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Navigating The Biases: The Effect Of Overconfidence And Loss Aversion On Investment Risk Tolerance

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Abstract: This research study examines the impact that overconfidence bias and loss aversion of investors have on their investment decisions. Under behavioral finance, cognitive biases have been proven to lead to less-than-ideal decision making outcomes for investors. Overconfidence bias and loss aversion, which are characterized by an optimistic and conservative approach respectively, seemingly tend to pull investors in opposite directions. A juxtaposed analysis can offer a more nuanced understanding of the interrelation of such biases and the subsequent effect of psychological aspects on investment decisions. The study focused on young adults in the district of Ernakulam in Kerala, aged from 18 to 30 years. Key findings suggested overconfidence bias to be strongly associated with an increased level of risk tolerance among investors. In contrast, investors exhibiting loss aversion tended to be less risk tolerant than others. This research contributes to the existing literature on the influence of cognitive biases and heuristics on investment decisions by examining investor behaviour and risk attitude in the cultural and socio-economic context of Kerala while providing nuanced insights into how community influences, regional norms, and financial practices shape such tendencies.

Keywords: Overconfidence Bias, Loss Aversion, Investment Risk Tolerance, Cognitive Biases, Behavioral Finance, Investment Behavior

I. INTRODUCTION

Behavioral finance, a subfield of finance that combines insights from psychology and economics, has revolutionized our understanding of investment decision-making. It offers a more realistic framework for examining financial markets and investor behavior by acknowledging that investors are not always logical and are instead susceptible to emotional and cognitive prejudices. It provides a better understanding of investors by highlighting the role of emotions, biases, and heuristics in shaping financial decisions. This study has significant implications as the necessity for a thorough understanding of the psychological elements influencing investor behavior has been brought to light by the growing complexity of investment decisions and the detrimental consequences they have on investors' capacity to make rational decisions.

Despite the significant body of literature that exists on behavioral finance, there remains a knowledge gap regarding the interplay between overconfidence, loss aversion, and risk tolerance. Most of the research that is available on this matter is concentrated within the developed nations. A developing country like India, with its rapidly growing economy, is lacking sufficient research on behavioral finance and its related disciplines. There is also a deficiency of literature when it comes to how biases can indirectly influence investment through risk. This paper aims to bridge the gap by exploring the relationships between these variables which will in turn affect investment decision-making. The purpose of this study is to investigate the cognitive biases, specifically overconfidence bias and loss aversion, influencing risk tolerance in investment decisions among the young adults in Ernakulam district. Gaining a deeper recognition in this subject can help with the creation of more informed strategies that will enhance risk management practices, investment outcomes and promote deliberate and rational decision-making. The findings of this research will provide valuable insights for investment professionals, policymakers, and individual investors for development within the field as well as have practical implications for financial education and investor training programs.

The scope of this study is focused on exploring the relationships between overconfidence, loss aversion, and investment risk tolerance among young adults aged from 18 to 30 in the district of Ernakulam in Kerala. Investment decisions made in early adulthood have the potential to be more biased and risky making them a relevant population for study. It can further offer insights into the development of investment habits and attitudes. This paper seeks to investigate the interrelation of biases and establish the impact that they have on the risk tolerance of investors.

2. THEORETICAL FRAMEWORK

Prior to the development of behavioral finance, the prevalent notion in finance was rooted in utility theory and rationality. According to this view, investors were assumed to be rational, self-interested, and utility-maximizing individuals who made decisions based on complete and perfect information. These assumptions and ideas were implying that investors would always act in their best interests and make optimal decisions. However, this traditional perspective overlooked the psychological and emotional factors that influence investor behavior, leading to a narrow and unrealistic view of human decision-making. The emergence of behavioral finance challenged these assumptions, revealing that investors are often driven by cognitive biases, emotions, and social influences that can lead to suboptimal decisions.

2.1 KAHNEMAN AND TVERSKY'S PROSPECT THEORY: A PARADIGM SHIFT

In their seminal 1974 paper, "Judgment under Uncertainty: Heuristics and Biases," Tversky and Kahneman introduced the concept of cognitive biases and heuristics, challenging the traditional assumption of human rationality. It revealed that humans exhibit systematic errors in judgment when faced with uncertainty or complex decisions, due to reliance on mental shortcuts (heuristics) and inherent biases, which enable quick decision-making, but can also lead to flawed outcomes. They identified three primary heuristics - representativeness, availability, and anchoring - which people use to simplify complex judgments and decisions. However, these mental shortcuts often lead to systematic errors and biases, resulting in suboptimal

decisions. For instance, the representativeness heuristic leads people to judge the likelihood of an event based on how closely it resembles a typical case, rather than on the actual probabilities. The Availability Bias, also known as the Availability Heuristic, is a cognitive bias that refers to the tendency to overestimate the importance or likelihood of information that is readily available, rather than seeking a more diverse range of information. The information that is available may not be representative of the bigger picture. Finally, the Anchoring Bias, also known as the Anchoring Effect, is a cognitive bias that refers to the tendency to rely too heavily on the first piece of information encountered when making a decision, even if it's irrelevant or unreliable. This paper marked a significant shift in the understanding of human decision-making, highlighting the importance of considering cognitive biases and heuristics in decision-making processes.

The following paper, "Prospect Theory: An Analysis of Decision under Risk," was published by the pair in 1979 revolutionizing the field of decision-making with the introduction of Prospect Theory. It challenged the traditional expected utility theory by introducing a new framework for understanding decision-making under uncertainty. Prospect theory posed that people made decisions under risk, focusing on the idea that individuals evaluate outcomes relative to a reference point, emphasizing losses more than equivalent gains. The theory itself arose from the concept of loss aversion, which suggested that individuals tend to prefer avoiding losses to acquiring equivalent gains. This idea was revolutionary, as it contradicted the traditional assumption of rational choice theory that individuals are neutral to outcomes and only care about overall wealth. Tversky and Kahneman demonstrated loss aversion through a series of experiments. The discovery of loss aversion has had a profound impact on our understanding of human behavior and decision-making, with implications for fields such as economics, finance, marketing, and public policy.

Tversky and Kahneman's study, ‘The Framing of Decisions and the Psychology of Choice’, published in the journal Science in 1981, investigated the "framing effect" – the phenomenon where people make different choices depending on how information is presented, even if the underlying options are logically equivalent. The results demonstrated that people are more motivated by the fear of loss than the promise of gain, and that the way outcomes are framed can significantly influence decision-making. The Framing Effect study is connected to Loss Aversion, as it shows how the presentation of information can influence decision-making by exploiting people's fear of loss.

In the 1991 paper, Tversky and Kahneman's "Loss Aversion in Riskless Choice" posits that people feel the pain of a loss more strongly than the pleasure of an equivalent gain, leading to a tendency to avoid losses and prioritize maintaining the current state of wealth. This bias highlights that people's decisions are influenced by a reference point (their current state), and losses relative to that point are perceived as more significant than gains. People are more risk-averse when facing potential gains and more risk-seeking when facing potential losses

A study(Barber and Odean, 2001) found that men, due to higher levels of overconfidence, tend to trade 45% more frequently than women. This excessive trading leads to higher transaction costs and lower net returns. Another study revealed that investors tend to sell winning stocks too early and hold onto losing stocks for too long, a phenomenon known as the "disposition effect" (Odean, 1998). Yet another explores the relationship between behavioral biases and investment decisions while focusing on how risk tolerance plays a mediating role among the investors of Punjab. The researchers found a connection between risk tolerance and overconfidence bias and regret bias. They also found a relationship between investment decisions and overconfidence bias and regret bias. This established that the effect of behavioral biases on investment decisions may be better explained through risk tolerance (Raheja & Dhiman, 2019). Another research studied the impact of overconfidence and anchoring bias on risk tolerance of investors and the subsequent effect of risk tolerance on investment decisions. Studying over 400 investors, the researchers found that both overconfidence and anchoring bias had a significant direct effect on risk tolerance. The results suggest that overconfidence is associated with low levels of risk aversion behaviour (Rani et al.,2024). Risk tolerance, risk perception and financial literacy influence people's investment behaviour. People with positive investment behavior enjoy better financial well-being. When people take more risks, they have a variety of positive behaviors, and these behaviors will bring them closer to financial satisfaction. (Ali et al., 2021**).** Excessive confidence is linked to a greater willingness to take financial risks. (Frank et al., 2024) Notably, the study also discovered that overconfidence does not predict behavioral risk aversion in older adults, highlighting the need for nuanced approaches to managing financial risk across different age groups. Another research highlights the significant impact of psychological biases on risk perception and investment decisions. By acknowledging and understanding these biases, investors can make more informed decisions and mitigate potential risks (Jiarui Xie, 2024),. A study examined the impact of psychological biases on investment choices in Nepal. The findings revealed that overconfidence has a positive effect on risk tolerance, increasing investors' willingness to take risks (Simkhada & Lamichhane, 2024)

2.2 OVERCONFIDENCE

Overconfidence bias refers to the tendency to overestimate one’s skills or abilities in a particular field. When coming to investments, overconfidence leads to increased levels of risk tolerance as there is a distorted perception of one’s own expertise in predictive capacity. Overconfidence may manifest as aggressive investment behavior among investors, leading to stubbornness and an ignorance towards ever-changing market environments. Such investors firmly hold on to their pre-existing beliefs and assumptions and do not adjust according to the variations within the market. Investors have been shown to be excessively optimistic about their investment returns, believing they will be successful and underestimate the potential risks involved (Barber & Odean, 2001). One study found that the disposition effect, when investors sell winners and hold losers, reduces returns (Odean, 1998). Studies have found that overconfident investors are more likely to be affected by disposition effect as well. Investor overconfidence was seen in another study prior to the 2008 and 2020 market crashes. However, none was noticed after (Kumar & Prince, 2022). Yet another paper noted how overconfidence increased trading activity in both genders (Deaves et al.,2009).In addition, overconfidence

can also result in a paradox in which investors think they have more control over their investments than they actually do (Langer, 1975). Overconfident individuals tend to attribute successes to their own abilities and failures to external factors called self-attribution bias (Miller & Ross, 1975). They often seek information that confirms their existing beliefs and ignore evidences that suggest otherwise (Nickerson, 1998). Confirmation bias can fuel investor overconfidence by causing them to overlook warning signs and dismiss contradictory data, ultimately leading to poor investment decisions. Overconfidence can also contribute to market volatility, as overconfident investors make bold, uninformed decisions (Shiller, 2000).Understanding the role of overconfidence bias in investor decision-making will enable financial advisors and researchers to develop strategies to mitigate the effects of the bias and improve investment outcomes.

2.3 LOSS AVERSION

Loss aversion bias was initially introduced by Amos Tversky and his associate Daniel Kahneman in 1979 in their research paper titled 'Prospect Theory: An Analysis of Decision under Risk'. In it, they suggested how loss aversion bias made individuals view gains and losses asymmetrically. The disproportionate fear of losses compared to the satisfaction of wins, which can lead to excessive caution and emotional distress among investors. Research has shown that loss aversion is associated with increased activity in the anterior insula, a region of the brain involved in emotion and risk processing (Kahneman & Tversky, 1979; Tom et al., 2007). The anterior insula's role in risk processing implies that loss aversion is closely tied to how individuals perceive and process risk. Asymmetric risk preferences result from investors with loss aversion bias favoring avoiding losses over achieving equivalent gains (Kahneman & Tversky, 1979). Due to this bias, investors are more sensitive to possible losses than gains, which makes them risk averse in situations involving gains and risk-seeking in situations involving losses (Tversky & Kahneman, 1991). As a result, poor financial choices, such as holding onto failing investments for too long or missing out on possible gains can happen. The Endowment Effect (Kahneman et al., 1990) is directly linked to loss aversion, where people tend to value things they own more than things they don't own. That is, people are reluctant to give up something they own. The framing effect exacerbates loss aversion, as people tend to be more risk-averse when options are framed as losses rather than gains, leading to a stronger preference for avoiding losses.

2.4 RISK TOLERANCE

Risk tolerance is a crucial factor that guides an investor's choices. Risk tolerance represents the willingness of a person to accept potential risk in exchange for valuable returns. Risk tolerance has 3 attitudes: Risk seeking, risk neutral and risk averse. The amount of risk that an investor can accept depends on a myriad of factors including but not limited to demographic factors, financial literacy, cultural practices and economic situation. (Grable & Lytton, 1999; Wang & Hanna, 1997). Prior research has suggested that men are more likely to take risks than women, suggesting gender to be a deciding factor for determining risk as well (Barber and Odean, 2001). Personality traits like agreeableness and openness to experience correlated with higher risk tolerance as opposed to neuroticism, which was associated with low tolerance for risk.(Nicholson et al., 2005) Further, risk tolerance has shown to decrease with age (Morin & Suarez, 1983). In addition, psychological factors, biases and heuristics also have a strong impact on risk tolerance, as indicated by various research

(Tversky & Kahneman, 1974). Additionally, research has shown that risk tolerance can be affected by market conditions, with investors becoming more risk-averse during times of market volatility. Another study (Roszkowski and Davey, 2010) found that risk tolerance depends on market return and volatility, and that risk tolerance questionnaires may not always accurately capture investors' risk tolerance in times of market stress .Understanding risk tolerance is essential for investors, financial advisors, and policymakers, as it can help with investment strategies, portfolio construction, and risk management decisions.

Analysing the interactions between these components can improve our comprehension of the psychological underpinnings of decision-making and ultimately offer guidance on techniques for making more informed, logical decisions in investment. The interconnection of risk tolerance, loss aversion, and overconfidence has important ramifications when it comes to financial choices. Investors who take on too much risk run the possibility of suffering large losses if they overestimate their ability to predict market movements or underestimate potential risks. However, investors who exhibit excessive caution as a result of loss aversion may lose out on potential gains and obstruct their long term financial goals.

3. RESEARCH METHODOLOGY

The primary data for this study was collected from 60 respondents through an online survey. Methods of sampling employed were convenient and purposive sampling under non-probability sampling. The questionnaire consisted of 21 questions carefully designed to capture the respondents' attitudes and perceptions towards loss aversion, overconfidence, and risk tolerance. The survey was divided into two sections: demographic information (4 questions) and research-related information (17 questions). Items measuring the constructs were further categorized into three sections: loss aversion (7 items), overconfidence (5 items), and risk tolerance (5 items). The scales were adapted from existing research studies (Zainul & Suryani 2021; Li et al., 2021). Responses were recorded using a 5 point Likert scale consisting of strongly disagree, disagree, neutral, agree and strongly agree allowing respondents to express their level of agreement or disagreement with each statement. The survey was administered to a diverse group of participants aged 18-30, including students and professionals from various educational backgrounds and financial understanding. This age range was chosen to capture the perspectives of young adults who are likely to be actively engaged in investment decisions. Peer-reviewed articles, academic journals, and reputable websites, were also consulted to provide a comprehensive understanding of the research topic, identify gaps in existing literature, and inform the development of the survey instrument. Correlation analysis was conducted to examine the relationships between the variables, while regression analysis was used to model the relationships between overconfidence, loss aversion, and investment risk tolerance, providing insights into the predictive power of these variables. Data analysis was performed using Microsoft Excel.

4. RESULTS AND DISCUSSION

Table 4.1: Correlation values

Variables	Mean	S.D	OC	LA	RT
Overconfidence (OC)	3.13	0.723	1		
Loss Aversion (LA)	3.3	0.866	(-0.478)	1	
Risk Tolerance (RT)	3.03	0.662	0.719	(-0.493)	1

Source: Primary data

The outcome, known as the correlation coefficient, ranges from -1 to 1. A coefficient between 0 and 1 suggest a positive correlation between the variables with the intensity increasing towards 1. A coefficient closer to -1 points to a strong but negative correlation. A coefficient of 0 suggests a lack of linear relationship between the variables. A test for simple correlation, which is a correlation between 2 variables, is employed in this study.

Table 4.1 presents the relationships among three psychological variables in investment behavior: Overconfidence (OC), Loss Aversion (LA), and Risk Tolerance (RT). The mean values for the three variables are fairly close—Overconfidence at 3.13, Loss Aversion at 3.3, and Risk Tolerance at 3.03—indicating a moderate presence of these traits on average in the sample. Standard deviations range between 0.662 and 0.866, suggesting a moderate variability in individual responses.

The Pearson's correlation coefficient between overconfidence and risk tolerance is 0.719, which indicates a strong positive correlation. This suggests that individuals who exhibit overconfidence bias tend to have higher levels of risk tolerance—i.e., they are more comfortable with taking financial risks, likely because of their belief in their own judgment and decision making capabilities.

Alternatively, loss aversion is negatively correlated with both overconfidence (-0.478) and risk tolerance (-0.493). The negative relationship between loss aversion and overconfidence suggests how individuals who are more averse to losses are less likely to be overconfident, possibly due to a heightened awareness of potential negative outcomes. Similarly, the moderate negative correlation between loss aversion and risk tolerance indicates that individuals who are more loss averse tend to be more risk-averse and cautious with their investments. All correlations are moderate to strong in magnitude, which indicates meaningful relationships between the constructs measured.

Table 4.2: Regression Statistics

Dependent Variable	Independent Variable	R^2	S.E	$\boldsymbol{\beta}$	p-value	$\boldsymbol{\alpha}$
Risk Tolerance	Overconfidence	0.516	0.464	0.658	9.78E-11	0.973
Risk tolerance	Loss Aversion	0.243	0.58	(- 0.377)	6.10E-05	4.296

Source: Primary data

The R^2 value for overconfidence (0.516) indicates that about 51.6% of the variance in risk tolerance can be explained by overconfidence levels, suggesting a strong relationship between them. The remaining 48.4% of the variation in risk tolerance is not explained by overconfidence and may be influenced by other factors including demographic, social and cultural factors. The beta coefficient ($\beta = 0.658$) shows a positive slope. This relationship is statistically significant ($p < 0.001$). Alternatively, loss aversion explains 24.3% of the variance in risk tolerance ($R^2 = 0.243$), indicating a moderate relationship. The beta value ($\beta = -0.377$) reveals an expected negative relationship, though not as strong. This effect is also statistically significant ($p < 0.001$). The intercepts (α) indicate the expected value of risk tolerance when the independent variable is zero, though in this context, they serve more as constants than points of interpretation. The standard error values indicate the precision of the estimated beta coefficients. A smaller standard error means that the slope (beta) is more stable across different samples. In this analysis, the standard errors for both predictors (0.464 and 0.580) are acceptable, supporting the reliability of the results.

It is important to recognize the various limitations of this paper. The sample size of 60 is evidently too small and may not be representative of the larger population of the young adults in India or any other countries. Additionally, the geographical focus limits the generalizability of the findings to other regions or cultures. Survey questionnaires that rely on self-reported data run the risk of introducing biases and mistakes. Furthermore, the cross-sectional design of the study provides only a snapshot of the current situation. Also, the survey questions and measurement tools may not be comprehensive or nuanced enough to capture the complexities of overconfidence, loss aversion, and tolerance. Even if the adapted scales matched the population and research goals, there is a dependence of prior reliability and validity. The study's analysis of risk tolerance is also incomplete since it may have overlooked other significant determinants of risk tolerance, such as emotional, psychological, cultural and demographic factors. This means the results cannot be generalized for other countries or even within India where these factors differ vastly across all states and may be more or less prevalent.

5. CONCLUSION

This study explored how cognitive biases—specifically overconfidence and loss aversion—affect individual risk tolerance in investment decisions. The findings revealed overconfidence to be positively linked to higher risk tolerance, while loss aversion showed a negative relationship. Most respondents displayed moderate confidence in their investment decisions but were cautious about stock predictions and potential losses. These patterns highlight the importance of psychological factors in financial behavior. For investors to be able to make good decisions, it is crucial to recognize and mitigate cognitive biases. Identifying the triggers and effects of overconfidence and loss aversion can help in designing financial education programs, investment tools, and advisory services that encourage a more balanced approach to risk and reward. Continuous learning and awareness of psychological influences will contribute to better investment decisions, ultimately leading to more stable and profitable financial management.

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