ascertain whether similar results of effect could be observed.

In contrast to this, Matthew (2017) did well as he sought to capture the impact of cognitive biases on investment decisions of individual investors in the Kerala. Using descriptive statistics for analysis of data acquired through a questionnaire, again comprising of a single

cognitive dissonance bias question; 'Holding to one's investment because selling them would be painful to him since it will would incur loss', he observed a high impact of cognitive dissonance bias (mean:2.84, std. deviation:1.581) on investment decision. However, among other cognitive biases including over-optimism bias, illusion of control bias and hindsight bias cognitive dissonance had the least impact with correlation (r=.546, p<.01).

Empirical findings of investigations into the relationship between cognitive dissonance bias and individual investment decision in the stock market show that cognitive dissonance bias is fundamental; that individual investors that possess cognitive dissonance bias may be unable to make the decision to invest in the stock market and as result, they may be unable to maximize on opportunities available for them to create wealth and if aggregatively they are many in number, then the stock market suffers a serious underfunding or lack of capital. This means it will not fulfil its mandate of capital allocation and the economy will suffer in general.

However, global empirical studies (Ady, 2015 and Gumbo 2018) study cognitive dissonance bias using different constructs. Whereas Ady (2015) uses phenomenology design and conducts interviews, Gumbo (2018) uses linear regressions. Binary logistic regressions have not been used. Trust induces investors to risk investing in the stock market by profligate expectation of returns and also explains why potential investors may choose not to invests even when they can afford, Gumbo (2018). However, a combined effect of risk averseness and perception has not been measured and by extension cognitive dissonance bias effect has not been measured.

While Matthew (2017) and Dakane (2013) used correlational analysis, Dakane uses snowball sampling method on general investors while Matthew uses purposive sampling. This study used stratified random sampling which was a more methodical approach to getting target respondents. These studies measured cognitive dissonance bias from single line questionnaire statements which generalize investor perceptions into cognitive dissonance bias. This research believed that cognitive dissonance bias could be measured in terms of its effect and with a broader spectrum of different perceptions and risk attitudes. It therefore intended to espouse cognitive dissonance from the frontiers of perceptions and risk attitude, especially risk averseness of teachers in Vihiga Sub- County, because of close interdependent relationship between the two factors. Local empirical studies have also not targeted specific individual investors to measure true behaviour, this study focused on teachers as a specific

sample.

Existing literature assume a linear relationship between cognitive dissonance bias and individual investment decision. This study does not make that erroneous assumption especially given the fact that individual investment decision is personal and therefore very subjective and may not necessarily be linear hence binary logistic regressions. This approach enhances efficiency of the data and gives more robust estimates. Moreover, these studies are disaggregated and none has given consideration to investor perception, investor risk averseness and the immediate decision to invest or not, yet when investigated separately, have shown inconsistent results. Therefore, no prior studies that have integrated the cognitive dissonance bias as a joint effect of two constructs, risk averseness and investor perception on the primary individual decision to invest or not in single stand-alone research. Additionally, majority of empirical studies have not measured effect of cognitive dissonance bias on investment decision; they have measured effect on participation or behaviour and factors influencing behaviour.

2.3.4 Herd-instinct Bias and Individual Investment Decision

Madaan and Singh (2019) study behavioral biases in investment decision making in Punjab India, surveying 243 general individual investors and analyzing the data using descriptive statistics. Four biases; overconfidence bias, anchoring bias, disposition effect and herd-instinct bias were studied with major significant results being noted under herd-instinct bias. Overconfidence and herd-instinct bias had significant positive effect on investment decision with t values (3.759) and (2.561) respectively. Though they agree that the efficiency of the stock market is a central pillar to determining effect of behavioral biases on individual investment decision, they pose that there is need to conduct one study with systematic review on behavioral biases under presence of financial literacy. They added that behavioral biases tend to overlap each other and are inter-twined such that they do not display themselves independently. If in India herd-instinct bias had a positive effect, then it also needed to be measured in Kenya.

Prasad (2015) analyses the influence of herding behaviour on Indian retail and professional investors and its impact on stock market price volatility in financial capital Market in a different state in India, Karnataka state. By referring to psychology and pointing out the imperfections of a human mind, it reveals mistakes committed by both individual and professional investors, specifically measuring; Impact of herd-instinct bias on stock market price volatility, impact of herd-instinct bias on Indian investors and find out solution for

enhancing good decision-making capacity of investors. His sample size was 100 investors sampled through convenience sampling restricted to Bangaloor area in Karnataka with 76% of them businessmen, 14% private employees, 7% government employees and 3% agriculturists. 56% of the respondents said that, their investment decision making depends upon herd-instinct bias, which meant they opined that they always follow their investment guru, experts and trusted stock broker's information and some time they influenced by some investment professional person who are provide information through television. 18% investors out of 100%, stated that, herd-instinct bias impacts their investment decision, according to them, only sometime they feel to get others information for their investment decision making but they are not completely followed others information blindly which is given by someone, they think rationally about all available opportunities then they will make investment. Out of 100% respondents only 13.5% respondents said that, they always follow investment legend or expert's opinion say for example, Warren Buffet or Richard Branson.

Prasad (2015) took a positive perspective in measuring herd- instinct bias, in the sense that influence measured through stock-brokers and financial market players. However, in a contemporary environment like that of teachers, such influencers are not common and therefore individuals in other environments needed to be studied. While Prasad (2015) measured herd-instinct bias among already investing individuals, he did not study individuals who have never invested and the effect of herd-instinct bias on their decision.

Continental empirical evidence shows similarities. Usman (2018) drew a simple random sample of 312 individual investors a target population of 1650 registered property investors in Plateau state Nigeria when determining influence of cognitive biases on investment decision in property market. He specifically studied anchoring bias, overconfidence bias representativeness and cognitive dissonance bias. He uses descriptive statistics and observes a positive linear relationship between the biases in investment decision.

Karanja (2017) uses descriptive research design, correlation analysis to investigate the effect of behavioral finance factors on investment decisions of individual investors at the NSE. He studied a mixture of factors, some not necessarily defined by behavioral finance theory; herd-instinct bias, market factors and prospect factors. He used snowball sampling to obtain his sample of 385 individual investors in Nairobi and used Stata analysis with multiple linear regressions. Results revealed that all the factors had a joint impact of 16.01% on investment decision of investors controlled by year of schooling, income, gender, type of security and age.

Herd-instinct bias had a significant positive effect and investors had little information on trading and investment. This study focused primarily on random factors affecting investment decision not behavioral cognitive biases.

Munyowki (2013) on a rotated component matrix, points out individual investors are more inclined to adopting herding behaviour than are institutional investors. He studied professional managers and observed that they will follow the herd if they are concerned about how others will assess their ability to make sound judgements. In a quest to research this he developed a theoretical model for some of the forces that can lead to herd behaviour after observing 8.316% influence of "Third party opinion" on the stock. According to his findings, herd behaviour can arise as a consequence of rational attempts by managers to enhance their reputations as decision makers. The models show that managers acquire information in sequence by observing the actions of other individuals in their group who precede them and that they will be doing what others are doing rather than using their own information. The conundrum that presents itself is whether this is replicable to teachers as opposed to managers who are better informed about investment opportunities and to what extent.

Similarly, a study by Weru (2019) uses correlational research design, descriptive statistics and linear regressions to investigate the effect of behavioral biases on investment decision for structured products at the NSE such as Real Estate Investment Trusts. The study focused on structured products as opposed to all NSE products. A sample size of 109 was used to measure herd-instinct bias, anchoring bias, overconfidence bias and representativeness. Anchoring proved significant whereas herd-instinct bias proved insignificant. It noted the need to educate investors on structured products. It was based on the premise that the real estate investment trusts at the NSE were largely undersubscribed only raising one third of the targeted ksh.12.5 billion. Weru (2019) studied the real estate market unlike this study which focuses on the stock market.

Reviewed continental and global literature have studied fairly urban with high probability of awareness among the populations which explains positive effects. It agrees that the information levels are inversely related to herd-instinct bias. Consequently, whereas Madaan and Singh (2019) and Prasad (2015) indeed measure herd-instinct bias presence on investment decision in the stock market, Usman (2018) focusses on the evidence of herd- instinct bias in the property market, which has different dynamics. (Madaan and Singh, 2019, Prasad, 2015 and Usman, 2018) dwell majorly on descriptive or correlational research designs, descriptive

statistics. They employ either simple random sampling or convenience sampling. Therefore, it is unknown how individual investors obtained through multiple sampling procedures and whose responses analysed through logistic regressions would result. These studies also examine herd- instinct bias from a positive angle, which means that they conceptualize the influence as coming from key market players and not from the actual environment of the respondents, whereas theoretical literature agrees that individual's investment decision is affected from their immediate surroundings, which may not always be with sufficient investment information.

Local empirical evidence (Karanja, 2017, Weru, 2019, Kosgei, 2014 and Munyowki, 2013) show mixed relationships in the associations between herd-instinct bias and investment decision. Munyowki (2013) measures three constructs but on a rotated component matrix. It remained unknown the effect of herd-instinct bias based on binary logistic regressions. Purposive sampling and snowball sampling seem to be the preferred sampling methods among reviewed studies. Purposive sampling could cause the biasness of respondent selection leading to skewed results. A methodical procedure of targeting respondents that would bring out clearer samples and results of such a procedure remained unestablished.

Generally, prior studies of both empirical and theoretical nature are disaggregated and none has given consideration to financial literacy bias, cognitive dissonance bias and herd-instinct bias, yet when investigated separately, have shown inconsistent results. Therefore, no prior studies that have integrated the three variables: financial literacy, cognitive dissonance bias and herd-instinct biases effect on investment decision in one research.

CHAPTER THREE
RESEARCH METHODOLOGY

This chapter describes the details of the research design used for this study. It discusses the population and sampling design, sample size, sampling technique, data collection methods, research procedures and data analysis methods.

3.1 Research Design

Research design is an overall framework or a plan for investigation and logical model of proof that guides the investigator in the various stages of research (Kothari, 2008). According to Aila (2014) research design begins with selection of the topic and a paradigm and that a paradigm provides the research with an idea of assumptions about the social world and how a study should be conducted. A study can follow a qualitative and or a quantitative paradigm where quantitative paradigm is the traditional, positivist or experimental and the qualitative paradigm is termed as the constructivist, naturalistic, interpretative, post positivist, experiential or post-modem perspective (Schiffman and Kanuk, 2009).

This research uses the quantitative paradigm as it is in tandem with the main purpose of the study which was to assess the effect of cognitive biases on Vihiga sub-county teacher investment decision in the stock market (Aila, 2014). Utilizing a quantitative paradigm, this study explores relationships between cognitive biases and individual teacher investment decision in the stock market. Ontologically, reality is objective and singular apart from the researcher. Epistemologically, the researcher is independent from that which is being researched.

Correlation research design is a quantitative deductive approach that aims to discover or establish the existence of relationships or associations or interdependence between two or more aspects of situations (Nyakundi, 2017). Blumberg (2014) explains that correlation research design helps provide answers to the questions of who, what, when, where, and how associated with a particular research problem and offers accurate and valid representation of the relevant variables that correspond to selected research questions. The purpose of using correlations in research is to figure out the relationship between variables, which descriptive research design may not be able to give. The goal of correlational research is to identify predictive relationships by using correlations or more sophisticated statistical techniques (Blumberg, 2014).

A correlation design was adopted in this study. The design was deemed suitable because focus of the study was to determine the extent to which behavioral cognitive biases (independent variables) affected individual investment decisions (dependent variable) among teachers. The approach was also chosen because it gave the researcher the opportunity to use quantitative data in order to find common characteristics about the population or phenomenon that was being studied. In this case, data on cognitive biases such as financial literacy bias cognitive dissonance bias and herd-instinct bias was analysed quantitatively in testing the hypotheses. Lastly, this design was adopted since it envelopes a direction of moving from theoretical background to analysis of actual data to approve or disapprove the theories unlike the inductive approach which moves from data to theories (Ross, 2009).

3.2 Study Area

Vihiga County borders Nandi County to the East, Kakamega County to the North, Siaya County to the West and Kisumu County to the South. It lies between longitudes $34^0 30$' and $35^0 0$'E and latitudes 0^0 and $0^0 15$'N. The county covers a total area of $531 Km^2$ with the equator cutting across the southern part of the county. Vihiga Sub- County is one of the four sub-counties in Vihiga County. It is generally densely populated with an average of about 1051 people per square kilometer and total employed population of about 220,000 people. This makes it one of the most densely populated counties in terms of individuals per square kilometer, second to Nairobi County with an average of 2 schools per 5 square kilometer radius (KNBS 2017). Teacher average according to KNBS (2017) surpasses expectations with 56% male teachers exceeding the national average of 55%. Despite the pupil to teacher ratio constraints experienced in other counties in the country and given the population density of Vihiga, the county has surprisingly maintained teacher to pupil ratios of 1:40, which is perfectly in line with international standards for teacher distribution and created a sufficient target population pool for the study.

Being the second smallest county in Kenya after Mombasa County, it gave the best rural setup for geographical coverage in collection of primary data, especially under constrained budget and time conditions. This enabled easier and faster dissemination of test kits for both pilot study and main study.

3.3 Target Population

Ross (2009) explained that the target population should have observable characteristics to which the researcher intents to generalize the result of the study. The target population consisted of all TSC teaching workforce serving in the learning institutions according to the Director of Education (DEO) Vihiga sub-county. The respondents were teachers of selected primary, secondary and tertiary institutions in Vihiga Sub-County, Kenya. In table 3.1, excluded column of schools and teachers were special needs schools and their respective number of teachers. As an ethical procedural conduct, guidelines by NACOSTI were quite restrictive on early education division of schools given the vulnerability of the pupils which led to ECDE teachers being excluded in the research totally. A detailed list of school and target population distribution is attached in Appendix I, II and III.

Table 3.1: Distribution of respondents of total target population

Target		Defined		Excluded	
Schools	Teachers	Schools	Teachers	Schools	Teachers
118	1149	115	1126	3	23

Source: Vihiga Sub-County Director of education office, 2019

3.4 Sampling

3.4.1 Sampling Frame

A sampling frame as defined by Bryman and Bell (2011) is a list of the source material or device from which a sample is drawn. It is a list of all those within a population who can be sampled, and may include individuals, households or institutions. The sampling frame was comprised of a list of 1126 teachers extracted from the official records of the sub-county director of education (2019) in Vihiga Sub- County.

3.4.2 Sampling Technique

Sampling is an element of data collection, and is defined by Bryman and Bell (2011) as the fragment or section of the population that is selected for the research process. Sample size is determined using an equation (equation 3.1) for populations exceeding 1000 but less than 2500(Nishat, 2019).

$$\frac{N.z^2.P.q}{\{E^2.(N-1)+z^2.P.q\}}$$ ………………………..……..…Equation (3.1)

Where; n= is the required sample size

N= is the population size (1126 individual teachers)

z= is the level of confidence of the sample size (set at 95%) thus

z=1.96

P and q are the population proportions (Each set to 0.5).

E sets the accuracy of the sample proportions (set to 0.05).

$$\frac{1126 \; X \; 1.96^2 \; X \; 0.5 \; X \; 0.5}{\{0.05^2 \; X \; (1126-1) + 1.96^2 \; X \; 0.5 \; X \; 0.5\}}$$

$$n = \frac{1081.41}{3.7729} = 287$$

The final required sample size thus comprised of 287 respondents. The study adopted random sampling to select the 287 respondents that were included in the study out of the population of 1126 TSC teachers. A sampling fraction was then determined to identify the particular number of respondents per institution.

A proportionate stratified sample was used in dividing the research population into three strata; Primary schools, Secondary schools and Tertiary schools. Daniel (2012) indicates that in proportionate stratified sampling, number of elements allocated to the various strata is proportional to the representation of strata in target population. The rationale for using proportionate stratified sampling is that it counts for teachers in each cadre of schools in which they teach.

Table 3.2: Distribution of respondents of target population

Strata	Desired		Defined		Excluded	
	Schools	Teachers	Schools	Teachers	Schools	Teachers
Primary	76	663	74	650	2	13
Secondary	28	340	28	340	0	0
Tertiary	14	146	13	136	1	10
	118	1149	115	1126	3	23

Research Data (2021)

Sampling fractions were then calculated to obtain the proportionate number of teacher sample and schools and number of teachers per school. There were three strata; primary secondary and tertiary schools.

Proportionate number of schools in a stratum was obtained using the sampling fraction:

$$= \frac{Total\ Number\ of\ Teachers\ in\ a\ stratum}{Total\ Number\ of\ Teachers} \times Number\ of\ Schools\ in\ a\ Stratum \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ Equation\ (3.2)$$

For primary school stratum

$$= \frac{650}{1126} \times 74 = 42\ schools$$

Proportionate number of teachers in a stratum was obtained using the sampling fraction:

$$= \frac{Total\ Number\ of\ Teachers\ in\ a\ stratum}{Total\ Number\ of\ Teachers} \times Sample\ size \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ Equation\ (3.3)$$

For primary school stratum;

$$= \frac{650}{1126} \times 287 = 165\ teachers$$

Therefore, a fixed sub-sample size of 4 teachers per primary school, 10 teachers per secondary school and 17 teachers per tertiary school was obtained using the following sampling fraction;

$$= \frac{Proportionate\ number\ of\ teachers\ in\ a\ stratum}{Proportionate\ number\ of\ schools\ in\ a\ stratum}$$

40

Table 3.3: Distribution of respondents of sample distribution

Strata	Schools	Teachers	Teachers per School
Primary	42	166	4
Secondary	8	87	11
Tertiary	2	34	17
	52	287	

Research Data (2021)

Bryman & Bell (2011) state that stratified sampling is used in order to ensure that the accuracy of sample estimates obtained for stratum is sufficiently high to be able to make meaningful comparisons between strata and elements that are smaller than a specified size are linked to a similar (and nearby) element to form a 'pseudo'. The sub-sample size design sampling fraction required that 17 teachers be drawn from each of the two tertiary schools.

However, only one school in the defined target population, Kitulu Vocational Training College, had enough teachers to accommodate the required number. Two similar (and nearby) tertiary schools were therefore combined south Maragoli Training Centre and Givigoi Vocational Training Centre to form a 'pseudo school'. The pseudo school is treated as a single school of 21 teachers during the process of selecting the sample. It was therefore treated as a single school for the purposes of selecting a subsample of 17 teachers. This concept has been applied before by the International Institute for Education Planning in Eastern and Southern African countries.

Table 3.4: Distribution of 'pseudo schools' of sample distribution

Strata	Schools	Teachers	Teachers Total
Secondary	Matsigulu Sec School	6	13
	Kidundu Sec school	7	
	Chambiti Sec School	7	17
	Idavaga Sec school	10	
	Ingidi Sec School	9	14
	Ikumba Sec School	5	
Tertiary	Kitulu Vocational Training Centre	9	16
	Lotego Vocational Training Centre	7	
	Mago Vocational Training Centre	8	17
	Vigetse Training Centre	9	

Research Data (2021)

3.4 Pilot Testing

According to Mugenda & Mugenda (1999), a pilot study sample should be 10% of the sample projected for the larger parent study. However, Uebersax (2006) cautions that this is not a simple or straight forward issue to resolve because these types of studies are influenced by many factors. Nevertheless, Blumberg (2014) and Uebersax (2006) suggested 5% – 10% and 10 to 30 participants respectively for pilots in survey research especially in social science. This study preferred 6% to be an effective percentage as it would also yield a number between 10 and 30 which would be representative. The questionnaire was pilot-tested on 17 teachers in Vihiga sub-county and who were purposively selected and excluded from participating in the study.

3.5 Data Collection Procedures

An introductory letter was sought from Maseno University. The researcher approached the subcounty director of education for teacher statistical data which was important in sampling and respondent's selection and additionally a permission to carry out research in Vihiga Subcounty. Once the teacher sample per school was determined, the researcher accompanied by an assistant approached the 52 schools and requested list of all teachers from the school principals. There was no duplication because distribution was performed according to the sample extracted from the list of teachers. Based on the simple random sampling the teachers selected would be issued with the questionnaire. The respondents were informed on the free will to participate in the study as well as the confidentiality of the information provided and teachers used in the pilot study were not used in the main study.

Blumberg (2014) defines a questionnaire as a self-report instrument consisting of a set of items to which the respondents are expected to react in writing. They are more efficient in that they require less time to conduct the research, are less expensive to construct and permit collection of data from a much larger sample. For the purposes of this study, questionnaires were used for the reasons that the sample size is large enough to warrant their use, they require less skill and sensitivity to administer and given the limited time constraint they are suitable. Further, Mugenda and Mugenda (1999) pointed out that questionnaires are free from distortion. Based on these premises and the fact that the target population is considered literate, the researcher concerned the study with questions that were standard and also based on the theoretical framework and the practical applications of behavioral finance theory.

The questionnaire had four sections: Section I comprising respondents' personal data and general financial literacy and investment decision, section II consisting of questions based on cognitive dissonance section III comprising of questions to gauge the respondents' perception and herd influence on their decision. The questionnaire was pre-tested to identify validity or truth of the instrument and the practicability of the research. The researcher piloted the questionnaire on 17 teachers in Vihiga Sub- County. From this, the researcher was able to gauge the suitability and applicability of items to the target population in order to detect ambiguities and make changes. The results showed descriptive similarities with those of a survey carried earlier by this study.

3.6 Data Analysis and Presentation.

Data analysis involved reducing accumulated data to a manageable size, developing summaries, looking for patterns and applying statistical techniques while data preparation includes editing, coding, and data entry and its activity that ensures the accuracy of the data and their conversion from raw form to reduced and classified form that are more appropriate for analysis. Data coding involves assigning numbers or other symbols to answers so that the responses can be grouped into a limited number of categories (Peng, 2013). The coding of constructs for this study was done based on the variables naming. All constructs under financial literacy were coded FLA1 – FLB-10, Cognitive Dissonance CDA12 -CDB20 and Herd-instinct Bias from HBA21 – HBB27. Statistical Package for Social Science (SPSS) version 22 was used as a tool to analyse the data.

3.6.1 Data Measurement

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. For each type of measurement, there is/are an appropriate method/s that can be applied and not others. In this research, Ordinal scale is used. The numbers assigned (1,2,3,4,5) did not indicate that the interval between scales were equal, nor did they indicate absolute quantities. They were merely numerical labels.

Based on Likert scale we have the following:

Table 3.5: Distribution of scale on the Likert scale used

Item	Very small extent	Small extent	Moderate extent	Great extent	Very great extent
Scale	1	2	3	4	5

Uebersax (2006) asserts that the use of Likert scale is justified as the most effective tool in measuring human behaviour. He further continues to add that Likert survey takes one of two forms: Likert-type data or Likert-scale data. He summarized his differentiation of the two by the table below:

Table 3.6: Differentiation of Likert- type and Likert-scale

Analysis	Likert-type Data	Likert-Scale Data
Central Tendency	Median, Mode	Mean
Variability	Frequencies	Sd
Associations	Kendall tau BorC	Pearson r
Other	Chi-square	ANOVA, t-test, regressions

He ascribed likert-scale data to the following characteristics; horizontal arrangement of choices, consecutive integer arrangement preferably from small and increasing, evenly spaced wordings and meanings which are opposite, centered around a neutral. These arguments make a lot of sense especially from a behavioral finance perspective and this explains why this tool was the most effective for the study.

Likert questionnaire structure was also important for the study especially in controlling the scope of options hence reducing significantly the possibility of outliers. Questions that were deemed qualified to be reverse coded were recoded as explained in the conceptual framework.

3.6.2 Descriptive Statistics

The study employed descriptive statistical techniques to allow presentation of data in a more meaningful way and thus simpler interpretation of data. Responses were coded, interpreted and their frequencies determined. The descriptive statistics that the study employed included percentages. Descriptives give us the reading; they singly and comprehensively relate with the simple operations on the ground (Ombok, 2014).

3.6.3 Logistic Regressions

Logistic regression is reminiscent of multiple regression. As the name implies, there are some similarities between logistic regression and multiple regression, but logistic regression is the more flexible technique because it makes no assumptions about the nature of the relationship between the independent variables and the dependent variable and the predictors do not have to be normally distributed. (Although the power of the analysis is increased if the independent variables are normally distributed and do have a linear relationship with the dependent variable). It has the power to accommodate both categorical and continues independent variables. For any given case, Logistic Regression computes the probability that a case with aparticular set of values for the independent variables is a member of the modelled category using Maximum Likelihood Estimation. Maximum Likelihood estimation yields; Unbiased estimators (estimate true β's), Asymptotically efficient estimations (narrow confident intervals), Asymptotically normally distributed estimations (can calculate C.I.'s and Test statistics using familiar of formulas) and Consistent estimators (Muchabwa 2013).

3.6.4 Binary Logistic Regression

Binary Logistic regression is a prognostic model that is fitted where there is a dichotomous/binary dependent variable like in this instance where the researcher is interested in whether teachers had invested in the stock market or not (Ernest, 2012). Usually, the categories are coded as "0" and "1" as it results is a straightforward interpretation. Normally the category of interest or the target category also affectionately referred to the case is typically coded as "1" and the other group is also known as the reference category as "0" (Muchabwa 2013). In this research teachers who had invested, target category, were denoted by a 1 and those who had not invested reference were denoted by 0.

3.6.5 Assumptions in Binary Logistic Regression

Binary logistic regression is only applied in cases where the dependent variable is dichotomous. This assumption was met because the data was coded as:

$$\text{Teacher Investment Decision} = \begin{cases} 0 & Not\ invested \\ 1 & Invested \end{cases}$$

Muchabwa (2013) contends that the same principles used when conducting linear regression also apply but the difference is only that the equation will be modelling the log odds and not the actual relationship among variables. Because it does not impose these requirements, it is

preferred to Discriminant Analysis when the data does not satisfy these assumptions. However, conditions for an error term $\mu = 0$ with standard error defined as $\Pi(x)[1-\Pi(x)]$ are assumed, which caters for any outlier effect and the conditional mean for the regression equation is: $0 \leq \mu \leq 1$ (Muchabwa, 2013).

Y are from Bernoulli or Binomial distribution. Log odds P (Y = 1) or logit *P (Y = 1)* is a linear function of covariates.

3.6.6 The Regression Model

In this study, the dependent variable, teacher investment decision, is a binary or dichotomous variable. Therefore, binary logistic regression is a suitable technique to use because it is developed to predict a binary dependent variable as a function of independent variables. In this model, the logit is the natural logarithm of the odds or the likelihood ratio that the dependent variable, Invested, is one (1) as opposed to zero (0), Not invested.

The probability, P, of having invested for each specific objective is given by the following equations in their natural log formats;

The overall model equation:

$$
\ln \frac{P}{1-P} = \beta_0 + \beta_1 \text{Investment Knowledge Awareness}_i
$$
$$
+ \beta_2 \text{Investment Services Access}_i + \beta_3 \text{Teacher Perception}_i
$$
$$
+ \beta_4 \text{Teacher Risk Averseness}_i + \beta_5 \text{Family Influence}_i
$$
$$
+ \beta_6 \text{Peer Influence}_i
$$
$$
+ \varepsilon_i. \tag{3.4}
$$

Where;

P - Probability; $0 \leq p \leq 1$ It lies between 0 and 1

$\left(\frac{P}{1-P}\right)$ - Odds of teacher falling into the target category (having invested)

β_0 – Constant; β_1 - Coefficient of Investment Knowledge awareness, B_2-Coefficient of Investment Services

β_3 -Coefficient of Teacher Perceptions, β_4 -Coefficient of risk averseness,

β_5 – Coefficient of Peer Influence, β_6 -Family Influence

3.6.7 Interpreting the Odds Ratio

When an independent variable for example cognitive dissonance bias measured through teacher perception increases by one unit, with all other factors remaining constant, the odds of the dependent variable (teacher investment decision) increase or decreases by a factor exp (β) which is called the odds ratio (OR) and ranges from zero (0) to positive infinity. It indicates the relative amount by which the odds of the outcome (teacher investment decision) increase (OR> 1) or decrease (OR< 1) when the value of the corresponding independent variable increases by one (1) unit. This is a valuable metric in measuring effect of cognitive dissonance bias and herd instinct bias on teacher investment decision. It also contributes to acceptance or rejection of the two hypotheses; there is significant effect of cognitive dissonance bias on teacher investment decision and there is significant effect of herd-instinct bias on teacher investment decision.

3.7 Diagnostic Tests

3.7.1 Data Processing

Data cleaning was important to remove data that was missing or irrelevant hence aiding in reduction of biased results. Before proceeding with the analysis, a quality check on the data was done to make sure that missing data was handled properly. Ernest (2012) states that the most important step in cleaning the dataset was checking for random versus non-random missing data. Random missing data is inevitable because it is quite typical for subjects to miss or choose not to answer questions here and there, but non-random missing data can pose a serious threat to the validity of the results of the analysis. Non-random missing data can occur when subjects do not have enough time to complete a questionnaire and there was a pattern of missing data among those questions on the survey (Oates, 2015). According to Peng (2013), there are three mechanisms under which missing data can occur: missing at random (MAR), missing completely at random (MCAR), and missing not at random (MNAR).

Tabachnick and Fidell (2013) suggest that to effectively measure randomness and non-randomness of data Little MCAR's (Missing Completely at Random) test be done, which this study adopted. Little MCAR's test answers missing data in predicted mode and is easy to compute especially for small to average datasets. If data results display p value greater than

the 5% MCAR level of missing values, then the appropriate remedial actions can be taken to handle missing data (Tabachnick and Fidell, 2013). The null hypothesis therefore would state that there is significant influence of missing data. They further maintained that statistical analysis is likely to be biased when more than 10% of data are missing and the amount of missing data is not the sole criterion by which a researcher assesses the missing data problem.

3.7.2 Hypothesis of the Expected Maximization Test.

The regression and missing data imputing methods implemented in statistical packages (e.g., SPSS) assume multivariate normality for variables. It has been shown that unlike prior methods such as Pairwise deletion and Listwise Deletion, newer principled methods such as the Multiple Imputation (MI) and Expected Maximization (E.M) based on the multivariate normal model can provide valid estimates even when this assumption is violated (Peng, 2013). Furthermore, this assumption is robust when the sample size is large and when the missing rate is low, although the definition for a large sample size or for a low rate of missing is not specified in the literature (Peng, 2013). Additionally, it was important to recognize that APA taskforce warned against the use of prior methods (Listwise and Pairwise deletion) which were adhoc and notorious for biased and inefficient estimates in most situations.

EM algorithm does not "fill in" missing data, but rather estimates the constructs directly by maximizing the complete data log likelihood function. It does so by iterating between the E step and the M step (Peng, 2013). The E (expectation) step calculates the expectation of the log-likelihood function of the constructs, given data. According to Peng (2013), the EM algorithm has many attractive properties. First, an EM estimator is unbiased and efficient when the missing mechanism is ignorable. Second, the EM algorithm is simple, easy to implement and stable. Third, it is straightforward in EM to compare different models using the likelihood ratio test, because EM is based on the likelihood function. Assuming Model B is nested within Model A, these two models can be compared based on the difference in the log likelihoods corresponding to these two models. Fourth, EM can be used in situations that are not missing data related. For example, EM algorithm can be used in mixture models, random effect models, mixed models, hierarchical linear models, and unbalanced designs including repeated measures.

3.7.3 Goodness-of-fit Test of the Model

The Hosmer Lemeshow goodness-of-fit statistic was test that was used to assess the model fit. The test compares the predicted values against the actual values of the dependent variable, with a minimum of 0 and a maximum of 1. A very small Hosmer-Lemeshow test statistic is desirable and a p-value greater than 0.05 indicates that the model is acceptable (Muchabwa, 2013).

The deviance was to assess the goodness of fit of the model. In cases were the deviance had a p-value greater than 0.05, it was concluded that there were some variables in the model that are important in predicting the decision to invest among teachers. The Wald statistic was used to assess the importance on individual independent variables in predicting the probability of success or failure of a share price. According to Muchabwa (2013), a coefficient with a Wald statistic p- less than 0.05 implies that the variable is important to the model and those variables with p-values greater than 0.05 are not important. Observations with modulus of the standardized residuals that were greater than 3 and the cook's distance greater than 1 were considered to be influential outliers and hence excluded from the data and the model refitted without the influential outliers

3.7.4 Model Estimation Fit Tests

SPSS gives statistical results for, the value of -2 times the log of the likelihood value, referred to as -2LL or -2 log likelihood, the Cox-test and the Nagelkerke pseudo R^2. The Cox and Snell or Nagelkerke R^2 are an analogous statistic in logistic regression to the coefficient of determination R^2 in linear regression. Cox and Snell's R^2 attempts to imitate multiple R^2 based on likelihood. It is well known that, the big problem with Cox-Snell R^2 is that it has an upper bound that is greater than 1.0 (Muchabwa, 2013).

Likelihood Ratio Test was used to check whether the variables added to a model were significant in predicting teacher investment decision. In cases where the p-value of the likelihood ratio test was less than 0.05, all added to the model were considered to be important in predicting the change in teacher individual investment decision in the stock market.

The omnibus test statistic was used to assess whether there was a linear relationship between the probability of having invested or not invested and the independent variables. An omnibus test statistic p-value less than 0.05 implied that the logistic regression could be used to model the data (Aila, 2014).

3.7.5 Multicollinearity Tests

Multicollinearity is a condition where two or more predictor variables in a multiple regression are highly correlated and therefore one can be linearly predicted from others with a high degree of accuracy (Nada, 2013). This study tested for Multicollinearity using the correlation matrix and the threshold considered as 0.7 for severe multicollinearity. The study further used Variance Inflation Factor (VIF) which was applied using the threshold of 10 for severe multicollinearity (Nada, 2013).

Table 3.7: Multicollinearity Test Results

Collinearity Statistics		
(Constant)	Tolerance	VIF
Financial literacy	0.169	5.931
Cognitive Dissonance Bias	0.165	6.051
Herd-instinct Bias	0.249	4.021
a Dependent Variable: Teacher Investment Decision		

Research Data (2021)

The Variance Inflation Factor (VIF) quantifies the severity of multicollinearity in an ordinary least- squares regression analysis (Ernest, 2012). VIF's greater than 10 are a sign of multicollinearity; the higher the value of VIF's, the more severe the problem. This study adopted a VIF value of 10 as the threshold. Financial literacy bias had VIF of 5.931; Cognitivedissonance Bias had VIF of 6.051 and Herd-Instinct Bias had VIF of 4.021. These results indicate that the VIF values of the independent variables were within the threshold of 10. This indicated that there was no threat of multicollinearity problem and therefore, the study used linear regression model.

3.7.6 Reliability

Reliability is defined as the repeatability, stability or internal consistency of a questionnaire (Nyakundi, 2017). Cronbach‟s alpha was used to test the reliability of the measures in the questionnaire. According to Nyakundi (2017), Cronbach's alpha has the most utility for multi-item scales at the interval level of measurement, requires only a single administration and provides a unique, quantitative estimate of the internal consistency of a scale.

Blumberg (2014) states that the size of a sample to be used for piloting testing varies depending on time, costs and practicality, but the same would tend to be 5- 10 per cent of the main survey and the respondents in a pilot test do not have to be statistically selected when testing the validity and reliability of the instruments.

The questionnaire responses were keyed into a statistical package for social sciences (SPSS) and Cronbach's alpha coefficient generated to assess reliability. The closer Cronbach's alpha coefficient is to 1, the higher the internal consistency reliability (Nyakundi, 2017).

Table 3.8 Reliability Test Results

Objective	Indicator	Cronbach's alpha	Number of items	Comment
Financial	Investment Services Access	0.701	5	Reliable
Literacy Bias	Investment Knowledge Awareness	0.864	6	Reliable
Cognitive	Teacher Investment Perceptions	0.749	5	Reliable
Dissonance Bias	Teacher Risk Averseness	0.732	4	Reliable
Herd Instinct	Peer Influence	0.747	4	Reliable
Bias	Family Influence	0.716	3	Reliable

Research Data (2021)

The Cronbach alpha for the variables Investment services access, Investment knowledge awareness, teacher investment perceptions, teacher risk averseness, peer influence, family influence were 0.701, 0.864, 0.749, 0.732, 0.747, 0.716, respectively which is above the threshold of 0.7 was achieved during pilot testing. Therefore, all sections of the questionnaire relating to the entire construct were reliable. Items deleted revealed that statistically there was no need to adjust any of the sections of the questionnaire. However, there was further refining of the data collection instrument in the following areas: Aligning of the expected responses (Likert scale) in line with the behavioral inclination of the respondent so that ranking of decisions is consistent, serializing of all questions.

3.7.7 Validity

Measurement validity deals with the question of whether a measure can actually provide measurements of a concept (Bryman & Bell, 2011). Content validity was achieved through face validity of two experts who are researchers in the field of behavioral finance. Certain test questions had to be restructured to ensure meanings are not distorted and are easily comprehendible. For instance, NSE, CMA and CDS had to be defined in easier terms for the teachers. Each expert gave their scores (76% and 85%) and an average congruency percentage 80.5% was calculated based on the percentage scores given by the both of them. This average score was sufficient according to Bahri (2019) who suggests that for two expert content validation, a minimum score of 80% is plausible.

3.8 Ethical Considerations

This research was conducted with full compliance with research ethics norms and more especially those established by the Maseno University Ethical Review Committee (MUERC) and the National Commission for Scientific Research (NACOSTI). It involved human participants commencing with a random sampling of the schools and subsequently followed by a random selection of the individual participants. Every research participant was issued with an informed consent form that detailed who the researcher was, why this research and from which institution it originates from, purpose of the study and its use and dissemination. It also included researchers' contact details in-case participants wished to retract information or withdraw participation at any point and also explained how anonymity and confidentiality was to be achieved. As part of ethical considerations, special schools and staff were excluded from the research.

The general objective of the study was to determine the effect of cognitive biases on teacher investment decision in stock market. This information was acquired by the use of the questionnaire. The data was analysed by the researcher and results only presented to a board of academicians and examiners at the Maseno University School of Graduate Studies.

CHAPTER FOUR
RESULTS AND DISCUSSIONS

The purpose of the study was to establish the influence of cognitive biases on teacher investment decision in Vihiga sub-county. The chapter is organized into four parts, i.e., presentation of findings, interpretation of results, discussion of results and implications. This process is done by sequencing descriptive, correlational and regression aspects of the study output providing quantitative findings which ultimately inform the discussions in line with the objectives. The chapter therefore provides a comprehensive analysis of the study findings by presenting the descriptive statistics for the general study and for each objective and the logistic regression results for each objective. It is completed by overall model regression results and classification accuracy.

4.1 Response Rate

Response rate refers to the extent to which the final data set includes all sample members and is calculated as the number of people with whom interviews are completed divided by the total number of people in the entire sample, including those who refused to participate and those who were unavailable, (Muchabwa, 2013). A total number of 287 questionnaires were administered to the teachers out of which 257 questionnaires were dully filled and returned in a field period of two weeks. This constituted 88.6% response rate. Muchabwa (2013) used questionnaire method gave respondents a period of 10 weeks and argued that two weeks was sufficient for collection of required data and return rates of 50% are acceptable to analyse and publish, 60% is good and 70% is very good.

Table 4.1: Response Rate

Questionnaires	Frequency	Percentage
Dully Filled & returned Questionnaires	257	88.5
Unfilled & unreturned Questionnaires	33	11.5
Total	**290**	**100.0**

Research Data (2021)

4.2 Data Processing

Results of the data processing, carried out using the Littles MCAR's test in SPSS are presented in tables 4.2.1- 4.2.3.

4.2.1 Tests for Missing Data

Table 4.2 Littles MCAR Test Results Univariate Statistics

Variables	N	Mean	SD	Missing	
				Count	%
FL A	250	2.0513	1.0103	7	2.7
FL B	248	2.3522	0.82392	9	3.5
CD A	251	4.0213	0.8797	6	2.3
CD B	250	4.0302	1.0183	7	3.4
HB B	249	3.8904	1.4146	8	3.1
ID 1	254	1.9000	0.5455	3	1.1

   a. Little's MCAR Test: Chi-square= 261.700, Df= 196, Sig = .630
   Research Data (2021)

Table 4.2.1 shows the univariate statistics of the constructs under the three independent variables. The three independent variables of the study were Financial Literacy bias (with two indicators FLA- Investment Knowledge Awareness and FLB- Investment Services Access), Cognitive Dissonance Bias (with two indicators CD A- teacher perceptions and CD B- teacher risk averseness), Herd-Instinct Bias (HB A- Family influence, HB B-peer influence and Investment Decision (ID). Little MCAR's test was used to determine the missing values count in the data for each variable. It additionally gives table results for expected maximization test which is employed by Little MCAR test as a method of computing for the missing values.

According to (Tabachnick & Fidell, 2001) a significance level greater than 0.05, (p= 0.63) for the independent variables is desired for this test and results obtained from the independent variables of the study show a significance level of 0.63.

The study therefore failed to reject the null hypothesis which further means that the data was missing completely at random.

4.2.2 Expected Maximization Test Means (E.M)

Table 4.2.2 presents means generated by the Expected Maximization test. EM algorithm does not "fill in" missing data, but rather estimates the constructs directly by maximizing the complete data log likelihood function and iterating between the Expected step and the Maximization step (Peng, 2013). SPSS gives results for the means of indicators after the E.M iterations.

Table 4.3: EM Means[a]

FLA	FLB	CDA	CDB	HBB	HBC	ID
2.64	2.04	4.02	4.03	3.67	3.56	1.9

b. Little's MCAR Test: Chi-square= 261.700, Df

= 196, Sig = .630Research Data (2021)

Significance of missing values, showed non-significance (p> .05, =0.63) therefore the study failed to reject the null hypothesis. This means that the data was missing completely at random. In addition, low means were observed among the indicator's financial literacy bias and Herd-instinct bias. Low means for financial literacy based on the structure of the research implied direct low levels of financial literacy since most of its scores were below the median score of three in the entire scale of 1- 5.

4.2.3 Data Imputation by Expectation Maximization.

This table displays results of correlations obtained consequent to the expected maximization imputation tests. As expected, it observed high correlation between indicators of the same construct but low correlations between indicators of different constructs.

Table 4.4: EM Correlations

	FL A	FL B	CD A	CD B	HB A	HB B
FL A	1.00					
FL B	0.708	1.00				
CD A	-0.15	-0.467	1.00			
CD B	-0.24	-0.585	0.695	1.00		
HB A	-0.397	-0.567	0.164	0.367	1.00	
HB B	-0.36	-0.212	0.250	0.296	0.868	1.00

Research Data (2021)

EM Test results displayed high correlation among constructs of the same variable. The only challenge this study encountered was that Expectation Maximization test was very resource intensive and therefore it lagged in generating the results. Correlation measures the extent of association between variables and varies from negative 1 to positive 1 ($-1 < r > +1$). It was also expected under the expected that indicators from the same variable would display high levels of correlation. It was observed from the correlations that indicators affiliated to cognitive dissonance bias and herd-instinct bias had negative correlations with financial literacy and were also not perfectly correlated with each other. This means that increased observed financial literacy among teachers in Vihiga Sub- County by correspondent decrease in cognitive dissonance bias and herd-instinct bias.

4.3 Demographic Representation and Descriptive Study findings.

This section presents analysis of the demographic descriptions of the respondents. Background information was sought on gender, age bracket, religion and income bracket of the respondents.

Table 4.5: Descriptives for Demographics

CONSTRUCTS		Teacher Investment Decision in Stock Market		
		Not Invested	Invested	Total
Gender	Male	101(39.3%)	16(6.23%)	117(45.53%)
	Female	115(44.75%)	25(9.73%)	140(54.5%)
Total		216 (84%)	41(15.95%)	257(100%)
Religion	Christian	194(75.5%)	39(15.2%)	233(90.7%)
	Muslim	13(5.1%)	1(0.4%)	14(5.45%)
	Other	9(3.5%)	1(0.4%)	10(35%)
Age	Below 45 years	158(61.5%)	9(62.5%)	167(65%)
	Above 45 years	58(22.6%)	32(3.5%)	90(9.7%)
Monthly Net Pay				
	Below sh 30,000	157(61.1%)	4(1.5%)	161(39.0%)
	Sh 30,000-50,000	52(20.23%)	13(5.6%)	65(13.7%)
	Sh 50,000 & above	7(4.5%)	24(9.4%)	31(12.1%)
Institution				
	Primary	120(46.6%)	26(10.1%)	146(57%)
	Secondary	54 (21%)	27(10.5%)	81(31.5%)
	Tertiary	26(10.11%)	4 (1.6%)	30(11.7%)

As indicated in the table above majority (54.5%) were female while 45.5% were male. This indicates that female teachers are more than male teacher which can be explained by the fact that in Vihiga, there are more girl schools than there are boys' schools. It was however perplexing to note that females presented a higher percentage of investment in the stock market than males. This characteristic in Vihiga could be explained by the fact that there were more female teachers than their male counterparts. Regardless, it triggers chain of thought in the direction of trust in investment. For example, it could be that investment information is disseminated through female circles and that is how they got to know and invest. If that is the case, then stock market players can target female teacher groups to inform them about investment.

Secondly enquires were about the income bracket specifically the monthly net pay. Ngahu (2015) and Aroni (2014) used net monthly pay in their studies of individual investors and contend that it is important to measure net pay since investable income is logically drawn from the net-pay. Whereas there may be other sources of income, it is practical for investment analysts and advisors to construct investment objectives based on reliable, stable regular income since most financial investment products are characterized by matching timely cashflows. The Certified Investments and Financial Analysts (ICIFA) practitioners in Kenya employ cashflow matching techniques in designing investment products for clients. Therefore, if teachers are expected to invest in the stock market, their monthly income would be a core aspect of their investment plans and portfolio. This was also important in determining the propensity of the respondents to invest in the stock market given higher investable income. It indicated that 25.8% were earning between sh.30,000 to sh.50,000 and 12.1 % earning above sh.50,000. With minimum investment of sh. 5,000(100 shares in the NSE at ksh.5), majority of the teachers sampled are moderate income earners in Kenya which shows potential investment pool for stock market players.

There was notably a big difference between teachers who had invested and those who had not especially among primary school teachers. Whereas that was anticipated, it showed a clear direction towards the problem which the study was focused on. It was clear that there were

biases and factors that would contribute to this and which meant that incase teachers are to be targeted for investing, primary school teachers should receive utmost focus.

Table 4.4 shows that majority (65%) of the respondents were of the age category of below 45yrs of age. The rest (35%) fell within the age bracket of above 45yrs of age. This finding illustrates that a majority of the teaching workforce were comprising of youthful investing age. This means that teachers in Vihiga have averagely long investment horizons hence their risk tolerance is high. An overwhelming majority (93.5%) of the study respondents were of Christian doctrine, while 5.4% were Muslim. The minority (1.1%) indicated that they subscribed to other religions.

4.4 Descriptive Statistics on Study Constructs

4.4.1 Descriptive Statistics on Financial Literacy Bias

The first objective of the study was to determine effect of financial literacy on investment decision among teachers in Vihiga Subcounty. This variable was first measured descriptively using means. The descriptive findings presented in table 4.4.1 show that as investment knowledge awareness increases from very small extent to very great extent, the more the number of teachers who have invested in the stock market.

Table 4.6: Descriptive Statistics on financial literacy bias constructs

CONSTRUCTS		Individual Investment Decision in Stock Market by teachers		
		Not Invested	Invested	Total
Investment	Very Great Extent	7 (2.72%)	17(6.6%)	24(9.4%)
Knowledge	Great extent	11 (4.3%)	13(5.1%)	24(9.4%)
Awareness	Moderate extent	11 (4.3%)	6(2.3%)	17(6.6%)
	Small Extent	66 (25.7%)	3(1.2%)	69(26.8%)
	Very Small Extent	121 (47.1%)	2(0.7%)	123(48%)
Investment	Very Great Extent	22 (8.6%)	21(8.2%)	43(16.3%)
Services	Great Extent	34 (13.23%)	13(5.1%)	47(18.3%)
Access	Moderate extent	46 (17.9%)	3(1.2%)	49(19.2%)
	Small extent	50 (19.5%)	2(0.7%)	52(20.23%)
	Very Small extent	64 (24.9%)	2(0.7%)	66(25.7%)

Source: Research Data (2021)

An analysis of trends depicts those teachers who were more aware about investment knowledge seemed to have invested in the stock market before while non-investment in the stock market resonated more with low investment knowledge awareness. Similarly, investment in stock market trends increased with investment services access among teachers and lack of investment in stock market increased with decreasing investment services access.

Generally, this means that increase in teacher financial literacy among teachers, based on these two indicators, is matched by increased investment in the stock market by the same teachers while a decrease in financial literacy is accompanied by a correspondent decrease in stock market investing. Wendo (2015) observed that lawyers in Nairobi County with knew about various financial products though not necessarily investment.

On investment services access study analysed teacher ability to manipulate online trading platforms, manipulating Nairobi Stock Exchange data, understanding of Capital Market Authority and whether they had ever traded shares online. These results implied that few teachers in Vihiga had ability to trade and manipulate NSE and CMA websites. These findings implied that teachers who had better access to investment services had actually invested to great extent. Majority of those who had not invested did not have access to investment services.

This study measured financial literacy based on two constructs that are innate in measuring financial services access, which is an annual measured metric in CMA and KNBS researches (CMA 2019). These results confirm the priori expectations of descriptive trends among individual investors not just locally but globally. Though they confirm the expectations, they speak a lot about the current financial mindset of individual investors indicating a societal finance and investment problem. They explain the deficiency of investment in the stock market and why Kenya is not able to generate sustained ingrown capital to fund its own stock market. Teachers are a representative of total individual investors in the country and whereas poor financial literacy is expected among them, descriptive statistics for financial literacy bias explain the magnitude and extent to which it plays a role in the nationally observed.

4.4.2 Descriptive Statistics on Cognitive Dissonance Bias

The second objective of the study was to determine effect of financial literacy on investment decision among teachers in Vihiga Subcounty. Descriptive trends were observed to get a general picture of cognitive dissonance bias performance among teachers.

Table 4.7: Descriptive Statistics on Cognitive dissonance bias constructs

CONSTRUCTS		Individual Investment Decision in Stock Market by Teachers		
		Not Invested	Invested	Total
Teacher	Very Great Extent	99 (39.7%)	1(0.4%)	100(40.1%)
Perception	Great Extent (negative)	56(21.8%)	2(0.7%)	58(22.6%)
	Moderate extent	29 (11.3%)	7(2.7%)	36(14.0%)
	Small extent Very	19 (7.4%)	11(4.3%)	30(11.7%)
	Small extent	10 (3.9%)	23(8.9%)	33(13%)
Risk	Very Great Extent	118(45.9%)	1(0.4%)	119(46.3%)
Averseness	Great Extent	62 (24.1%)	3(1.2%)	65(25.3%)
	Moderate extent	22 (8.6%)	5(2.0%)	27(10.5%)
	Small extent	9 (3.5%)	14(5.5%)	23(8.95%)
	Very Small extent	5 (2.0%)	18(7.0%)	23(8.95%)

Source: Research Data (2021)

Descriptive trends show that with increased strength of negative perceptions about investing among teachers, there is a decline in number of teachers who have invested meaning teachers who have invested most likely have positive perceptions about investing, which is the correct perception. This construct also brings to light the role negative perceptions have played in dismal investing numbers among teachers. Some of the questions that were posed were; whether teachers care about spending as compared to saving, whether procedures for CDS account opening are cumbersome and whether teachers perceive stock market returns as having long durations. It was clear that those who cared more about spending than saving, those who perceived CDS account opening procedures to be long and who thought returns take too long had invested less while those who thought otherwise had invested more.

Similarly, teacher risk averseness trends increased with decreasing investment decision into the stock market. Generally, this means that teachers who agreed to being risk averse had hardly invested in the stock market while a decrease in financial literacy is accompanied by a

correspondent decrease in stock market while those who agreed to a smaller extent of being risk averse had invested. Risk averseness is critical to investment practitioners since it as stipulated by Investments and Financial analysts act 2016, it is a required measurement in the investment policy statement. This trend is informative in the sense that it means majority of individual investors are highly risk averse but yet expect high returns. Teachers may also be risk averse because they may have lost money investing before, which means they have a pre conceived risk perception about investing. This is at the core of the definition of cognitive dissonance bias.

4.4.3 Descriptive Statistics on Herd-Instinct Bias

The study also reported descriptive statistics on herd-instinct bias and individual investment decision among teachers.

Table 4.8: Descriptive Statistics on herd-instinct bias constructs

CONSTRUCTS		Individual Investment Decision in Stock Market		
		Not Invested	Invested	Total
Family	Very Great Extent	17(8.500%)	16(0.7%)	38(38.9%)
Influence	Great Extent	30(11.67%)	13(1.9%)	43(35%)
	Moderate extent	22(8.6%)	3(1.9%)	25(10.5%)
	Small extent Very	65(25.29%)	6(3.4%)	71(6.2%)
	Small extent	82(30.0%)	3(7.4%)	80(9.4%)
Peer	Very Great Extent	4(1.6%)	16(8.2%)	99(38.5%)
Influence	Great Extent	12(4.7%)	8(1.2%)	81(31.5%)
	Moderate extent	23(8.95%)	7(0.4%)	28(10.9%)
	Small extent	78(30.4%)	8(4.3%)	23(8.9%)
	Very Small extent	99(38.5%)	2(1.9%)	26(10.111%)

Source: Research Data (2021)

One notable trend in the descriptive data was that increasing acknowledgement of influence from family resonated with having invested in the stock market while decrease in family influence matched increased investment in the stock market. This trend in descriptive data sheds light on the nature of teacher environment or surrounding. It meant that more teachers

who had invested were influenced by family members in one way or the other. Which further meant that information about investing passed on to teachers who have invested may not have been gotten through teacher circles but outside of teacher circles.

Consequently, peer influence seems to have cut across both teachers who had invested and those who had not. They both disagreed to having any kind of peer influence in their investing decisions which confirmed that stock market investing was not popular among teacher circles.

4.5 Effect of Cognitive biases on Individual Investment Decision

The general objective was to determine effect of cognitive biases on individual investment decision among teachers in Vihiga subcounty. Binary Logistic regressions were run using the enter method based on the conceptual framework. In this method all independent variables are entered into the equation at the same time. This is an appropriate analysis when dealing with a small set of predictors and when the researcher does not know which independent variables will create the best prediction equation (Uebersax, 2006)

4.5.1 Omnibus Test of Model coefficients

The results in Table 4.9 show the model chi-square and the significance levels for test of the null hypothesis that all the coefficients are equal to zero.

Table 4.9: Omnibus test of the Model Coefficients

Omnibus Test of Model coefficients

Model		Chi-square	df	Sig
Enter	Step	123.778	6	.000
	Block	123.778	6	.000
	Model	123.778	6	.000

(Research Data 2021)

The model chi-square value which is the difference between the null model and the current (full) (chi-square values =123.778), the null hypothesis is rejected since the p-value (sig. value in Table 5.1) is less than 0.05 (significance level), implying that the addition of the independent variables improved the predictive power of the model.

4.5.2 Hosmer-Lemeshow Test

Table 5.0 displays results of the Hosmer- Lemeshow test that is a test of goodness of fit of the model. Before a model is relied upon to draw conclusions or predict future outcomes, we should check, as far as possible, that the model we have assumed is correctly specified, that is, that the data do not conflict with assumptions made by the model Ernest, (2020). The significance (sig) is the most critical value and a sig. value below 0.05 would signify that the data did not fit the overall model.

Table 4.10: Model significance test

Step	Chi-square	df	Sig.
1	65.000	7	0.105

Research Data (2021)

As it is observed from the table above since P-value is 0.105 is greater than the level of significance at 5%, we can conclude that indicating that insignificant differences remain therefore our fitted logistic regression model is good fit. Hosmer and Lemeshow Test (the inferential measure of goodness-of-fit) tests the null hypothesis that the observed data are significantly different from the predicted values in the mode (Aila, 2014). The insignificant chi-square at (p = .105) indicates a good fit.

4.5.3 Pseudo R^2 Measures

Table 5.1 contains results of Pseudo R^2 measured in logistical regressions to show how much of the dependent variable is explained by the independent variable. According to Aila (2014), two pseudo-R-squared (descriptive measures) are used to indicate improvement from null to fitted model.

Table 4.11: Model summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	111.00[a]	0.53	0.61

Research Data (2021)

Under the model summary, -2 Log Likelihood statistics is 111.00. This statistic measures how poorly the model predicts the individual investment decision among teachers, the smaller the statistic the better the model. The Cox and Snell and Nagelkerke ^{2} are analogous statistic in logistic regression to the coefficient of determination R^2 in linear regression (Ernest, 2020). The model summary provides some approximation of R^2 statistic in logistic regression. Cox and Snell's R^2 attempts to imitate multiple R^2 based on likelihood. The result of Cox and Snell R^2 indicates that 53% of the variation in teacher investment decision in stock market is explained by cognitive biases which is assumed to be good enough (Ernest, 2020). Nagelkerke R-Squared adjusts Cox & Snell R-squared so that the range of possible values extended to 1 (Aila, 2014). Therefore, Nagelkerke *R- Square* = 0.61 indicates a greater improvement from the null to fitted model.

Table 4.12 Binary Logistic Regression of cognitive biases and individual investment decision

The multivariate result set in Table 4.12 and Equation 4.1 is therefore used to address the three study objectives consecutively.

(Dependent Variable, Individual Investment Decision=Yes=1 No=0)

	B	S.E.	Wald	Df	Sig.	Exp(B)	95.0% C.I.forEXP(B) Lower	Upper
Financial Literacy Bias								
Investment Knowledge awareness	0.623	0.272	5.643	1	0.021*	1.865	1.143	3.122
Investment Services access	0.828	0.367	5.107	1	0.015*	2.288	1.240	4.967
Cognitive Dissonance Bias								
Teacher Perceptions(negative)	-1.361	0.019	4.543	1	0.042*	0.256	0.001	2.134
Teacher Risk Averseness	-0.984	0.022	4.707	1	0.033*	0.374	0.269	1.947
Herd- Instinct Bias								
Family influence	0.576	0.201	4.752	1	0.02*	1.779	1.100	3.547
Peer Influence	0.432	0.312	5.000	1	0.031*	1.5403	1.227	4.322
Constant	-20.463	1.813	.001	1	0.7823	0.629		

a. Variable(s) entered on step 1: Investment Knowledge Awareness, Investment services access, Teacher perceptions, Teacher Risk averseness, family influence, Peer Influence.

The full model is subsequently presented as Equation 4.1 with p-values in bracketed form. Coupled with the statistically based measures of model fit and goodness in 4.5.1- 4.5.3, the model was deemed acceptable in terms of both statistical and practical significance.

$$\ln\left(\frac{P}{1-P}\right) = -20.463 + 0.623\ Investment\ Knowledge\ Awareness_{(0.021)}$$
$$+ 0.828\ Investment\ Services\ Access_{(0.015)} - 1.361 Teacher\ perceptions_{(0.042)}$$
$$- 0.984\ Teacher\ risk\ averseness_{(0.033)} + 0.576\ Family\ influence_{(0.02)}$$
$$+ 0.432\ Peer\ Influence_{(0.031)} \hspace{3cm} (eq.\ 4.1)$$

4.5.4 Effect of financial literacy bias on teacher investment decision

The first objective of the study was to determine effect of financial literacy on investment decision among teachers in Vihiga Subcounty. Its result is represented by two variable constructs: Investment Knowledge Awareness and Investment Services Access. Investment knowledge awareness has a significant Wald statistic at p = 0.021 meaning it is statistically different from zero. Its beta coefficient B = 0.623 is more than twice as large as its standard error SE = 0.272 meaning it is doing a better job than the intercept in predicting consumer preferences for indigenous chickens. Its odds ratio Exp(B) = 1.865 indicates that holding other factors constant, an additional unit of investment knowledge awareness increases the likelihood of a teacher having invested in the stock market by 1.865 times with a confidence level ranging between 1.143 and 3.122(Aila, 2014). This meant that awareness about investment positively affected teacher's decision to invest in the stock market. This strong statistic explains the magnitude of the effect of investment knowledge and its importance in influencing teacher individual investment decision in the stock market.

This statistic is consistent with Liobl (2008), who in his sample of 710 American high school teachers in a survey consisting of 54 questions, which included items relating to teacher financial literacy levels and attitudes towards financial literacy observed that an investment knowledgeable teacher is more likely to teach personal finance management skills if they have invested in the stock market before. He found that in most schools, Business education teachers were more likely to have completed formal education in finance areas, and attached great importance to teaching financial literacy compared with their colleagues. Both studies propagate the efficient market hypothesis theory which states that in an efficient market, full information is available and investment is done which contributes to price liquidity in the stock markets.

Questions tested included; whether teachers had by any chance had received information about investing in stocks from through media including mainstream, print and social media, whether they believed they had sufficient knowledge on investing and whether they could be able to relay this information to students, whether information was passed onto them in teacher training and if they were made aware of investing through their personal bankers.

Media is a valuable channel of disseminating financial and investment knowledge to teachers in Vihiga sub-county. This is in today's world enhanced through access to social media which has proved an effective tool for disseminating such information to investors. Social research studies have attributed younger populations to advance information technology access. Media can be used as a tool, not only to inform populations about investing, but also to disseminate investment services access. Onyango (2014) found that investors in Nairobi Securities Exchange did not attribute media to their investment knowledge but they still displayed low levels of financial literacy. In agreement with Ngahu (2015) who found that a total aggregateof 31% of investors attributed to media, specifically mainstream television and print media asthe source of their investment knowledge these results contend that despite the growth of social media and ease of access to media sources could be very impactful when disseminatinginvestment knowledge among teachers.

Whereas Muchiri (2015) observed an embracive attitude to investment knowledge among his sample respondents of individual investors, teachers in Vihiga subcounty surprisingly lacked confidence to relay that information to their students if given the opportunity, which is where this study is inconsistent with Muchiri, 2015. This study found this an important aspect to measure since previous studies had not measured it.

Teacher performance appraisal form as is currently used by the State Department for Education includes in it a section on financial management especially for school heads. Its intention is to assess a teacher in the area of financial management to ascertain their capability. However personal finance and investing knowledge is not included and in Vihiga, teachers do not want it to. These results show that a teacher who had not invested in the stock market is less likely to advocate for assessment of personal finance management among teachers.

The beta coefficient of investment services access was 0.828 with standard error at 0.327.

Wald statistic was statistically significant at p = 0.015 meaning it is statistically different from zero while its Odds Ratio Exp(B) = 2.288, with confidence level ranging between 1.240 and 4.967, indicated that holding other factors constant, an additional unit of investment services access increased the likelihood of a teacher having invested in the stock market.

This meant that a teacher with access to a bank or broker who gives them information relating to investment is relatively 2 times more likely to have invested in the stock market. Key stock market players rely on regular, constant and easy to access information which is the foundation of the Efficient Markets Theory. A teacher in Vihiga sub county, being a rural area, may not be familiar with investments into the Nairobi securities exchange and the Capital Markets, bringing into light the interplay of teacher environment. Generally speaking, financial literacy is detrimental to investment decision and is a fundamental pre- requisite to understanding stock exchange investing.

This result shows inconsistency with Capital Markets Authority (2019) which shows that financial services access among individual investors in Kenya has improved drastically in the last ten years. If there was increase in financial services access, then descriptively, more teachers should have invested. It however agrees with part of the report in the sense that teachers who had access to investment services were more likely to have invested. If teachers cannot access stock brokers and other investment services experts within their locality then this depicts a systemic problem that needs to be fixed. Knowledge of existence and operation of the only stock market in the country and the only regulator in the country should be easily available and understood by all investors. This enhances their ability to identify stock-brokers, within their jurisdictions and also investment opportunities in the market. Secondly, access to financial knowledge is expected at teacher training level as part of awareness which in turn increases the pool of local investors into the market.

Ability to manipulate the NSE online platforms and understand the share buying processes such as CDS account opening were measured, suggested that regularity of financial information in stock market investors played a critical role in determining investment decision. These results mean that teachers with access to online investment platforms through their bank or brokers were more likely to have invested in the stock market. This is also true for those who were familiar with the investment process and CDS account opening procedures.

Overall, then, the results on the first objective offers evidence indicating that positive financial literacy bias has significant positive effect on teacher investment decision in the stock market which is consistent with theory.

4.5.5 Effect of cognitive dissonance bias and individual investment decision

The second objective of the study was to determine effect of cognitive dissonance bias on individual investment decision among teachers in Vihiga Subcounty. The hypothesis to be measured was that there is significant effect of cognitive dissonance bias on individual investment decision. Two constructs were used to achieve this objective: Teacher perceptions and Risk averseness. Teacher perception construct had significant negative effect with its Wald test significant at p=0.042 meaning it was significantly different from 0. Its coefficient of teacher perceptions was -1.361 with standard error 0.019, implying an odds ratio of 0.256. Thus, a unit increase inteacher perceptions, as they currently are, predicts a likelihood decrease in the odds of a teacherhaving invested in the stock market by a factor of 0.256. Thus, with the current teacher perceptions about the stock market, teachers in Vihiga are less likely to invest in the stock market, all factors held constant. Teachers' decision to invest in the stock market seems to be affected by negative perceptions about the stock market and stock investing. One of the items measured which scored highly was 'investment in stock market is meant for the rich'. It can be concluded that teachers to a large extent think that investing in the stock exchange is either expensive or for some reason, not meant for them. According to NSE (2020) this notion has been observed among Kenyans and it has been the biggest misconception about the Nairobi Securities Exchange.

Teachers also perceived that they lack sufficient information about stock investing and also that CDS account opening procedures are quite long. This had a negative effect on their investment decision in the stock market. In a survey conducted by this study, there was no uniformity in the number of accounts opened versus the CDS accounts opened among individual investors in Vihiga Subcounty with the lowest levels being detected among the teachers and medical personnel. From these results, it is clear that this has an effect on teacher's investment decision in the stock market and therefore the odds of a teacher in Vihiga subcounty investing in the stock market with their current perceptions of it are 0. In addition to this, this logistic regression result concurs with correlation statistics results from the expected

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maximization test that showed negative correlation between teacher perceptions and teacher financial literacy, meaning that teacher negative perceptions could be stemming from an informational deficiency

Ideally in practice the largest or greatest investors become the owners of the economy. It is therefore not surprising to this study that teachers in Vihiga sub-county would think that investing in the Nairobi Stock Exchange is expensive. If these results are representative of all teachers as potential investors, and by extension all local investors in the Nairobi Stock Exchange currently, then it would explain the mentality behind the dismal local investment in the stock exchange which currently stands at 8%, in comparison to foreign investment at 50%, according to CMA 2019 report. The CMA report further continues to explain why dependence on foreign investment is unreliable for the country stating that such investment is vulnerable, that is, itexits the market during downside economic cycles, such as the election periods and enters at peak levels when profit potential is high, leaving behind a dilapidated stock exchange.

The coefficient of teacher risk averseness as shown in table 5.2 was -0.984 with standard error = 0.022, this implies an odds ratio of 0.374. This statistics Wald test was significant at 0.033 and predicted that a unit increase in risk averseness (fear of risking) among teachers in Vihiga subcounty leads to a decline of in the odds of a teacher having invested or investing in the stock market by a factor of 0.374. Therefore, the odds of risk averse teachers in Vihiga subcounty having invested were very low (0). These findings indicate that teachers who to a great extent think it is risky to invest in the stock market stay away from investing. Practically speaking, this may affect their investment decisions when they always choose to invest in other avenues and neglect investing in the stock exchange which gives them the option of not directly engaging in day-to-day achievement of returns, is safe and contributes towards a local pool of capital. In addition to that, this specific result is indicative of the current status of information that is among the teachers, which is that stock exchange investment is risky. This means risk averseness of teachers in Vihiga sub-county is relatively high and this is a hypothesis that can be measured at advanced stages of research. Risk tolerance, which constitutes risk averseness and risk appetite is one of the preliminary stages of creating investment portfolios by financial analysts and brokers. Measurement of risk tolerance is required in practice by the regulator, CMA, and is in-principle included in the Public Financial Management Act used by financial analysts today. Risk averseness also stems from lack of trust in the stock market. This research

believes that this sample is representative of teachers in Vihiga subcounty, and therefore can represent teachers in the county and any other rural county in Kenya. Teachers need to overcome the fear of risking and this can be achieved if their individual capacity and capability is enhanced through a mindset change.

According to financial analysts' act of 2015, risk profiling of individual investors is categorized into two major deviations; ability to take risk and willingness to take risk, and individual investors are classified into four categories; cautious investors (risk averse), methodical investors (risk averse), individualistic investor (risk seekers) and Spontaneous investors (risk seekers). Most investors are considered generally risk averse but with increase in information, averseness reduces (Jagongo & Mutswenje, 2013). Additionally, highly risk averse investors also tend to have a lot of emotional attachment to their investments and this leads to the fear of risk taking. These results therefore show consistency with those of Jagongo & Mutswenje (2013).

This state of risk averseness of teachers in Vihiga Sub- County is expected especially given thelevel of information they have and therefore these results display similarities with those of Gumbo (2017) who also observed that risk aversion reduces probability of holding stock. However, whereas Gumbo (2017) explains this behaviour from the basis of lack of trust, this study believes that lack of trust among teachers is not sufficient enough to explain their lack of investment in the stock market. Teachers seem to have a lot of emotional attachment to their investments which is why the question- 'I have once lost money trading in an account' followed consecutively by- 'I would bet on a winning team instead of buying shares in the stock market' scored highly leading to a general negative effect. This means that teachers in Vihiga subcounty can be categorized as cautious or methodical investors and therefore strategies usedin practice to target such investors can be used to target them and investment advisors handlingteacher clientele should be able to construct suitable investment portfolio based on this characteristic.

Where Gumbo (2017), while determining factors that affect investor participation in the stock market in Zimbabwe, randomly stratifying 120 respondents, measured perceptions and trust descriptively observed that shown by the data in the table, trust of stock market had an average value (mean) of 2.43 meaning individual investors could not risk in the stock market and Wendo (2015) who in investigating effect of behavioral biases on investment decision on

individual investors measures cognitive dissonance bias effect on respondent by one statement; 'I am holding to my investment because selling them would be painful to me since I would incur losses', this study adds to this sphere of behavioral finance by observing a negative effect of cognitive dissonance bias on teacher investment decision hence agreeing with Gumbo(2017).

According to McLeod (2018), if an individual puts effort into a task which we have chosen to carry out, and the task turns out badly, we experience dissonance. Which explains why teachers who have lost money investing before may not have invested in the stock market. McLeod (2018) asserts that to reduce this dissonance, individual investors are motivated to try to think that the task turned out well. Secondly, he recommends a total change of behaviour, though difficult to achieve because individuals frequently employ a variety of mental maneuvers. In behavioral change he proposes increasing the attractiveness of the chosen alternative and to decrease the attractiveness of the rejected alternative. This he defines as "spreading apart the alternatives." This is probably because dissonance would be caused if we spent a great effort to achieve something and then evaluated it negatively. Individuals could, of course, spend years of effort into achieving something which turns out to fail and then, in order to avoid the dissonance that produces, try to convince themselves that they didn't really spend years of effort, or that the effort was really quite enjoyable, or that it wasn't really a lot of effort.

It was evident that based on the indicators of Cognitive Dissonance Bias, it had a general negative effect on teacher investment decision in the stock market. The significance of these two indicators shows presence of cognitive dissonance bias among teachers. The significance of teacher perceptions means that teacher perceptions affect their investment decision, albeit negatively, due to the deficiency of financial information. Teachers' cognitions or perceptions are dissonant, they are unclear as to how investment in the stock market is done and what it is. Evidence of this bias among teachers proves behavioral finance right in stipulating that cognitive dissonance bias affects individual investment decision in the stock market. However, cognitive dissonance can be corrected through the acquisition of new positive information that corrects the negative experience and perception.

Using the Wald test, the null hypothesis Ho: ' There is no significant effect of cognitive dissonance bias on teacher investment decision in stock market in Vihiga Sub-County ' is rejected.

4.5.6 Herd-Instinct Bias Effect on Teacher Investment Decision

The third objective of the study was to establish the significant effect of herd-instinct bias on investment decision making in stock market by teachers in Vihiga subcounty. It was measured through two indicators; family influence and peer influence.

The coefficient of peer influence was 0.576, this implies an odds ratio of 1.779 increases in the odds of a teacher having invested or investing in the stock market with a lower bound of 1.100. Wald statistic was significant at 0.02 meaning that the statistic was significantly different from 0. The standard error (0.201) which was marginally lower than the beta coefficient suggested that the construct added to the model as a good fit. Interpretation of the odds ratio is that a teacher is 1.779 times likely to have invested based on a unit increase in peer influence.

This measured the susceptibility of teachers to influence from peers and fellow teachers. The question under this construct included; 'Our teachers Sacco shares with us stock market investment information', 'I have interacted with beneficiaries of stock investing', 'Most of my colleagues/friends have other investments e.g., betting, real estate and so do I' and 'Stock market investing is popular among teacher circles' with majority of teachers who had not invested agreeing to a very small extent with them. This is expected since as enumerated by the first variable, there is very little information on stock investing among teacher circles.
The significance of peer influence is important. Therefore, a teacher who had invested in the stock market was more likely to have interacted with fellow colleagues who had also invested whereas those who had not were most likely following the rest of the herd who lack investment information. This means if there was more information about stock investing around teacher circles, a positive effect would probably be observed. The effect can be explained from the descriptive statistics. From the descriptive, it was observed that majority of the teachers who had invested were above the age of 45 years. Majority of these respondents are least likely expected to be influenced by peers as compared to those below the age of 45. Those below this age had not invested in the stock market by an overwhelming majority and this is expected because majority of them are likely to be following their peers.

Therefore, peer influence is a significant factor in determining investment decision among teachers, it only has a negative effect explained by the scarcity of financial information. Prasad (2015) observed similar results descriptively 23% of the investors were not imitating others

while making investment decision. They thoroughly analyse available information. With the help of own information, they desire to construct their own portfolio. This is indicating rationality and prudent behaviour of investors in stock market but in this study find existence of rational investors are only few. This study also observed a small percentage of non-imitators among those who had invested.

These results add to the body of knowledge on peer influence and family as a part of herd-instinct bias. Previous studies (Prasad, 2015 and Karanja 2017) failed to measure herd-instinct bias based on the two constructs. This showed presence of herd-instinct bias, where an in which individual responds to signals from the behaviour of others. It agrees with Munyowki (2013) that the effects of peer influence and family influence are significant (p= 0.00 and p=0.01).

The coefficient of family influence was 0.432, this implies an odds ratio of 1.5403 increases in the odds of a teacher having invested or investing in the stock market with a lower bound of 1.227. Wald statistic was significant at 0.031 meaning that the statistic was significantly different from 0. The standard error (0.312) which was marginally lower than the beta coefficient suggested that the construct added to the model as a good fit. Interpretation of the odds ratio is that a unit increase in family influence predicted likelihood of a teacher having invested in the stock market by a factor of 1.5403.

This particular construct was specifically aimed at exposing the involvement of family in investment making decisions. The study measured three areas; - 'My personal values guide my investments not my friends' reflected more on family than friends because individual values and principles begin at the family level. The findings showed that teachers who involved family in their investment decision making were 1.5403 times likely to have invested than those who had not. This means that teachers who had invested in the stock market were more likely to have consulted with family and gotten their opinions, and also their families were aware of their investments unlike those who had not invested who shy off from sharing the information with family. Secondly, it could also be that the source of information about investing among the teachers who had invested came from family, which may be more aware about stock investing than teachers. Meaning a huge percentage of non- financial information is in teacher surroundings in Vihiga Subcounty. It is expected that with the right information, herd-instinct bias would have a positive effect especially with its significance.

In targeting new investment in the stock market, market players and regulators like the Capital Markets Authority would prefer to target specific groups of potential investors. Target market segmentation is important and is used in finance practice to get the customized service to target population. These results signify that teacher population has not been targeted as potential stock market investors and the necessary information and services have not been developed for them. The significance of herd-instinct bias shows that if financial information is disseminated amongst them, there is great potential of it being spread amongst them. However, it is currently deficient.

According to Wizely (2020) overcoming herd-instinct bias begins from making a conscious effort to form your own opinion. It adds that in human rationale, individuals will make decisions based on a justification (regardless of whether this justification is grounded) and when someone is exemplifying herd-instinct bias, they justify their decisions based on the fact that others are doing so, it is the age old 'strength in numbers' argument. However, if you force yourself to justify your decisions independent of others, you will be applying a level of scrutiny to your decision making that should hopefully avoid herd-instinct bias altogether. Educating yourself about why you want to make a decision within the markets will naturally lead to better informed decisions. It further adds that the unquenched search for knowledge about investment should be rooted within an investors' mind because it is useful before and during investing. This seems obvious, but it is this level of discipline which will make you a better investor.

Secondly and in connection to the first, individuals must be willing to go out on their own. Herd-instinct bias justifies that one is more likely to justify an investment decision if others are doing it. Similarly, a decision can seem initially unappealing if one is the only person supporting it. It's the obvious thought "if I'm the only one thinking it, I must be wrong". Wizely (2020) claims 'Don't be afraid to stand out, you could well be ahead of the crowd in investment'. Thirdly, taking time when making decisions is important. When one is making decisions in time-critical environments, one is more likely to copy herd behaviour if everyone seems to be piling into a behavior (Wizely, 2020).

From the logistic regression analysis, it was also evident that the odds of investment services access, investment knowledge awareness, teacher perceptions, teacher risk averseness, peer

and family influence are significant variables that seem to influence teacher investment in the stock market as compared to investment in the stock market. This means that cognitive biases affected the current status of investment decision among teachers. The more teachers who displayed evidence of cognitive dissonance bias the less they had invested in the stock market. Those who had invested in the stock market were not highly dissonant (not affected by cognitive dissonance bias) and were also not highly influenced by peers in their investment decision, however family influence seemed to have an effect on them. This means that they widely consulted and relied on opinions from family and values instilled in them from family.

4.6.1 Classification Accuracy

Classification accuracy enumerates binary dependent variable classification in terms of how accurate the model was in predicting it.

Table 4.13: Classification Table

Observed	Predicted		Total
Individual Investment decision in Stock Market	Individual decision	Investment in Stock Market	
	Invested	**Not Invested**	**Percent Correct**
Invested	34	7	(82.9%)
Not Invested	181	35	(83.7%)
Overall Percentage			(83.7)

Research Data (2012)

This represents the level of predictive accuracy achieved by the fitted model. It can be observed from the classification table in table that the fitted model predicted an overall percentage of 83.3% correctly. That is 83.7% of the outcome yes of the variable Not Invested is predicted correctly while 82.9% of the outcome no of the variable Invested is predicted correctly by the fitted model.

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.

This chapter presents the summary, conclusions and recommendations for further studies. This study was set to determine the Cognitive Biases effect on individual investment decision in stock market among teachers. The conclusions are based on the study findings as stated below. It comprises of summary of findings, conclusions, limitations, recommendations and suggestions for further research.

5.1 Summary of Study Findings

The first objective of this study was to determine effect of financial literacy bias on teacher investment decision in the stock market. Financial literacy bias was measured with two indicators namely investment knowledge awareness and investment services access. Descriptive statistics show agreement to low extent of financial literacy bias among teachers meant poor access to investment services and investment knowledge and lack of investment in the stock market. This meant less familiarity with investment in the stock market among teachers especially among primary school teachers which meant very few teachers could; manipulate online trading platforms, understand the investment process and therefore very few had confidence to communicate investment knowledge to others. In terms of effect, in Vihiga subcounty, the teachers who had invested in the stock market had better access to investment services and were more aware about investing in the stock market and its opportunities. This means that they were able to manipulate online trading platforms, had access to investing knowledge through their brokers, were more confident to teach investment information and did not have a problem with personal finance being measured in teacher appraisal. The study also established that a majority of these teachers were of age 45 and above and had more access to financial information therefore had ability to make more informed investments decisions because they are more aware about finance and investing as compared to the majority younger teachers.

This trend was earlier expected among individual investors in the NSE. It however signaled that access to investment services and investment knowledge had a positive effect on investment decision in the stock market. Therefore, to enhance investment into the stock market financial literacy bias plays a role which was in agreement with theoretical studies of Hede (2012). It is expected that if investment knowledge awareness is increased at the teacher training level, then investment services access will be enhanced and therefore more

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investment into the stock market will be observed. If investment knowledge is disseminated to teachers, then this will trigger enthusiasm about stock market investment and a multiplier effect of this information will be observed from teacher to teacher. It will be much easier for this information to trickle down not only to the students they teach but also to the rest of the communities where they influence. Teachers are represented in every fabric of the society, nationally and therefore a target on teacher training will have a national influence on investment. Teachers are representative of individual investors in the country. Poor financial literacy levels among teachers signify poor literacy levels among individual investors.

The second objective of this study was to establish effect of cognitive dissonance bias on teacher investment decision. Cognitive dissonance was measured through two constructs and 10 questions. First was teacher perception which proved to have a negative significant effect on teacher investment decision. Teachers had a negative perception about investing in the stock market and this had an effect on their investment decision such that the more perceptions they had, the less probability of them having invested in the stock market. Teachers found procedures of investment account opening to be tedious and therefore investing in stock market meant for 'the rich'. This mentality among individual investors proves cognitive dissonance bias among individual investors in Kenya.

The study realized risk averseness of teachers in Vihiga sub-county was significant (p=.002) and had a negative coefficient (-0.984) which meant that risk averseness resonated more with not investing in the stock-market than investing. This further meant that teachers who were more risk averse had a fewer probability of having invested in the stock market. Risk averseness is expected especially among individual investors who have not invested in the stock market. They consider investing in the stock market as being risky as compared to other investments. This could be attributed to the fact that based on the founding premise of lack of sufficient financial information; it was more difficult for the teachers to clearly ascertain their stance as pertaining to investment decision. Since risk averseness stems from a general lack of trust, the results obtained display lack of trust in stock investment among teachers. If teachers are representative of individual investors in the country, then there is a general lack of trust among individual investors. A question that espoused this point quite well was one that measured the possibility of teachers having lost investment in earlier experiences. This could be associated with the observed trend in lack of investment. They possessed well-formed negative perceptions concerning investment into the stock market.

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Lastly, the study sought to examine herd bias perception on investment decision among teachers in Vihiga Sub- County. Results obtained by the researcher established that there exists a significant positive relationship between herd bias perception and individual investment decision. This meant that the more prone teachers are to herd mentality the lower their chances of making a decision to invest in stock market. This shows that the information available to teachers through their herd groups may not in any way related to investment. Teachers who have invested seemed to possess independent mindsets that are less influenced by the contributions of their friends. However, they had interacted with fellow colleagues who had invested. The researcher can deduce also from this research that there may not be sufficient information regarding investment in teacher Sacco's which contributes to this negative relationship. The more teachers get involved in their Sacco societies the less likely they will make a stock market investment decision. This is a direct indicator that the current available investment opportunities and information available in their Sacco societies may not be related to stock market investment.

5.2 Conclusions on Study Findings

Teachers in Vihiga Sub- County do not have sufficient information as regards to investment which could influence their sensitivity to herd-bias perception and cognitive dissonance. Teachers as individual investors are normal rather than rational. They are not immune to biased investment decision making. It is evident that low financial literacy plays a major significant role to them not being able to invest. Additionally, they lack an inlet of more information that relates to stock market investing. This can also be affirmed through the fact that teachers who have spent more years in the workforce display a better level of financial understanding, have more access to stock brokers, have previously invested and interacted with the stock market and have less propensity to be influenced by their mates in making investment decisions.

In establishing effect of cognitive dissonance bias effect on investment decision, the study concluded that cognitive dissonance bias generally had a significant negative relationship on investment decision of teachers of Vihiga Sub- County. This characteristic could however be attributed to the dismal financial information disseminated among teachers. Teachers in Vihiga sub-county experience dissonance because they have put effort in investment before but have

lost money and therefore feel discouraged to invest. To reduce this dissonance, teachers are motivated to try to think that the experience turned out well. Secondly, a total change of behaviour among teachers is needed by increasing the attractiveness of investing in the stock market and to decrease the attractiveness of not investing. This means that a total mentality change is required among teachers from the perception of spending what is currently earned into investing for the future. Teachers must also be willing to risk out on their own. Ability to risk is characteristic of successful investors in the stock market. Without that ability, teachers may not be able to realize their full potential both at a personal level and in terms of their investment potential.

Herd-instinct bias serves to their detriment since it limits their ability to begin their investment journey. However, it is a behavioral finance tool and a cognitive bias that has also proved significant among teachers who have already invested, which means it can be used to their advantage. If more teachers were familiar with their colleagues who have invested, then they would have probably invested in the stock market. If teachers had family members who had invested or heard about stock market investing, then they would probably have invested. Therefore, the significance of peer and family influence is essential to the study as it depicts teacher immediate environment is not favorable to the positive potential of herd-instinct bias.

5.3 Recommendations

The researcher makes the following recommendations to improve teacher capability to make investment decisions.

For improvement on the availability of financial information based on the first objective, the Capital Markets Authority should adopt a nationwide model that is aimed at encouraging investment, for example the teachers in this case, in the suburban and rural counties of this country has access to sufficient financial information and better understanding of Stock Marketinvesting. Teachers possess various loopholes for information dissemination. The use of the various forms of media can also be an effective tool. Television, teacher magazines and pamphlets that are released monthly can be an avenue for the CMA to advertising the variousproducts offered in the market. Teachers seem to have easier access to this currently but the information dispatched through them is not congruent to investing.

One effective and underutilized method is the teacher savings and credit societies which the Capital Markets Authority can use by getting in touch with the management and organizing avenues for teacher education, especially Mwalimu Sacco. Most products and information can

be disseminated through this medium. More workshops and seminars can be organized in partnership with Teachers Service Commission in a quest to enlighten teachers on investing in the stock market specifically targeting the younger groups of teachers who are new in the workforce.

On the second objective, teachers' perceptions and averseness can be corrected It is recommended that Brokerage firms should establish capacities in their respective institution to be able to continuously train investors and whenever necessary assist them to interpret key financial indicators to support in informed decision making. The Managers of listed companies should also strive to avail financial information to the public in a timely manner, preferably by posting the annual reports on the website as announcement updates.

The NSE, stockbrokers and the Institute of Certified Investments and Financial Analysts (ICIFA) should approach this potential market target across the country with an embracive approach. They should reduce their concentration in the urban areas of the country and increase their effectiveness in the rural sectors. Teachers in Vihiga sub-county display not only substantial levels of personal disposable income but also willingness to invest in the stock market. The stock brokers and the NSE can help the CMA in accessing the teachers and enlightening them on these investment avenues and making teachers aware and access analysts and investment advice through the Institute of Certified Investments and Financial Analysts (ICIFA). For example, school heads have their annual seminar in Mombasa Kenya every year. This could be an opportunity to target them and spread more information about investment in stock market.

Based on the measured cognitive dissonance bias and herd-instinct bias, it can be suggested that teacher investment decisions are filled with cognitive bias and are therefore irrational, which explains the current trends not only among teachers, but individual investors. These biases are progressively reduced by increasing the education level, experience, and maturity of one's emotions to produce more rational investment decisions. Behavioral finance has proposed investment decision capacity building in the sense that teachers should be informed on overcoming biases, for example overcoming risk averseness. Personal financial management skills are critical to overcoming cognitive biases and help develop an investor to discover their individual investment personalities. Majority of teachers were below the age of 45, which means with an investment horizon of about 10 years and based on technical analysis done by this study, there is possibility of growing personal portfolio 10 times in 10years. This group needs to be targeted by industry players.

5.4 Limitations of the Study

This study was carried out among teachers in Vihiga Sub-County as a representative of the whole country, Kenya. This is limited due to geographical and financial constraints. More objective findings would be possible given an extension of the research to include other Counties. The researcher relied heavily on quantitative data compared to qualitative data. This means that the benefits associated to using qualitative research had to be forgone. Teachers' investable income is used which may have comprised mainly of monthly income due to its stability and regularity especially given that TSC teachers are employed by the government. This study was based on Behavioral finance and strongly believes in the narratives put forth by behavioral finance in explaining individual investment decision. It therefore does not digress from behavioral finance; perhaps one would prefer another other angle to explain behaviour, but behavioral finance brings out the best measurement.

5.5 Suggestions for Further Research

Successful stock investing is achieved through staying rational, having access to the right information and being able to make sound decision concerning investment in order to keep track and control excess optimism and pessimism. However, this has not been observed in practice. Based on the significance of the three cognitive biases, the large differences between teachers who have invested and those who have not can be explained. However, these large differences mean that cognitive biases are currently playing a major role in investment trends and other biases could also be having effects on investment decision.

One other bias as defined by behavioral finance theory which could present itself among non-investors is Overconfidence bias. Overconfidence bias can be observed among teachers of primary, secondary and tertiary levels to determine its effect and role in the huge differences among the numbers. In measuring Cognitive dissonance bias, risk averseness was measured by this study. Behavioral finance also explains a bias named 'Fear of Regret' which is closely associated with trust and risk averseness. This bias should be examined among teachers and other individual investors if more information is required in the behavioral finance space. These biases could also be studied among teachers of different category such as; primary, secondary and tertiary colleges.

Further owing to the fact that teachers are not the only investors in the stock market and based on a survey earlier conducted, Vihiga sub-county also has a substantial number of investing group populations with stable regular monthly income. However poor investment levels were observed among teachers and medics. Research needs to be conducted on the factors that influence investment decision among these other groups in Vihiga sub-county.

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APPENDICES

Appendix I: Total Number of Secondary Schools and Teachers

	Secondary School	**Distribution of Teachers**
1	Chambiti Sec. School	7
2	Chandolo Sec. School	8
3	Chango Sec. School	22
4	Chavavo Sec. School	14
5	Emanda Sec. School	5
6	Gavalagi Sec. School	8
7	Gilwatsi Sec. School	6
8	Idavaga Sec. School	10
9	Ideleri Sec. School	11
10	Ingidi Sec. School	6
11	Ikumba Sec. School	5
12	Kerongo Sec School	11
13	Kegoye Sec School	18
14	Kidinye Sec. School	9
15	Kidundu Sec. School	4
16	Kisienya Sec. School	5
17	Kitumba Sec. School	6
18	Madira Girls High school	17
19	Magui Sec. School	16
20	Matsigulu Sec. School	6
21	Masana Sec. School	8
22	Mbihi girls high School	14
23	Mudasa Academy	10
24	Mudavadi Girls High School	28
25	St.Clares Girls High School	28
26	Womulalu Sec. School	7
27	Vihiga High School	41
28	Vigina	10
	TOTAL	340

Source: Vihiga Sub-County Education Office

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Appendix II: Total Number of Vocational Training Institutions and Teachers

Vocational Training Institutions	Registration Number	Teachers
Boyani Vocational Training Center	TVETA/PUBLIC/VTC/0094/2016	12
Chanzeywe Vocational Training Center	TVETA/PUBLIC/VTC/0109/2017	13
Kitulu Voctional Training Center	TVETA/PUBLIC/TVC/0037/2016	23
Givigoi Vocational Training Center	**TVETA/PUBLIC/VTC/0097/2016**	**10**
Keveye Vocational Training Center	TVETA/PUBLIC/VTC/0026/2016	12
Vihiga Business College	TVETA/PUBLIC/VTC/0100/2017	9
LOTEGO VOCATIONAL TRAINING Center	TVETA/PUBLIC/VTC/0161/2018	7
Gimomoi College	TVETA/PRIVATE/VTC/0012/2016	8
North Maragoli Vocational Training Center	TVETA/PUBLIC/VTC/0104/2017	10
South Maragoli Vocational Training Center	**TVETA/PUBLIC/VTC/0040/2018**	**11**
St. Peter's Hambale Vocational Training Center	TVETA/PUBLIC/VTC/0150/2018	10
Vigetse Vocational Training Center	TVETA/PUBLIC/VTC/0089/2017	9

Source: Vihiga Sub-County Education Office

Appendix III: Total Number of Primary Schools and Teachers

Primary School	Teachers
BUSAMO FRIENDS	9
CHAMBALE	13
CHAMBITI	9
CHANDA ADC	9
CHANDOLO SALVATION ARMY	11
CHANDUGUNYI	10
CHANGO	13
CHANZEYWE	9
CHANZUVU	8
CHAVAVO	7
CHAVUGAMI	9
DOWN HOME	10
EMANDA	9
EMBAGA	8
ENANGA	9
FRIENDS PRIMARY SCHOOL GIVOGI	9
GAVALAGI	7
GILWADZI	9
HAMASANA	8
HAMBALE	9
IDAVAGA	6
IDELERI	9
IDUKU	11
IGAKALA	8
IHYAGALO	8
IKUMBA	7
INAVI	7
INDULU	8
INGIDI	9
INYANZA	9
ISAKU ADC	8
ITENGI	10
KEDOHI PIR	10
KEGENDIROVA	9
KEGOYE FRIENDS	8
KERONGO	9
KIDINYE	10
KIDUNDU	11
KIGADAHI	12

KISIENYA PRIMARY SCHOOL	8
KISINGILU	7
KITULU	8
KITUMBA	8
LUSAVASAVI	9
LWANGELLE	10
LYAMAGALE	10
LYAMIDI	8
MADIRA	9
MADZUGI	8
MADZUU	9
MAGAKA	8
MAGUI	10
MAHANGA	9
MALINDI ADC PRIMARY	10
MASANA	11
MATAGALU	8
MATSIGULU	9
MBIHI	9
MKOMBOZI	8
MOSES AKARANGA	9
MUHANDA	10
MUKULI	9
MUSUNGUTI	8
MWOKI	9
NAVUHI	9
*VALIANT JUNIOR SCHOOL	7
VIGETSE S A	7
VIGINA	10
VIHIGA	11
VISIRU	7
VUMALE	8
VUNANDI PRIMARY	7
WAMAGE	7
WOMULALU	9
*WOMULALU FRIENDS SPECIAL	6

Appendix IV: Introduction Letter to Head Teachers

Jesse Isiaho Ludenyo,Maseno University,

Department of Finance and Accounting,

P.O. Box 333-40105,

MASENO, KENYA.

The Principal,

………..…………….. Secondary school,

P.O. Box ……………………..

……………………………….

Dear Sir/ Madam,

RE: PERMISSION TO UNDERTAKE RESEARCH IN YOUR SCHOOL

I am a postgraduate student at Maseno University undertaking a Master of Science degree in Finance, Department of Finance and Accounting. I am carrying out research in public secondary schools in Vihiga Sub-County as a requirement to complete the course.

Your school has been selected for this study. Please allow me to carry out research in the school among your teachers between July and August 2018. This study is purely academic and therefore be assured that any information collected will be treated with utmost confidentiality; and will not be used anywhere else beyond this study.

Thank you in advance.
Yours faithfully,

Jesse Isiaho Ludenyo

Appendix V: Questionnaire for Secondary School Teachers in Vihiga Sub-County

I am a Msc. (Finance) student at Maseno University currently undertaking a study on the cognitive biases affecting investment decisions among teachers in Vihiga Sub-county. The purpose of this questionnaire is to gather information from you on the influence of some of these factors on your investment decision. The questionnaire is made up of three sections that should take only a moment of your time. Kindly fill in your responses by ticking in the appropriate box or against the preferred responses. Your name and that of your institution are not necessary. The information you provide will be treated in confidence and for research purpose only.

It is structured to measure your understanding of financial markets and your investment decision. **The Nairobi Securities Exchange (NSE) is the only stock market in Kenya** where all investors trade. The **Capital Markets Authority** is the regulator of all markets that raise capital/money in Kenya. These questions will circle around the **Nairobi Securities Exchange (NSE) and the Capital Markets Authority (CMA).** A Central Depository Settlement (CDS) is an account that enables you to trade shares.

Thank you.

Part I: Background Information.

    1. Indicate your gender:

Male	( )
Female	( )

    2. Indicate your age bracket

Below 40 years	( )
40-50 years	( )
Above 50 years	( )

    4. Indicate your Job Position in school.

Teacher	( )
Senior Teacher/School Principal	( )

    5. What is your average monthly income?

Below Kshs 30,000	( )
Kshs 30,000 – 50,000	( )
Kshs 50,000 – 60,000	( )
Above Kshs 60,000	( )

    6. Indicate your religion

Christianity	( )
Islam	( )
Other	( )

Investment Decision

    7. Have you invested in the Stock Market before?

Yes	( )
No	( )

PART II: Section 1 Financial literacy.

Please indicate your opinion on whether you **agree** with the following statements about your investment decision making; 1. Very small extent 2. Small extent 3. Moderate extent 4. Great extent 5. Very great extent

Investment Services access

	Statement	1	2	3	4	5
1	My bank or broker gives me information regarding investing opportunities including the stock market					
2	I have manipulated/know about the NSE or CMA website.					
3	I can or have bought shares online					
4	I know the minimum numbers of shares that can be bought					
5	I can apply for CDS account on my own					

Investment Knowledge awareness

	Statement	1	2	3	4	5
6	I have sufficient knowledge of personal finance and investment					
7	I have heard about shares investing through my bank branch					
8	I receive information on trading from media e.g tv (business news), printmedia e.t.c					
9	I can teach personal finance management skills					
10	In teacher training campus I attended classes on personal finance and investment					
11	T-Pad should include personal finance and investing in appraisal					

Section 2: Cognitive Dissonance.

Please indicate your opinion on whether you **agree** with the following statements about your investment decision making; 1. Very small extent 2. Small extent 3. Moderate extent 4. Great extent 5. Very great extent

Teacher Investment Perceptions

	Statement	1	2	3	4	5
12	Investing in stock market is either a scam or it is meant for the rich					
13	Returns in stock market take too much time I prefer faster returns					
14	Procedures for CDS account opening are so long					
15	I care about spending on my daily obligations more than investing for the future					
16	I believe that certain details about stock investments in Nairobi Securities Exchange are not available to me					

Teacher Risk averseness

	Statement	1	2	3	4	5
17	I think it is risky to invest in stock exchange					
18	I have once lost money trading in an account (e.g., forex, bitcoin, shares,)					
19	With sh.9000 I would bet on a winning team instead of buying shares in the stock market(gaming)					
20	When investing, I consider the return I get more than the risk					

Section 3: Herd-instinct Bias

Please indicate your opinion on whether you agree with the following statements about your investment decision making; 1. Very small extent 2. Small extent 3. Moderate extent 4. Great extent 5. Very great extent

Peer influence

	Statement	1	2	3	4	5
22	Our teachers sacco shares with us stock market investment information					
23	I have interacted with beneficiaries of stock investing					
24	Most of my colleagues/friends have other investments e.g., betting, real estate and so do I.					
25	Stock market investing is popular among teacher circles					

Family influence

	Statement	1	2	3	4	5
26	If I made profit investing in shares, I would disclose to my family					
27	My personal values guide my investments not my friends					
28	My family would have to consent before I buy shares					

THANK YOU FOR YOUR ASSISTANCE.

Appendix VI: Variables Operationalization

Variable	Operationalization	Indicator	Measurements
(Dependent Variable)	Teachers Individual Investmentdecision in the stock market	Invested Not Invested	Nominal Scale
Cognitive biases (Independent Variable)	Financial Literacy Bias	Access to investment knowledge and opportunities Awareness about investment	Ordinal Scale
	Cognitive Dissonance Bias	Perceptions Risk Averseness	Ordinal Scale
	Herd-Instinct Bias	Peer influence Family Influence	Ordinal Scale

Indicators	Construction	Scale
Access to investment knowledge and opportunities	Based on 5 questions	5-point Likert scale (FL A)
Awareness about investment	Based on 6 questions	5-point Likert scale (FL B)

Indicators	Construction	Scale
Perceptions	Based on 5 questions	5-point Likert scale (CD A)
Risk Averseness	Based on 4 questions	5-point Likert scale (CD B)

Indicators	Construction	Scale
Peer influence	Based on 6 questions	5-point Likert scale (HB A)
Family Influence	Based on 1 question	5-point Likert scale (HB B)

Table 1.1: Variable Definition

Variable	Type of Variable	Definition	Sources of Constructs		Tools of Analysis
Financial Literacy Bias FL	Independent	• Reflects how financially literate a teacher is in terms of investment services access and investment knowledge awareness. Measured from a scale of 1- low access/awareness to 5-high access/awareness	CMA 2017,2018,2019:74-90 Toor 2014: Literature Review Dakane:2013	Ordinal	Descriptive
Cognitive Dissonance Bias CD	Independent	• Reflects on whether there is negative perception about stock market investment in a teacher. Measured at 5- high level of negative perception. Risk averseness is also defined as the fear of taking risk by a teacher measured from 1-low risk averseness to 5- highly risk averse	Gumbo 2018: 13 Hoffman: 2009	Ordinal	Inferential
Herd-Instinct Bias HB	Independent	• Reflects on whether a teacher makes the decision to invest in the stock market based on influence from peers, family. 1 represents low likelihood of making the decision based on influence from these indicators, 5 represents high likelihood	Arya 2015: 3 Bikchandani 2000: MF Working Paper, 28	Ordinal	Inferential
Teachers' Individual Investment Decision	Dependent	• Reflects on teacher decision in the past, whether they have ever invested or not. It is dichotomous in nature with a binary outcome 1 = Invested; 0= Not invested		Nominal	Descriptive and Inferential

Effects of Cognitive Biases on Teacher Investment Decision in Vihiga Sub-county

Principal Investigator: Mr. Jesse Ludenyo- Maseno University

Co-Investigators: 1. Dr. Robert Kisavi Mule- Maseno University

2. Dr. Benjamin Owuor Ombok- Maseno University

Study Location: Vihiga Sub-County, Kenya.

Purpose of research: To establish effect of behavioral cognitive biases that influence teacher investment decision in stock market

DESCRIPTION OF RESEARCH

Mr. Jesse Ludenyo is conducting research on your investment decisions in the stock market and how you came about making those decisions. It will also factor in whether you have invested in the stock market or not. The ultimate goal is to establish teachers' investment decision patterns and therefore advice the Capital Markets Players on how to understand their clients better. You were selected randomly as a possible participant in this study because you are a teacher recognized by the Teachers Service Commission in Vihiga. You will only be required to answer or fill out a research questionnaire with three sections and a personal information section. If you agree to participate in this research;

You will be approached by the researcher who will have been given permission by your school principal. He will present the research questionnaire to you to fill.

You will be given two days to fill out the questionnaire after which the researcher will collect the instrument back.

No other activity will you be required to perform in participating with this research.

You may choose not to accept the questionnaire, not to answer any questions or may withdraw from the process at any time you wish.

The questionnaire shall entail three sections;

The personal information section. This section shall only take up your biographical data in terms of age, gender, income and position

Part A. This part shall ask questions about your financial literacy or knowledge in finance and investing. It shall have a maximum of seven questions.

Part B. This part shall ask questions relating to your accessibility of finance and investing services. It shall have a maximum of seven questions.

Part C. This part shall ask questions regarding your peer influences on your investment decision. It shall have a maximum of seven questions.

The raw data of these questionnaires will be stored in password protected computers and accessed by the Principal Investigator and the two Research Participants. The data will then be systematized and stored in the secure office of the Principal Investigator. The entire research project is anticipated to take two weeks and once necessary conclusions have been made from it all the collected documents shall be disposed off. In case of any changes made to the study project or should new information become available, you will be duly informed.

POTENTIAL DISCORMFORTS INCONVINIENCE, INJURY, HARM OR RISK

The researchers do not anticipate any potential injury physically or otherwise that may occur to you except that you may need at least half an hour to fill out the questionnaire which may inconvenience your time.

POTENTIAL BENEFITS

This project is designed to inform multiple stakeholders including academicians, stock market players such as the Capital Markets Authority, Nairobi Securities Exchange and stock brokers. The study participants may have access to findings and result through the Maseno University access library.

CONFIDENTIALITY

To maintain your anonymity as a participant, your name will not be asked by the questionnaire and neither will be your statutory requirements and personal identifiers such as identification number, huduma number or passport number.

PARTICIPATION

You may choose to participate in this study or not. If you choose not to participate in this study, kindly inform the principal researcher.

CONTACTS:

For any questions or concerns about this study or in the event of study-related injury or eventualities, please contact:

Mr. Jesse Ludenyo (+254)718187437   OR   Dr. Robert Kisavi Mule

P.O Box 233, Maragoli   (+254)720664885

INFORMED CONSENT FORM FOR ALL THE RESPONDENTS

Effect of Cognitive Biases on Individual Investment decision in Stock Market Among Teachers in Vihiga Sub-County, Kenya

Identification

Consent code………23………   Date: 5th January, 2021

I am a principal Investigator at Maseno University conducting a study to determine Effect of Cognitive Biases on Individual Investment decision in Stock Market Among Teachers in Vihiga Sub-County, Kenya. It is for academic purposes and the findings will also of help to the Capital Markets Authority, NSE and policy makers and other stake holders in their effort to improve laboratory occupational health and safety. If you accept to respond to our questions, any information you give to us will be kept confidential. The information you give to us together with the others we receive from other schools will not be identified as having come from you. Your participation is voluntary, and even if you decide to take part; you can withdraw your consent any time. If you agree to participate, then we will ask you a few questions.

Do you agree to participate in the study?

Yes | √ | No | |

I

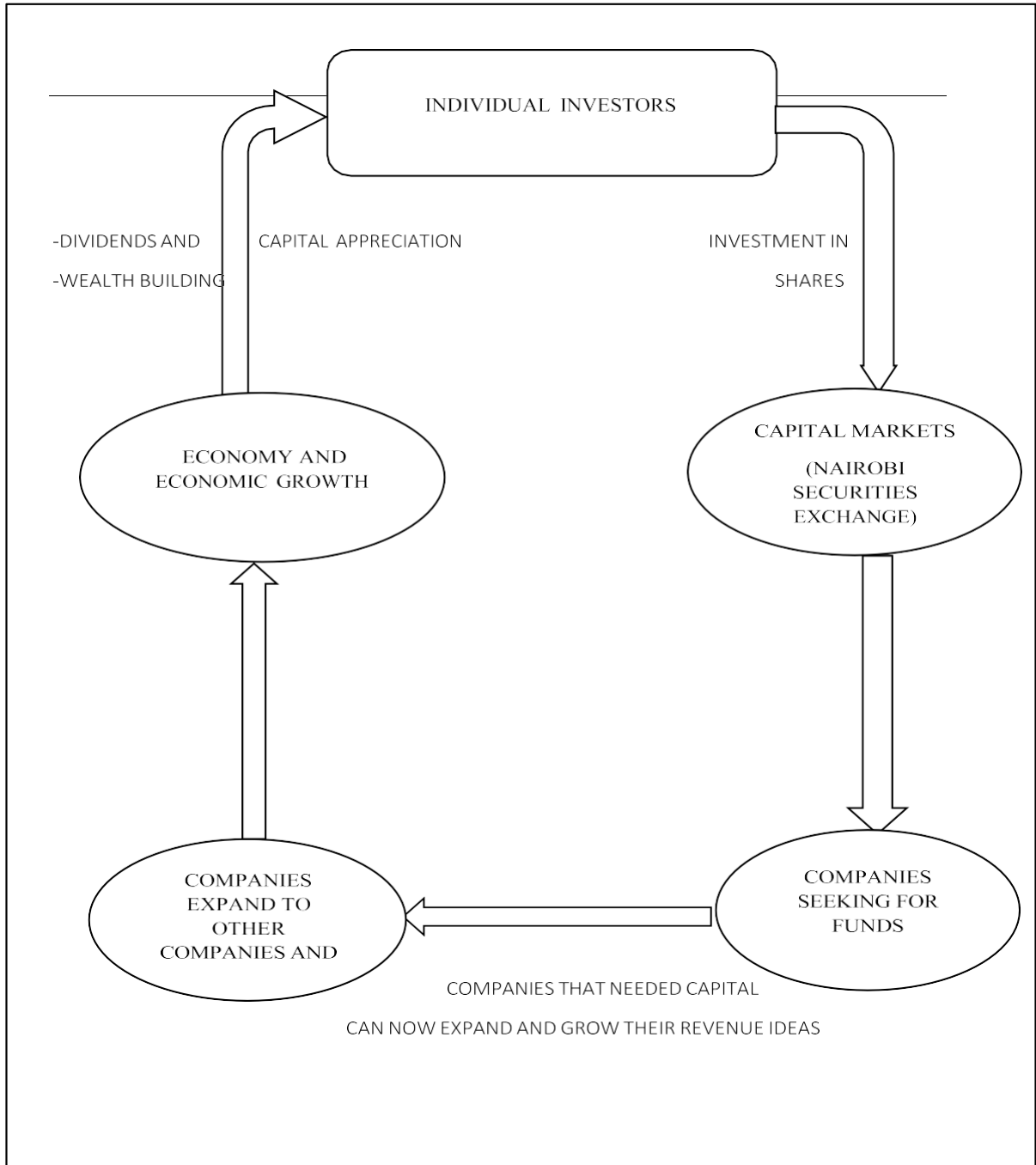(Sign) .... hereby give consent to be interviewed by the investigator. If you have any questions related to the study, you can contact the investigators;
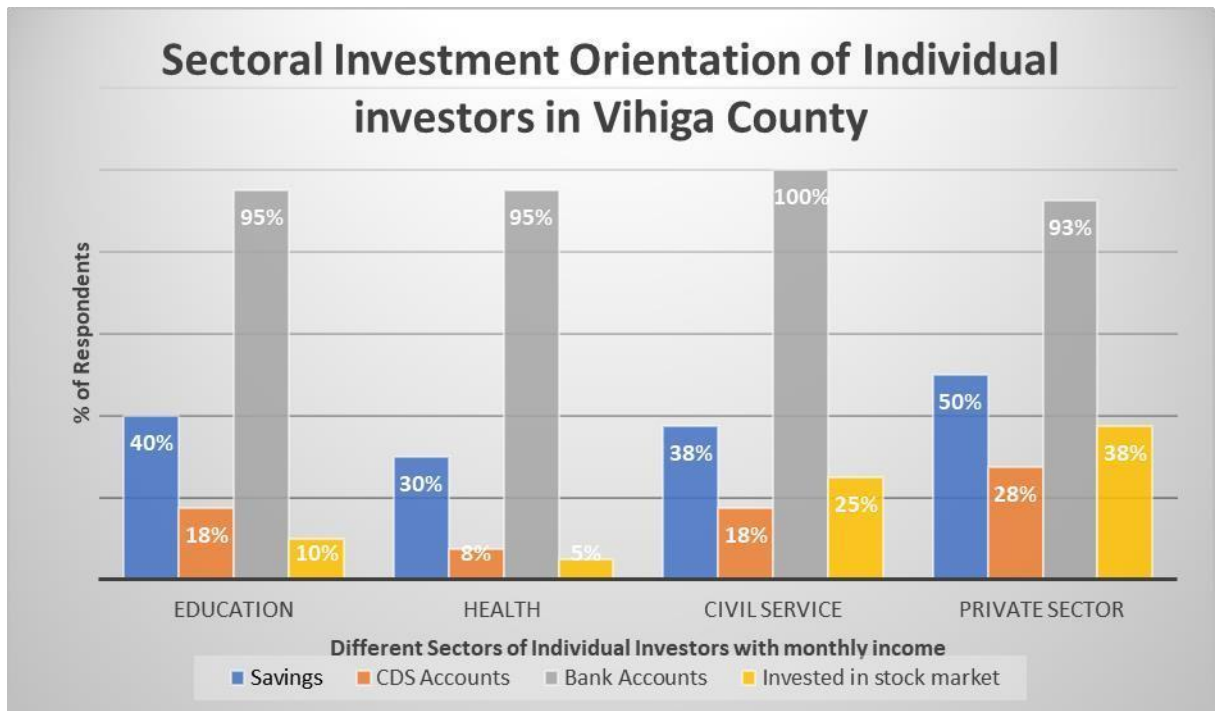
Jesse Ludenyo on mobile number: +254 - 718187437 or Dr Robert Mule on: +254 -722381214 or Prof James Ombaka of Maseno university on (+254)720664885, or the Maseno University Ethical Review on: 057 35 15 88.

Appendix IX: Operation of the Stock Market

OPERATIONS OF THE STOCK MARKET: VALUE OF INDIVIDUAL INVESTORS

INDIVIDUAL INVESTORS

-DIVIDENDS AND   CAPITAL APPRECIATION   INVESTMENT IN

-WEALTH BUILDING   SHARES

ECONOMY AND
ECONOMIC GROWTH

CAPITAL MARKETS
(NAIROBI
SECURITIES
EXCHANGE)

COMPANIES
EXPAND TO
OTHER
COMPANIES AND

COMPANIES
SEEKING FOR
FUNDS

COMPANIES THAT NEEDED CAPITAL

CAN NOW EXPAND AND GROW THEIR REVENUE IDEAS
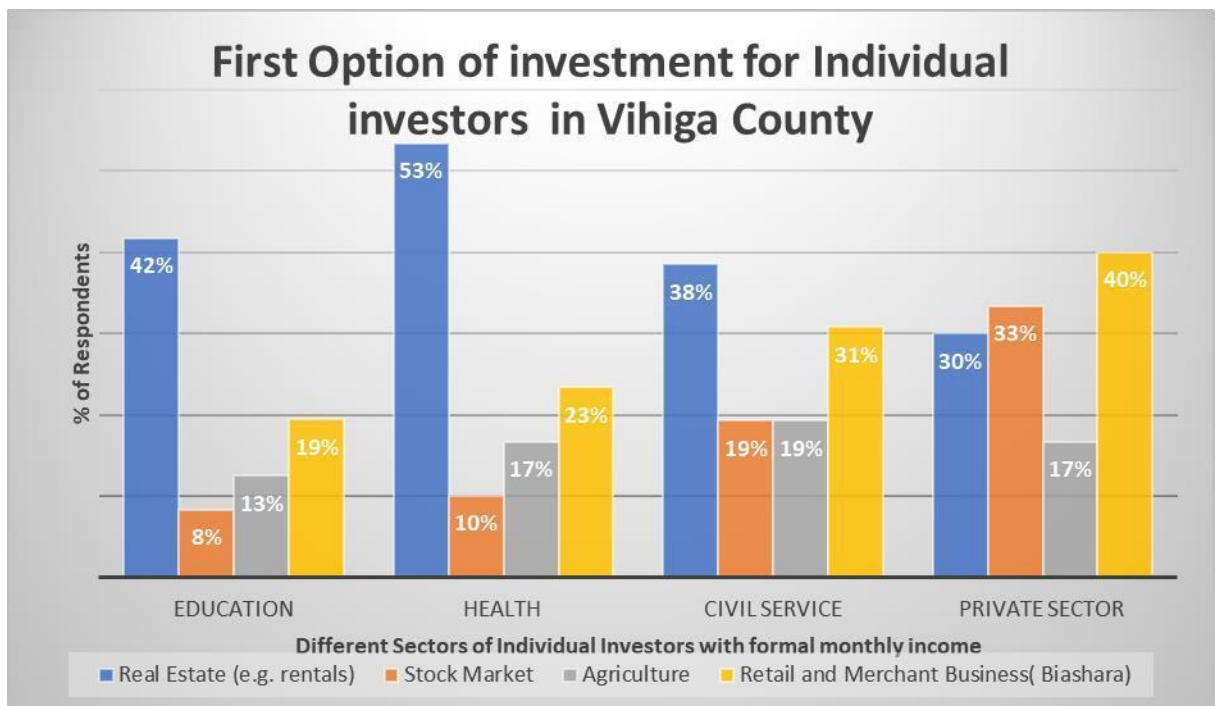
Study Survey of different individual investor groups accounts characteristics.
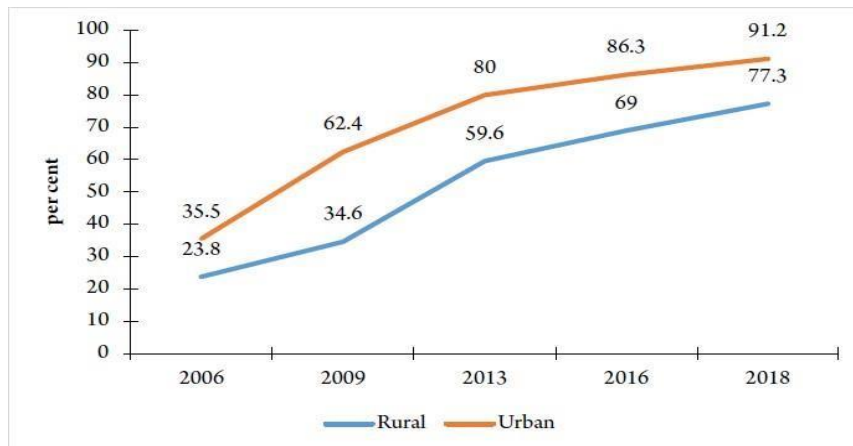
Source: Study Survey Feb 2019

Study Survey of different individual investor groups investment choices

Source: Study Survey Feb 2019

Access to formal financial services in Urban and Rural Populations in Kenya.

Source: CMA Annual Statistical Bulletin(2018- 2021)
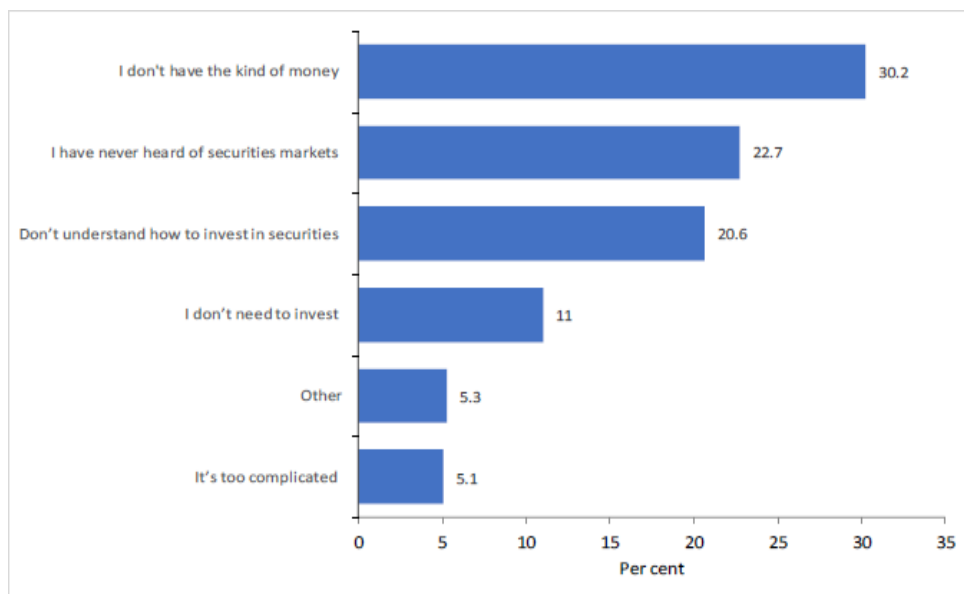
Reasons for not investing in Securities.

Source: CMA Annual Statistical Bulletin, Fin-Access Survey (2018-2021)

Technical Analysis on individual investors capital appreciation in NSE for period 2009-2021

Source: Nairobi Securities Exchange/investing.com

Appendix XII: Theoretical Differences

INVESTMENT IN STOCK MARKET

BEHAVIORAL FINANCE THEORY (Investors are Normal)

TRADITIONAL FINANCE THEORY (Investors are Rational)

COGNITIVE (PSYCHOLOGICAL) BIASES

GENERAL INFLUENCING FACTORS

HERD INSTINCT BIAS

COGNITIVE DISSONANCE

OVERCONFIDENCE BIAS

REGRET AVERSION BIAS

INFORMATIONAL

ECONOMICAL

PEER INFLUENCE

PERCEPTIONS

RISK SEEKING

FEAR OF LOSS

LATEST NEWS

CAPITAL/LACK OF FUNDS

Focuses on Individual Investment decision (Both investing &non-investing)

Focuses on Group Investment Participation(OnlyParticipating)

MASENO UNIVERSITY ETHICS REVIEW COMMITTEE

Tel: +254 057 351 622   Ext: 3050
Fax: +254 057 351 221

Private Bag – 40105, Maseno, Kenya
Email: muerc-secretariate@maseno.ac.ke

REF: MSU/DRPI/ MUERC/00842/20   Date: 7th September, 2020

TO: Jesse Isiaho Ludenyo
      PG/MSC/BE/00130/2016
      Department of Accounting and Finance
      School of Business and Economics
      P. O. Box, Private Bag, Maseno, Kenya

Dear Sir,

RE: Effects of Cognitive Biases on Teacher Investment Decision in Vihiga Sub, Kenya
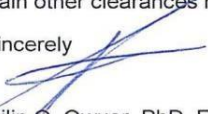
This is to inform you that **Maseno University Ethics Review Committee (MUERC)** has reviewed and approved your above research proposal. Your application approval number is MUERC/00842/20.The approval period is 7th September, 2020 – 6th September, 2021.

This approval is subject to compliance with the following requirements;

  i.   Only approved documents including (informed consents, study instruments, MTA) will be used.
  ii.   All changes including (amendments, deviations, and violations) are submitted for review and approval by Maseno University Ethics Review Committee (MUERC).
  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 Maseno University Ethics Review Committee (MUERC) within 24 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 Maseno University Ethics Review Committee (MUERC) within 24 hours.
  v.   Clearance for 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 expiry of the approval period. Attach a comprehensive progress report to support the renewal.
  vii. Submission of an executive summary report within 90 days upon completion of the study to Maseno University Ethics Review Committee (MUERC).

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely

Prof. Philip O. Owuor, PhD, FAAS, FKNAS
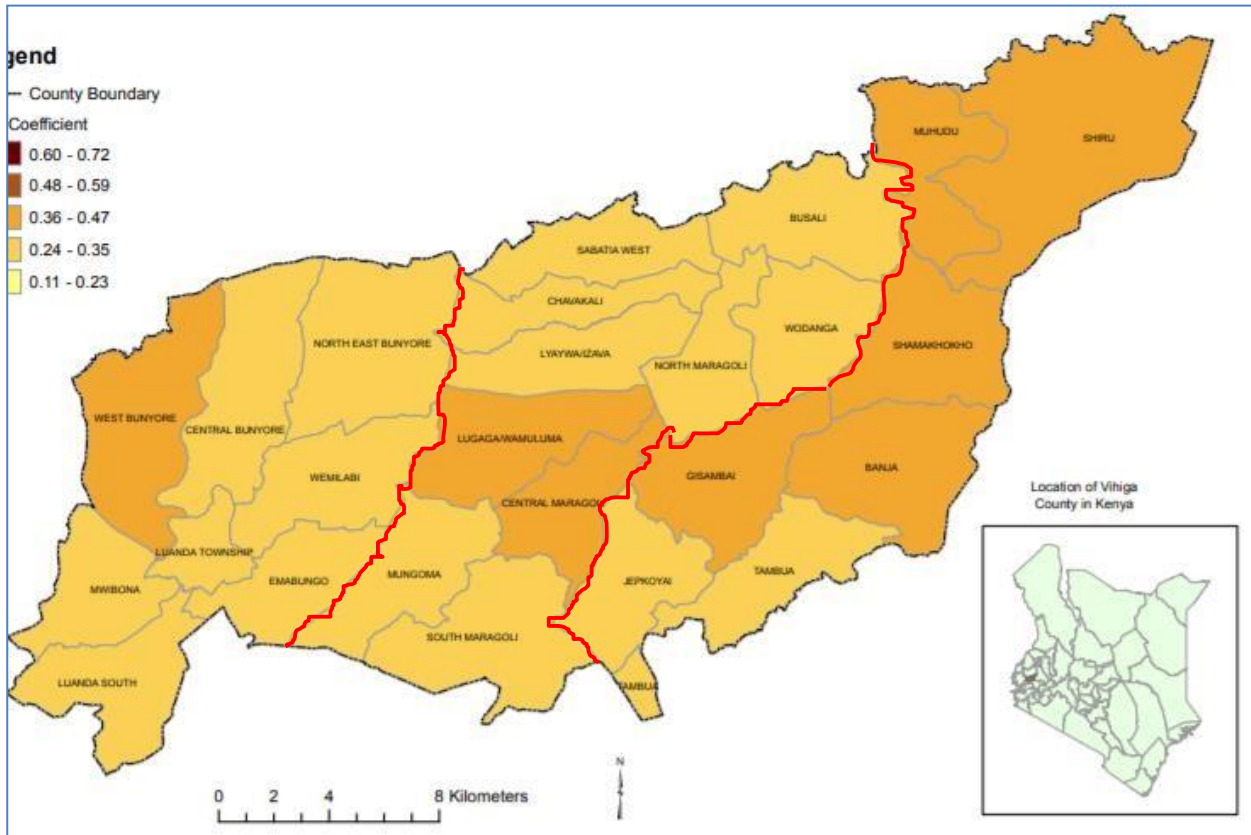**Chairman, MUERC**

MASENO UNIVERSITY IS ISO 9001:2008 CERTIFIED

Appendix XIV: SAMPLE DATASET

Q_1	Q_2	Q_3	Q_4	Q_5	Median	Q_6	Q_7	Q_8	Q_9	Q_10
5	5	5	5	5	**5**	2	2	1	1	1
1	2	3	4	5	**3**	3	3	4	4	4
1	2	1	4	2	**2**	3	3	1	2	1
5	1	3	2	4	**3**	3	3	1	2	1
1	2	1	4	2	**2**	3	3	1	2	1
5	1	3	2	4	**3**	2	2	1	1	1
1	2	1	4	2	**2**	3	3	1	2	1
1	2	1	4	2	**2**	2	2	1	1	1
5	1	3	2	4	**3**	5	5	5	5	4
3	3	1	2	1	**2**	2	2	1	1	1
3	3	1	2	1	**2**	3	3	1	2	1
3	3	1	2	1	**2**	2	2	1	1	1
3	3	1	2	1	**2**	3	3	1	2	1
1	2	1	4	2	**2**	3	3	4	4	4
1	2	1	4	2	**2**	2	2	1	1	1
1	2	1	4	2	**2**	2	2	1	1	1
1	2	1	2	1	**1**	3	3	1	2	1
2	2	1	1	1	**1**	2	2	1	1	1
3	3	1	2	1	**2**	3	3	1	2	1
2	2	1	1	1	**1**	2	1	1	1	1
3	3	1	2	1	**2**	2	2	1	1	1
5	1	3	2	4	**3**	2	2	1	1	1
2	2	1	1	1	**1**	2	1	1	1	1
2	2	1	1	1	**1**	5	5	5	5	4
1	2	1	2	1	**1**	2	1	1	1	1
2	2	1	1	1	**1**	2	2	1	1	1
1	2	1	2	1	**1**	2	2	1	1	1
2	2	1	1	1	**1**	2	1	1	1	1
3	3	1	2	1	**2**	3	3	1	2	1
2	2	1	1	1	**1**	2	2	1	1	1

Database

Investment Decision		Age	Gender	Respondent Income	Religion	Q_1	Q_2
Yes	1	Below 45	Male	Below ksh 30,000	Christian	Very great extent	Very great extent
No	2	Below 45	Male	Below ksh 30,000	Other	Very small extent	Small extent
No	3	Below 45	Female	Below ksh 30,000	Christian	Very small extent	Small extent
No	4	Below 45	Male	30,000- 50,000	Christian	Very great extent	Very small extent
No	5	Below 45	Female	30,000- 50,000	Christian	Very small extent	Small extent
No	6	Above 45	Female	50,000 & above	Christian	Very great extent	Very small extent
No	7	Below 45	Male	30,000- 50,000	Christian	Very small extent	Small extent
No	8	Below 45	Female	Below ksh 30,000	Christian	Very small extent	Small extent
Yes	9	Below 45	Male	50,000 & above	Christian	Very great extent	Very small extent
No	10	Below 45	Male	30,000- 50,000	Christian	Moderate extent	Moderate extent
No	11	Below 45	Male	Below ksh 30,000	Christian	Moderate extent	Moderate extent
No	12	Below 45	Female	Below ksh 30,000	Other	Moderate extent	Moderate extent
No	13	Below 45	Female	Below ksh 30,000	Christian	Moderate extent	Moderate extent
No	14	Above 45	Male	Below ksh 30,000	Christian	Very small extent	Small extent
No	15	Above 45	Female	Below ksh 30,000	Christian	Very small extent	Small extent
No	16	Below 45	Male	30,000- 50,000	Christian	Very small extent	Small extent
No	17	Below 45	Female	Below ksh 30,000	Christian	Very small extent	Small extent
No	18	Below 45	Female	50,000 & above	Christian	Small extent	Small extent
No	19	Above 45	Male	Below ksh 30,000	Christian	Moderate extent	Moderate extent
No	20	Below 45	Female	50,000 & above	Christian	Small extent	Small extent
No	21	Below 45	Female	Below ksh 30,000	Christian	Moderate extent	Moderate extent
Yes	22	Below 45	Male	50,000 & above	Christian	Very great extent	Very small extent
No	23	Below 45	Female	Below ksh 30,000	Christian	Small extent	Small extent

Appendix XV: Sample Study Area Map

Source: Vihiga Sub- County Education Office