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Wealth Guardians: Navigating Behavioral Biases In Investing

Samra Hassan[1]
MS Finance Scholar
Sadeema Nazir[2]
MS Finance Scholar
Ibrar Hassan Khan[3]
M.Phil. Scholar
Ms. Maliha Baig[4]
Assistant Professor, Bahria Business School, Bahria University E-8 Campus, Islamabad

ABSTRACT

Purpose: The paper highlights the major gap in the prevailing studies on behavioral biases. We aim to highlight the biases that investors need to consider, whether consciously or unconsciously when making any investment decisions. The main objective/ goal is to offer a thorough understanding of the core behavioural elements affecting the individual investor's decision-making. **Design/methodology/approac**h: A questionnaire was distributed to 100 individual investors of PSX to gather data. The data is analysed by using Statistical Package for Social Sciences (SPSS). **Findings:** The findings of our study highlight that there is a significant and positive correlation between Behavioural Biases and Individual investor investment decision-making. This study also provides information related to the influence of Behavioral Biases on the investment decision-making of investors participating in the Pakistan Stock Exchange (PSX). Our study interposes to the literature by showing the significant affiliation between Behavioral Biases and Investment decision-making. **Research limitations/implications:** This paper focuses on individuals' behavioral biases in investing decision-making who believe their behavioral biases influence their investing decisions positively. While the analysis and discussion in this study raise several issues for further exploration, there are

avenues for future research. **Originality/value:** To the best knowledge of the authors', this paper is the first to examine a combination of three different Behavioral biases involved in decisions of investment while using Risk Propensity as a mediator and moderating variable of Financial Literacy. This study will be useful to academicians, researchers and individuals in the field of behavioral finance in understanding the influence of behavioral biases on investment decisions.

Keywords: Behavioral biases, confirmation bias, loss aversion bias, overconfidence bias, Prospect theory, Rationality & Bounded Rationality Theory, Structured Equation Modelling, Statistical Package for Social Sciences.

Introduction

The stock market is precious for investors because it creates opportunities for wealth creation. The smooth-running stock markets contribute significantly to organizing investments and savings and also organizing for the production of goods and services that lead to the creation of career opportunities. This eventually contributes to the whole country's economic expansion. Long-run investors contribute their wealth to enhancing the economy's productive competency. Investors individually have a significant part in the financial markets because they prefer firms' stocks regarding the risks, liquidity, returns and other non-financial measures.

The individual investor's equanimity in the financial marketplace has been questioned in past periods, and Investors are undergoing a major transformation, being shaped by rational and psychological biases. Two major factors can describe this development: recent evidence showing psychological bias affects the market participant's behaviour and drawback of the logical investment frameworks in describing the trading activity and performance of the stock market (Daniel & Hirshleifer, 2015). Hence there is an increasing acknowledgement of the prominence of behavioral finance literature and its supremacy in the field. According to (Kapoor & Prosad, 2017), Behavioural finance assists in explaining the emotional basis for investment decisions and the psychological repercussions on financial markets, and (Gomez Martinez, Paule-Vianez & Prado- Roman, 2020) highlighted that this perspective can sort out the complexities inherent in a traditional conventional paradigm marked by conflicting feasible choices. Utilizing this feature can help to explain the reasons behind the specific choice of investment. This paper studies the

effect of behavioral biases, such as loss aversion, overconfidence bias, and individual investor confirmation bias.

Daniel Kahneman, the pioneer known as the father of behavioral finance, was presented a Nobel Prize for his innovative work on prospect theory. Other key figures in this field include Richard Thaler and Amos Tversky, who identified behavioral biases as the core element of finance behaviour. It includes biases as, anchoring, herding, overconfidence, and more, highlight discrepancies between behavioral finance and traditional finance (Thaler, 1988 & Singh, 2016). This study thoroughly examines how behavioral biases impacts personal investment decision-making (Spence, Eshraghi & Taffler, 2017).

Investment decision involves the strategic allocation of funds across a spectrum of Assets ranging from low-risk options like deposits and savings to highly risk ventures such as gold and real estate or stocks as emphasized by (Odean & Barber, 2001; Siegrist & Keller, 2006). An investment decision extends beyond rational considerations, including psychological elements that affect financial behavior. Investment decisions frequently involve allocating funds or resources for a specified duration to obtain future benefits. Investments involve putting money or funds in different types of assets, such as financial and real assets (Kane, Bodie, & Marcus, 2019).

According to past literature, FL has been considered as the important attributes affecting the individual's financial decision-making ability (Anis and Mouna, 2017; Spataro and Thomas, 2018), and there is significant evidence expressing deficiencies in financial literacy contribute to a state of inertia and results in not optimal decision-making within the domain of personal finance. Lyons study of 2007 observed that financial knowledge helps in improving financial behaviour. Similarly, Shumway and Kimball (2006) identified a significant relationship between investors' level of sophistication and the increased engagement in engagement in the stock market, similarly a greater portion of their wealth allocated to stocks. Additionally, stock market participation can be predicted by the measures of FL, such as numerical measures (Christelis et al., 2011). Based on (Mitchell and Lusardi, 2006) study financially illiterate individuals accumulate assets, often neglect retirement planning, and are more focused on obtaining funds on high-interest-based loans (Moore, 2004).

If an investor is financially literate, they'll be better equipped to make informed decisions to assess the investment risk and will have the aptitude to process it better.

Prospect theory provides a structure that investors use in their investment decisions, especially when faced with uncertain situations. (Kahneman, 1979) developed this concept. The theory of Prospect is alienated into two parts, firstly in the decision-making processes that involve modification and structuring, and the second one in the result evaluation process. Outcomes are evaluated concerning gains or losses. Investors differ in their attitudes towards gains and losses. Loss aversion is a critical aspect to consider in this context, as it concerns the psychological phenomenon wherein persons tend to experience the impact of losses more severely than that of gains. Therefore, this theory includes three biases: mental accounting, Regret aversion, and Loss aversion. Based on this theory, the researcher opted to investigate the impact of Loss aversion bias on individual investors decision-making process and their performance within the Pakistani stock markets.

Contextual Analysis and GAP Analysis

In the last few decades, Pakistan has been gaining power as an emerging economy, as proposed (Ali, 2018). The Pakistan Stock Exchange (PSX), has boasted a market of around $50 billion capitalization and comprising 546 listed companies, is increasingly enhancing a significant driver of economic improvement (Henricks, 2021). Numerous searches persistently strive to uncover diverse factors affecting investment decisions, performance, and investor contentment. For instance, (Mohd-Rashid, Mehmood, Ong, and Che-Yahya 2020) identify the factors shaping investors' perceptions.

Initial Public Offering valuation, while (Marghoob and Javed, 2017) and (Naz, Khan, Ghafoor, and Qureshi, 2017) investigate the impression of market dynamics, prospect evaluation, anchoring, and behavioral influences on investment decisions. Additionally, (Saeed, Ramzan, and Mumtaz, 2018) examine the effects of heuristics, risk aversion, financial techniques, daily experiences, and corporate governance on investment choices, whereas Shah et al. (2018) explore the impact of heuristics on investment decisions. Despite the burgeoning interest in these areas, the impact of overconfidence bias on investment performance through risk propensity remains relatively underexplored, despite calls from the academic community to probe these factors (Bouteska & Regaieg, 2018; Combrink & Lew, 2020; Trejos et al., 2019).

Therefore, this study seeks to bridge this gap by investigating the variables amongst the individual stock market investors in PSX.

Problem Statement of the Study

The stock market will grow as the economy grows and vice versa as the direct link between the economy and stock market. To determine the trends of the stock market, the investor's investment decision-making accompanied in a stock market by its investment performance plays a significant role which ultimately creates an impact on a country's economy. The detailed investigation of behavioral factors is crucial for recognizing and providing a relevant explanation for investors' decisions, as these factors affect investors' decision-making in Pakistan's stock exchanges. Furthermore, this study aims to identify the impact of these reasons on investment performance, providing investors with valuable insight into the typical behaviours of individual investors. Understanding these behaviours will help investors justify their responses, ultimately striving for improved outcomes.

Research Questions

From the theoretical background, the following research questions arose:

1. To what degree do investors demonstrate the overconfidence bias?
2. To what degree do investors demonstrate the loss aversion bias?
3. To what degree do investors demonstrate confirmation bias?
4. Do investors tend to pursue risk?
5. How much does each factor influence investment decision-making?
6. Does risk propensity mediate the connection between behavioral biases and investment decision-making?
7. Does this financial literacy level have any substantial consequence on the investor's investment decisions?

Research Objectives

The following are the objectives of our study:

1. The main objective/ goal is to offer a thorough understanding of the core behavioral elements affecting the individual investor's decision-making.
2. We aim to highlight the biases that investors need to consider, whether consciously or unconsciously when making any investment decisions.

3. This study will examine existing literature that has investigated single or multiple biases in their research endeavour's.

Significance of the Study

Pakistan as a developing economy exhibits diverse traditions and numerous cultural attributes found in other Asian nations. Our research aims to provide a summary of the situation of behavioural finance in the scenario of Pakistan. The implication of this study lies in providing individual investors with insights into the trends and behaviour surrounding stock investments. This study is conducted to offer valuable information and practical applications of behavioural finance concepts within stock markets. Additionally, it underscores that actors in financial markets often diverge from rational decision- making processes, acknowledging the constraints and limitations inherent in their choices.

Literature Review

One of the branches of Finance is Behavioural finance which looks at how people's emotions and psychology influence their money decisions. This branch suggests how information is presented and how the characteristics of people in the market can affect investment choices and outcomes. Investing is when you put money or assets into something to make a profit or increase the value of your investment over time. In finance, making choices about where to invest is crucial, as it directly impacts the value of a company. The theory assumes that individuals usually make rational decisions, but behavioral finance acknowledges that emotional and psychological factors can also play a critical role in these choices.

The field of behavioral finance has examined how psychology affects investor decision-making in a variety of contexts. Prospectus theory was originally established by two psychologists, Kahneman and Tversky (1979), who are considered important contributors to the field of behavioral finance according to Zahera and Bansal (2018). They explained that expected profits and losses are the basis for investor decision-making rather than actual results. Furthermore, prospect theory as per Daniel and Tversky, explains the purpose of decision-making in a situation that centers on an uncertain outcome.

As a substitute for rational expectations theory, the theory of expected utility, the theory of efficient market hypothesis, and the prospect theory have gained

popularity (Bansal and Zahera, 2018). As a financial theorist, Thaler (1980) claimed that people frequently make poor investment decisions and don't consistently behave in a rational manner. He also established theories on the application of prospect theory to the financial market.

Cognitive theory focuses on how investment choices are influenced by people's thoughts and mental processes. The theory suggests that prior experiences, emotions, and beliefs all play a role in the investor's decisions. By highlighting the behavioral finance perspective on decision bias, (Ul Abdin, 2022) contributes to the literature of cognitive theory. The impact of cognitive ability in describing stock market participation has been documented in previous studies. (Cheng et al., 2019) extends the foundation of cognitive theory by exploring specific behavioral components associated with investing performance. These components include, but are not restricted to, wealth disparity, personal values, financial awareness, financial literacy, and financial knowledge.

Rational decision-making is a thought process through which desired results are achieved. Research conducted by (Kumar, 2016) highlights rational choice theory, which states that investors typically examine different options in different situations before deciding. To achieve complete rationality, individuals require unlimited cognitive abilities. Due to diverse human nature and the limitations of limited cognitive abilities, individuals are unable to consistently exhibit fully rational decision-making behavior. As a result, Simon (1956) developed the novel idea of bounded rationality, which holds that people's decisions deviate from rationality due to limited information and memory lapses.

Bounded rationality provides a more accurate representation of how people make decisions. (Jariwala, 2015) clarified that the theories of behavioral economics and finance raise doubt on the concept of perfect rationality by arguing that people frequently make irrational decisions.

Furthermore, they clarified that there is no universally rational outcome for financial decisions since rationality is context-dependent and directed towards individual and collective interests. Making a decision means weighing all possibilities and selecting the best one.

Loss Aversion Bias and Investment Decision-Making

The loss aversion postulation was introduced by two famous psychologists Amos Tversky and Daniel Kahneman in 1979. According to them, people feel loss-pain more strongly over the satisfaction from gain, which is known as the prospect theory. Loss-averse investors are more focused on protecting their capital and avoiding losses than on growing their investments or making a profit. Loss aversion means that individuals are more susceptible to a capital decline than an increase (prospect theory). Loss-avoiding behavior remains consistent across different investment choices and is not easily influenced by small investments or changes in the environment (Rabin, 2000). People often focus more on losses and profits because they underestimate their quick adaptation to changes (Rabin & Koszegi, 2006). Cultural values also play a role in influencing cognitive biases; for example, females are often more loss-averse than males in Pakistan, as per the study of (Tahira Hassan, Wajiha, Khalid & Habib, 2014).

Certain demographic factors, like age and employment status, also contribute to loss aversion. Older and unemployed individuals often more risk-averse in financial decisions as compared to employed and younger individuals. It involves being more sensitive to potential losses than gains and usually evaluating consequences.

Confirmation Bias and Investment Decision-Making

Confirmation bias means the possibility of favouring information that confirms our existing beliefs while disregarding anything that denies them. It's like convincing ourselves of what we want to believe. This bias makes us give more importance to information that supports our views and downplay evidence that goes against them (Pompian 2012). It's a common phenomenon in psychology, economics, and scientific practices, where individuals tend to ignore information that doesn't fit their preconceived notions (Alahverdian and Galstyan 2014).

According to Schwind et al. (2012), Festinger's Dissonance Theory helps explain why confirmation bias occurs. Most of the time people feel uneasy when faced with information that goes against what they believe, and this discomfort leads them to either avoid or downplay the importance of information. This discomfort is known as cognitive dissonance. Confirmation bias operates in two ways: through selective research for information that aligns with existing beliefs and through biased

interpretation of information to reinforce those beliefs (Allahverdyan and Galstyan 2014). Investors, induced by confirmation bias, give preference to their investment beliefs and avoid information that presents alternative views.

Overconfidence Bias and Investment Decision-Making

People who overestimate their talents, skills, and intellect are said to exhibit overconfidence bias. According to (Glaser and Weber, 2010; Campbell, Goodie, and Foster, 2004), people have a psychological propensity to overestimate the likelihood of certain events. People with overconfidence bias often think that they are smarter and more intelligent than they are. So, there is a gap between perceived knowledge and what they actually know as per Dobelli (2014).

For instance, when an investor has experienced recent success, they may mistakenly believe it's a sign of genuine skill rather than possibly being due to luck. This can lead to overconfidence, causing the investor to take more risks and make potentially unwise trading decisions. Decision-making may be greatly impacted by overconfidence bias as it can cause people to act in ways that are not always justified and may affect their views on their expertise and skills.

According to Odean (1999), overestimating one’s stock knowledge and analytical accuracy can lead to overconfidence. It is also defined as a failure to identify one’s intellectual limitations as per Russo and Schoemaker, (1992). (Odean, 2002) reports that overconfident traders generate worse returns than those traders with well-diversified assets. This was the result of insufficiently diversified portfolio formation and overtraded portfolios.

Risk Propensity, Loss Aversion, and Investment Decision-Making

Loss aversion is a phenomenon in which deviations from reference points are interpreted differently based on whether they are losses or gains. It emphasizes that people are more affected by losses as compared to gains. Nicolau JL, 2008 states that a loss has a larger overall effect on demand than a gain of the same size. According to Thaler et al. (1990), loss aversion emphasizes people's propensity to react more strongly to drops in wealth than to rises in it.

Traditional finance theories have placed a strong emphasis on the idea of investor rationality, which holds that judgments made by investors are rational because they are based on accurate information, facts, and understanding of the field

of finance. Contrary, behavioral finance questions the rationality of decision-making by arguing that human nature is irrational and affected by customs, beliefs, and norms. Psychological biases, as identified by (Froot and Dabora, 1999), contribute to varying prices for identical shares and securities, reflecting diverse human natures and emotional influences on decision-making. The research conducted by Nikiforov on fund managers highlights the fact that despite intensive training, human emotions still influence decision-making.

Risk Propensity, Confirmation Bias, and Investment Decision-Making

As per Devlin and Billings (2018), confirmation bias occurs when investors hold onto information that strengthens their prior convictions instead of taking new information into account. It's a mental mistake where investors interpret information in a way that confirms what they already think and ignore information that challenges their beliefs (Shefrin, 2007a). The existence of confirmation bias in business behaviour was shown by Bogan and Just's (2008) study, which had 2,333 participants and revealed that senior leadership was less responsive to recent and updated information than non- executives.

Influence of confirmation bias on investors' financial decisions was also investigated by Bashir et al. (2013), who found that it did influence their decisions. Likewise, Onsomu (2014) researched behavioral biases amongst investors in the Securities Exchange of Nairobi and found that confirmation bias affected investor's investing choices.

Risk Propensity, Overconfidence Bias, and Investment Decision-Making

A behavioral bias known as overconfidence occurs when investors overestimate their expertise and engage in unjustified risk-taking. Overconfident investors see risks favourably and are more likely to take a riskier strategy when making investing decisions, according to Parveen et al. (2020). The study highlights how biases like mental accounting, herd behavior, and anchoring intensely affect investors' choices.

The emotional and psychological sides of investors' actions were researched by Wattanasan et al. (2020), with particular emphasis on biases such as availability, risk-taking, herding, conservatism, and overconfidence. They uncovered that the psychology of investors was significantly impacted by factors like tax reduction, appreciation, and income production. The influence of behavioral finance, principally

overconfidence, on stock investing selections on the Amman Stock Exchange was investigated by Areiqat et al. (2019). According to the study, those individuals who are overconfident in their skills hesitantly seek out riskier investments.

Financial Literacy, Loss Aversion, and Investment Decision-Making

To fully understand investors' behaviour, it is necessary to investigate behavioral biases and financial literacy. (Anood Bin Kalli, and Al–Tamimi, 2009) says that those researchers who are studying behavioral finance are becoming more interested in determining how financial literacy impacts the investment decisions made by individual investors. Empirical research indicates that financial literacy and behavioral biases significantly influence investor's behaviour. Financial literacy is not a moderating variable between investors' investing decisions and behavioral biases, nor has the relationship between these two ideas been well investigated.

As a result, we recognize that prior studies either failed to fully examine moderating variables or should have ignored their potential relevance in the light of the literature review. (Bucher-Koenen and Ziegelmeyer, 2011; Anood Bin Kalli and Al–Tamimi, 2009) studies on financial literacy have considered how it affects investing decisions and financial performance. To investigate discrepancy, we looked at this variable as a moderator of the connection between investors' investing decisions and loss aversion bias. Several studies have shown that understanding finance alters people's attitudes about investing. Risk perceptions varied between individuals with greater financial literacy and those with less, as revealed by Diacon (2004). Knowledge-related measures and risk-related measures showed strong correlations, according to Wang et al. (2011).

Previous studies demonstrated the favourable effect of financial literacy on wealth accrual (Rooij Van et al., 2012), post-retirement readiness (Mitchell and Lusardi, 2007), diversification of portfolio (Jappelli and Guiso, 2008), and increased stock participation (Rooij Van et al., 2007). (Aren and Aydemir, 2014b) claims that these studies appear to overlook additional individual/attitudinal aspects, although concentrating on financial literacy, demographics, and socioeconomic characteristics.

Financial Literacy, Confirmation Bias, and Investment Decision-Making

Regarding the interaction between the decision process of individual investors and confirmation bias, financial literacy plays a pivotal role as a moderator. The term

"financial literacy" explains the understanding of financial ideas, products, and techniques required to make informed decisions viewing one's own money and investments. Individuals with greater financial literacy may be better able to identify confirmation bias and lessen its impact on their investing choices.

Following the study of Mitchell and Lusardi (2014), financially literate people are more likely to resist confirmation bias and as an alternative make decisions based on critical evaluation of information, objective analysis, and attention to the wider range of factors. As a result, financial literacy functions as a shield against the negative effect of confirmation bias on investing decisions. The financially educated investors are more likely to consider other perspectives before making investing decisions and are more skilled at distinguishing when they are thoughtfully seeking out information that confirms their beliefs. Financial literacy can help lessen the negative impacts of confirmation bias and boost more logical and informed investing behaviour by equipping people with the right abilities and information to manage the intricacies of the financial markets (Lusardi & Mitchell, 2014).

Financial Literacy, Overconfidence Bias, and Investment Decision-Making

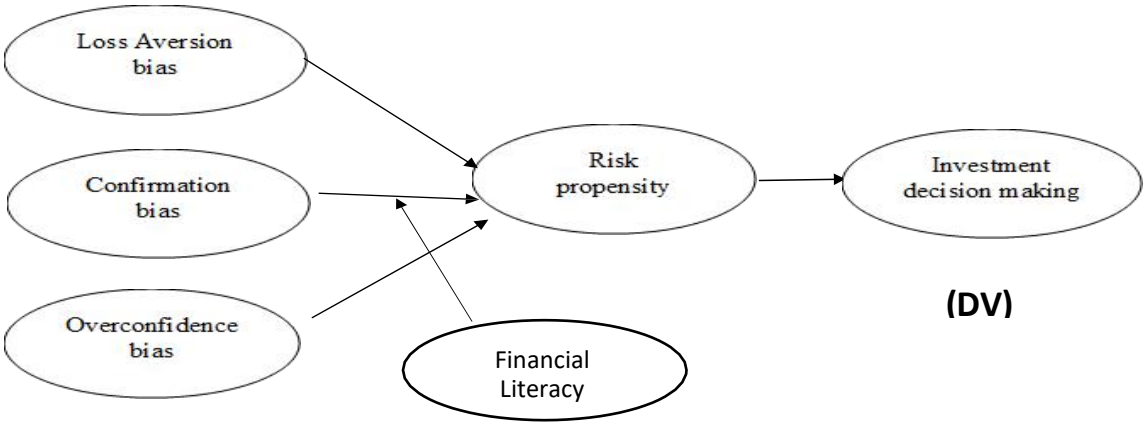
Financial literacy is also linked to overconfidence. It is expected that sophisticated investors are anticipated to behave differently than naive investors due to their higher level of financial literacy, education, and rationality. Sophistication and financial literacy are positively correlated according to Kimball and Shumway (2010). Based on data from Dutch households, Rooij van et al. (2011) demonstrate a direct connection between stock market involvement and basic & self-evaluated financial literacy. In the survey review of transaction records for German brokers' clients from 1995-2000, Sengmuller and Dorn (2009) discovered that lopsided trading happens for enjoyment to explain investors' behaviours, research on other variables such as risk perception, financial literacy, investor sentiments, and peer influence is being conducted. A higher association between diversification and financial literacy is shown by Jappelli and Guiso (2008). According to Rooij van et al. (2011), better education boosts stock market involvement, while limited financial literacy makes investors less inclined to buy stocks.

Financial literacy has a stronger stimulus on purchase behavior, or herding, which is subsequently a propensity towards debt, according to Potrich & Vieira,

(2018). Conversely, financial literacy ...shows an inverse relationship with herding bias and the disposition effect (Baker et al., 2019). Overconfidence bias is unrelated to financial literacy as per Dhar and Zhu (2006). Drawing from the existing research, we attempt to investigate how financial literacy has a moderating influence on investment decision-making and overconfidence bias.

Theoretical Framework & Hypotheses

This theoretical framework was ripened through a comprehensive review of the literature and consists of three phases. The first phase included three independent variables (Confirmation bias, Loss aversion bias, and Overconfidence bias) and one dependent variable (Investment decision-making). In the second phase the mediating variable i.e., Risk Propensity will be investigated with the independent and dependent variable. The third phase is based on moderator i.e., Financial Literacy. In this phase, role of Financial Literacy in the relationship of moderation between independent variables and Dependent variable will be studied. So, nine hypotheses in this model lead the three independent variables (IVs) to the Dependent variable (DV), Moderator, and Mediating variable relationship. In addition, the framework includes three direct hypotheses, three mediator hypotheses, and three moderator hypotheses, as shown in Figure 1.



H1: Loss aversion bias has a significant impact on investment decision-making.

H2: Confirmation bias has a significant impact on investment decision-making.

H3: Overconfidence bias has a significant impact on investment decision-making.

H4: Risk propensity mediates the effect of loss aversion on investment decision-making.

H5: Risk propensity mediates the effect of confirmation bias on investment decision-making.

H6: Risk propensity mediates the effect of overconfidence on investment decision-making.

H7: Financial Literacy moderates the relationship between loss aversion bias and individual investment decision-making.

H8: Financial Literacy moderates the relationship between confirmation bias and individual investment decision-making.

H9: Financial Literacy moderates the relationship between overconfidence bias and individual investment decision-making.

Research Design and Methodology

The questionnaire method was picked for data collection, as it offers a comprehensive understanding of respondents' attitudes. Accepting a mono-method approach, Data from the survey was gathered at one specific moment, providing a picture of participants' perspectives. This methodological framework allows for a systematic exploration of the particulars surrounding behavioural biases and their effect on investment decisions. This paper is centred on primary data gathered from the participating individuals of Stock Exchange of Pakistan. The population for our paper is the individual investors in (Rawalpindi and Islamabad). There are approximately 135 individual investors in (Rawalpindi and Islamabad). For this study, individual investors are selected**.** Therefore, the unit of analysis are individual investor.

Criteria for the Selection of the Respondents:

The target unit of analysis is selected based on the following criteria:

1. Participants need to actively engage in the stock market of Pakistan.
2. They must have at least 1 year of experience in trading.
3. Participants must have a significant investment in equities.
4. They must be residents of Pakistan.

Participants should have a basic understanding of English and financial terminology.

We used convenience sampling which is the non-probability sampling type in which we contacted the individual investors for data collection, who are conveniently available to provide it. There are different methods and formulas for sample selection.

Firstly, 58 Yamane (1967) developed a formula for the calculation of sample size. The researcher recommended that for the targeted population, a sample size of 370 is enough. Secondly, as per the described table by the researcher, if the population is approximately between 5000-6000, a sample of 370 will be enough. I target a total of 135 respondents, so my sample size is 100.

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

Where:

n = Sample Size,

N = Population size

e = acceptable error (at 95% confidence, assume the 5% error)

Questionnaire Detail

To verify the validity and reliability of the instrument pilot study was performed. Final responses are collected from individual investors are used to test the nine suggested hypotheses. The questionnaire consists of two parts: the first part is about the demographic variables such as age, gender, qualification, profession, and experience. The second part consists of Six constructs broken down into 39 items in total. The items are assessed using a Likert Scale that spans from strongly disagree to stron gly agree.

Measurement Scale

The instruments used in this study have been adopted from research studies. The investment decision-making scales was adopted by (Loibl and Hiran, 2008). The scale of investment decision- making in the questionnaire consists of a total of five items. The risk Propensity scale was adopted by (Tversky and 1979 Kahneman, Simon, Houghton, and Aquino). The scale of risk propensity in the questionnaire consists of a total of 8 items. The Financial literacy scale was adopted by (Rooij Van et al. 2011). The scale of financial literacy in the survey consists of a total of 4 items. The loss aversion bias scale was adopted by (Khan, 2017). The scale of loss aversion bias in the questionnaire consists of a total of 6 items. The confirmation bias scale was adopted by (Rassin, 2008). The scale of confirmation bias in the questionnaire consists of a total of 8 items. The overconfidence bias scale was adopted by Williams and Gilovich (2008), and (Judge et al. 2003). The scale of overconfidence bias in the questionnaire

consists of a total of 8 items. The detailed questionnaire is attached in the Annexure. The Likert Scale is used to evaluate the items, with a range from strongly disagree to strongly agree because it provides comparatively better results as it is respondent friendly.

Data Analysis

Statistics Software SPSS is used for examination and measurement of data. In this study, SEM is used to examine the structural model, which evaluates the overall fitness and reliability of collected data against the hypothesized structural model. SEM not only observes relationships but also tests hypotheses concerning different variables. Researchers support SEM over simple regression, believing it produces more precise findings by reducing measurement error and bias.

Results, Analysis and Interpretation

To ensure the normality and reliability of data, we conduct a reliability analysis.

Table 01: Reliability Analysis

Variable	**No. of items**	**Cronbach Alpha**
Loss Aversion Bias	6	0.870
Confirmation Bias	8	0.900
Overconfidence Bias	8	0.899
Risk Propensity	8	0.891
Financial Literacy	4	0.854
Investment Decision Making	5	0.894

For data reliability, Cronbach's alpha test was done. Benchmark for Cronbach's Alpha is between 0.7 and 0.9. As shown in above table Cronbach's alpha value of all constructs lies between the 0.7 and 0.9 range which shows the reliability of all variables.

Table 02: Investors Demographic Profile

Characteristics	Frequency	Percentage	Characteristics	Frequency	Percentage
Age			**Qualification**		
18-25	11	11	undergraduate	5	5

26-33	28	28	Graduate	45	45
34-41	23	23	Postgraduate	42	42
42-49	18	18	Others	8	8
50 & above	20	20			
Gender			**Experience**		
Male	70	7	1-5 years	57	57
Female	30	3	6-8 years	28	28
Profession			9-12 years	7	7
Business	57	57	13-15 years	5	5
Salaried	43	43	Above	3	3

Table 02 shows the demographic profile of the respondents. Data was gathered by floating Questionnaires. Respondents were both males and females having 70% males and 30% females. Mode (1) indicates Males and mode (2) was used for Females. As per data, male respondents were more then female respondents. A total of 57 respondents were business professionals while 43 were salaried employees. Respondents were also looking into their ages, 11% were between the age of 18-25, 28% were between 26-33, 23% were between 34-41, 18% were between the age of 42-49, and 20% were between 50 and above.

Similarly, respondents Qualifications were investigated. 5% of respondents had an intermediate level of education, 45% had done with their bachelor's level, 42% had done with their master's level, and 8% had other levels of education. Additionally, respondent's employment experience was also investigated. 57 respondents had 1-5 years of experience. The 28 people had 6-8 years of experience while 7 respondents had 9-12 years of experience, and 5 respondents had 13-15 years of experience. The remaining 3 had more than 15 years of experience.

Table 03: Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
ID	2.17	5	3.998	0.492	-0.180	2.370
RP	2.11	5	4.036	0.481	-0.502	2.773

FL	2.25	5	3.905	0.529	-0.412	1.308
OB	2.55	5	3.642	0.339	0.561	2.614
LB	2.75	5	3.474	0.355	1.410	3.661
CB Valid N (listwise)	2.56	5	3.958	0.461	-0.236	1.515

Table 03 provides the data for the descriptive statistics. The descriptive analysis shows the properties or characteristics of data such as standard deviation, mean, range, minimum and maximum values, kurtosis, and skewness. The mean is the data set's average value, representing the data's central tendency. The standard deviation represents the dispersion or the spread of data from the mean value. The range is the difference between the lowest and highest values in the data set. It gives information on the total spread of data.

The smallest number in the data set is the lowest value, while the largest num ber is the highest value. The skewness is a degree of the asymmetry of data distribution. A skewness value of 0 specifies a symmetrical distribution, a skewness value greater than 0 points out a positively skewed distribution while a value less than 0 points out a negatively skewed distribution. Kurtosis is the measure of the Tailedness of the data distribution.

Table 04: Correlation Matrix

	ID	RP	FL	OB	LB	CB
ID	1					
RP	0.659**	1				
FL	0.525**	0.468**	1			
OB	0.485**	0.539**	0.536**	1		
LB	0.707**	0.604**	0.493**	0.397**	1	
CB	0.373**	0.453**	0.660**	0.568**	0.681**	1

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

The results show that investment decision-making and Behavioural biases had a significant positive correlation at a 0.01 level of significance. The correlation between investment decisions and Overconfidence bias was 0.485. This points out that with

the increase in overconfidence bias of investors, then this also increases investors investment decision-making. The correlation between Loss aversion bias and investment decision-making was 0.707, showing that an increase in loss aversion bias also increases investment decision-making of investors. The correlation between Confirmation bias and investment decision-making was 0.373, showing that an increase in confirmation aversion bias also increases the investment decision-making of investors. Furthermore, the moderator, Financial Literacy had a positive impact on all other variables, and the mediator Risk Propensity also influenced the linkage between all three biases and investment decisions.

Table 05: Direct Relationship

IV	**DV**		**S.E**	**T-Value**	**p-value**
OB	ID	1.138	0.091	12.525	0.000
LB	ID	0.980	0.099	9.883	0.000
CB	ID	0.869	0.063	13.841	0.000
OB	RP	1.042	0.097	10.731	0.000
LB	RP	0.820	0.109	7.508	0.000
CB	RP	0.786	0.069	11.330	0.000
RP	ID	0.869	0.054	15.954	0.000

To observe the Hypotheses, we used Structured Equation Modelling. A structural model was residential to inspect the direct impact of Behavioural Biases on Investment decision-making. Then, a mediating model was created to inspect both the specific and overall indirect effects of Risk Propensity. Lastly, the moderating model was created to find out the direct impact of Financial Literacy.

Above table shows the behavioural biases such as Overconfidence Bias, Loss aversion Bias and Confirmation bias, and Individual investor investment decision-making has a direct relationship. The results show that the behavioural biases and investment decision-making had a significant positive relationship consistent with previous studies. We made several hypotheses in which the first three hypotheses were related to the linkage between behavioural biases and investment decision-making. the next three hypotheses were related to the role of a mediator such as Risk

propensity in the relationship between investment decision-making and behavioural biases. The last three hypotheses were related to the role of a moderator such as Financial Literacy in the connection between behavioural biases and investment decisions. Findings show that all the T-values are above the 1.96 and P-values are lower than 0.05 which shows that findings were significant because the benchmark for the t-value is t >1.96 while the p-value is p <0.05.

Table 06: Mediation Analysis I

	Effect	SE	T-Value	P-Value	LLCI	ULCI
Total Effect	0.8593	0.0627	13.7027	0.0000	0.7348	0.9837
Direct Effect	0.4145	0.0750	5.5273	0.0000	0.2656	0.5633
			Effect	**BootSE**	**BootLLCI**	**BootULCI**
Total Indirect Effect			0.4448	0.1030	0.2498	0.6568
CB→RP→ID	0.5654	0.0719	7.8666	0.0000	0.4228	0.7081
			1	**2**	**3**	
R2			0.7906	0.6571	0.5686	
F-Statistics			183.1474	187.7634	129.1827	
P-value			0.0000	0.0000	0.0000	

Note: The table shows the information related to the mediation analysis, centring on the initial stage of evaluating the mediation role of Risk propensity between the Confirmation Bias and Investment Decision-making. The results highlight the intermediate procedures influencing the linkage among the variables considered.

Table 07: Mediation Analysis II

	Effect	**SE**	**T-Value**	**P-Value**	**LLCI**	**ULCI**
Total Effect	0.897	0.067	13.312	0.0000	0.7633	1.031
Direct Effect	0.404	0.084	4.8281	0.0000	0.238	0.570
			Effect	**BootSE**	**BootLLCI**	**BootULCI**
Total Indirect Effect			0.4930	0.1091	0.2805	0.7069
LB→RP→ID	0.583	0.076	7.6563	0.0000	0.4315	0.7335
			1	**2**	**3**	

R2			0.7780	0.6439	0.5918	
F-Statistics			169.998	177.20	142.05	
P-value			0.0000	0.0000	0.0000	

Note: The table shows the information related to the mediation analysis, concentrated on the initial stage of evaluation of mediating role of Risk propensity between the Loss aversion Bias and Investment Decision-making. Results highlight the intermediate mechanisms influencing the relationships among the variables considered.

Table 08: Mediation Analysis III

	Effect	SE	T-Value	P-Value	LLCI	ULCI
Total Effect	0.881	0.057	15.4207	0.0000	0.7680	0.9948
Direct Effect	0.452	0.091	4.9688	0.0000	0.2712	0.6319
			Effect	**BootSE**	**BootLLCI**	**BootULCI**
Total Indirect Effect			0.4299	0.1228	0.2361	0.7145
OB→RP→ID	0.499	0.088	5.6564	0.0000	0.3237	0.6736
			1	**2**	**3**	
R_2			0.7805	0.7082	0.6994	
F-Statistics			172.5011	237.7978	228.0575	
P-value			0.0000	0.0000	0.0000	

Note: The table shows the information related to the analysis of mediation, focuses on the initial stage of evaluating the mediation role of Risk propensity between the Overconfidence Bias and Investment Decision-making. The findings highlight the intermediate mechanisms influencing the connection among the variables considered. In this paper, we examined the part of Risk Propensity as an intervening / mediating variable between Behavioural Biases and individual investor investment decision-making. All the above three mediation analysis tables show that Risk Propensity acts as a positive mediator for all three behavioural biases and investment decision-making. This shows that behavioural biases have a greater bearing on the investment decision-making for individual investors with higher Risk propensity. It also shows that individual investors with higher levels of Risk propensity is likely to be persuaded by their biases while making investment decisions.

Table 09: Moderation Analysis

	IV	DV		SE	T-Value	P-Value	LLCI	ULCI
1	CB	ID	0.3319	0.2750	2.2058	0.0080	-0.2145	0.8783
2	FL	ID	0.0268	0.2998	6.0893	0.0000	-0.6219	0.5683
3	Int-1	ID	0.0797	0.0716	1.9842	0.0000	-0.0623	0.2218
1	LB	ID	0.6095	0.3113	2.9578	0.0000	-0.0085	1.2276
2	FL	ID	0.2578	0.3159	3.8162	0.0060	-0.3692	0.8849
3	Int-1	ID	0.0094	0.0760	4.1229	0.0010	-0.1419	0 .1607
1	OB	ID	0.6112	0.2570	2.3784	0.0000	0.1011	1.1214
2	FL	ID	0.1717	0.2783	5.6171	0.0120	-0.3807	0.7241
3	Int-1	ID	0.0193	0.0658	3.2332	0.0000	-0.1114	0.1500
R2						0.7178	0.6970	0.7472
ΔR2						0.0036	0.0000	0.0002
F-Statistics						81.3861	73.606	94.563
P-Value						0.0000	0.0000	0.0000

Note: The table highlights the findings of moderation analysis, accentuating the influence of Financial Literacy on the relationships considered. These results show how the moderation factor impacts the overall dynamics amid the constructs under consideration.

Above table of Moderation analysis shows that Financial Literacy significantly moderated the connection between Behavioural Biases and Investment Decisions. The results show that financial literacy plays a buffering role in the relations between Behavioural biases and investment decision-making. Despite the significant connection between behavioural biases and investment decisions, financial literacy lessens the impact of biases and leads toward more informed decision-making. The findings also reflect that individuals with highest levels of financial literacy are less likely to be swayed by biases, even if they are present.

Limitations and Future Directions

This study focuses solely on individual investors who believe their behavioural biases influence their investment decisions positively. While the analysis and discussion in this study raise several issues for further exploration, there are avenues for future research. Future studies might explore additional biases like Regret Aversion Bias, Trend-Chasing Bias, and Availability Bias from the perspective of individual investors. Moreover, examining the effect of decisions made by individuals and institutions on mutual funds could be valuable. It's also crucial to investigate other socio-economic groups to ensure the generalizability of the findings. Longitudinal studies could validate whether cognitive biases and investment performance remain consistent.

Conclusion

This study aimed to understand how behavioural biases, such as loss aversion, overconfidence, and confirmation bias, influence investors in the Pakistan stock markets. It also focuses on the role of demographic factors like income and gender in investment decision-making. One of the key findings is that individual investors are not homogeneous; their behavioural aspects, investment motives, and risk perceptions vary widely. Acknowledging the irrationality inherent in investment decision-making is crucial for investors to strive for rationality.

The study sought to identify factors contributing to behavioural biases, their correlation with propensity of risk, and their impact on investors' investment performance. While the literature on behavioural finance addressing these determinants among individual investors is limited, this study emphasizes the importance of understanding their behaviour, given their significant relation in the stock market and the broader economy.

The findings underscore the pivotal behaviour and the relation of individual investors in the stock market. Notably, behavioural biases significantly influence risk propensity and investment decision-making. This aligns with previous research suggesting that investors often take risks due to self-attribution. Those inclined to risk tend to achieve positive investment outcomes, consistent with prior studies highlighting their comfort with risk and belief in higher returns. This study reinforces the notion that risk-takers are generally satisfied with their investment performance.

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