

Behaviour Bias and Investment Decision in Nepalese Investors

Aarju Poudel¹, Sudip Bhusal¹ & Durga Datt Pathak¹

¹ Central Department of Management, Tribhuvan University, Nepal

Correspondence: Aarju Poudel, Central Department of Management, Tribhuvan University, Nepal. E-mail: aarju.769528@cdm.tu.edu.np

Received: January 8, 2024

Accepted: February 6, 2024

Online Published: February 26, 2024

doi:10.5539/ijbm.v19n2p85

URL: <https://doi.org/10.5539/ijbm.v19n2p85>

Abstract

The purpose of this study was to examine the impact of behavioral biases, such as overconfidence, disposition effect, herding, risk aversion, and financial literacy, on investment decision making. The sample was collected using a convenient method, and 338 respondents participated in the study. The study utilized descriptive statistics, ANOVA, independent sample t-tests, correlation, and linear regression analysis to analyze the data. The findings of the study suggest that overconfidence, disposition effect, and risk aversion have a significant positive impact on investment decision making, while herding does not have a significant effect. Furthermore, the results indicate that financial literacy moderate's overconfidence, disposition effect, risk aversion, and herding negatively. This implies that higher financial literacy levels can help mitigate the impact of these biases on investment decisions. The study provides valuable insights for policymakers, stakeholders, and financial institutions to develop policies and strategies aimed at improving financial literacy. It can be useful for researchers and the general public as well, as it provides a deeper understanding of the behaviour bias and investment decision. Future research can broaden the scope of the study by including new independent variables, such as loss aversion and confirmation bias. Additionally, future research can explore the moderating effect of other factors, such as age and gender, on the relationship between behavioral biases and investment decision-making. Overall, the study highlights the importance of understanding and managing behavioral biases in investment decision making, and suggests that increasing financial literacy can help individuals make more informed investment decisions.

Keywords: behaviour bias, overconfidence, disposition effect, herding, risk aversion, financial literacy, investment decision

1. Introduction

An investment decision is the process of choosing which assets to purchase or sell in order to meet a specific financial goal (Dash, 2010). This can include stocks, bonds, real estate, and other types of investments. The process of making an investment decision typically involves analyzing a variety of financial and economic factors, such as market trends, company financials, and risk-return tradeoffs. Sharma & Sharma (2015) said biases and heuristic significantly affect both individual and institutional investor on decision making. Financial market provides opportunity to make unprecedented profit, financial assets are easily liquid able and financial market provide the diversity option for the individual investors from which the investor can choose the assets as per their investment objectives (Akhtar & Das, 2019).

Traditional finance theories imply that the investment markets and those who participate are rational and realistic individuals seeking to maximize their wealth. However, on many occasions, emotions, prior experiences, and beliefs influence investing decisions, and investors respond in unexpected, irrational, and irresponsible ways. To comprehend the effect of these factors on investment decisions, a new branch of finance has arisen. This new field of finance known as "Behavioral Finance" is an attempt to connect this behavioral approach with classic economics and finance theories to clarify the causes for irrationality in the investments made by investors these days. Behavioral Finance is concerned with the internal and external behavioral aspects that influence investors' financial decisions. This study examines the impact of numerous factors on investment behavior as it pertains to behavioral finance.

Behavioral finance posits that financial markets are not informational efficient, leading individuals to exhibit inconsistent rationality and form judgments based on preconceived behavioral notions. Consequently, a profound

comprehension of behavioral finance becomes indispensable in the field of finance, leveraging cognitive psychology to fathom human behavior. Investors must assess the impact of behavioral biases when their decisions deviate from rational facts. Despite the compelling theoretical and empirical evidence supporting the Efficient Market Hypothesis (EMH), the emergence of behavioral finance stems from the challenge of confirming it, given numerous observed anomalies. The behavioral finance approach is employed to scrutinize the habitual poor decision-making or cognitive errors made by investors.

Behavioral biases are the propensity for people who are cognitively deteriorating to make poor financial selections. Human psychology exhibits a variety of biases (Hoffmann et al., 2010). These biases include investors' strong overconfidence in their forecasts (overconfidence), their propensity to keep losing stocks longer and sell winning stocks sooner (disposition), their unwillingness to take risks personally (risk aversion), and their tendency to follow the herd (herding). Hoffmann et al. (2010), for example, argue that investors who use essential analysis are overconfident, trade often, and are more inclined to incur risks. Lin (2011) proposed that a lack of technical expertise is the outcome of behavioral biases, and that a person may make an informed investment decision according to their ability. Individuals learn from their investing experiences, according to Nicolosi et al. (2009), notwithstanding their illogical behavior. The mainstream of research studies suggest that behavioral biases prejudiced investing decisions, and education is seen as a significant tool for overcoming biases Pompian (2006) and behavioral biases may be handled in effective ways (Pompian, 2012). As a result, their behavioral biases may work differently depending on their educational level.

Effective financial resource management is aided by financial literacy. According to the research, investors with poor financial literacy are more likely to make unwise investment decisions (Sezer & Demir, 2015; Son & Park, 2019) and are also more likely to take on large amounts of debt (Lusardi et al., 2009). According to research (Fedorova et al., 2015), investors with inadequate financial literacy avoid investing in stocks and maintain an undiversified portfolio. The belief that those with low incomes and those who lack financial knowledge are less likely to make wise investment decisions Son and Park (2019) and policymakers see financial education as a solution to bad investment choices, although it is not yet apparent if this will change behavior.

Individuals' behavior changes in response to new information and knowledge, and investors invest in response to accessible information and financial knowledge (Son & Park, 2019). A knowledgeable investor is able to ignore their prejudices and make solid financial decisions (Son & Park, 2019). Several survey studies have also attempted to shed light on the significance of financial literacy in making sound investment decisions.

Numerous initiatives are underway in Nepal, led by public, corporate, and non-governmental sectors, with the aim of enhancing financial literacy. The "NRB with Students" program was introduced by Nepal Rastra Bank to enhance the financial literacy of students. The NRB Strategic Plan for 2012-2016 places a significant emphasis on financial literacy programs targeting women, conflict victims, ethnic minorities, as well as underprivileged and marginalized segments of the population. In alignment with this, the NRB's monetary policy has prioritized financial awareness programs since 2012, acknowledging the need for a "suitable strategy" due to the ineffectiveness of financial services arising from insufficient financial literacy (NRB, 2014).

The objective of the current study is to determine if certain behavioral biases might influence investing choices based on gender. In addition, we want to explore if financial literacy affects these connections. In this regard, financial literacy may also play a significant role in predicting investment choice. The gender differences in financial literacy and how they impact the relationship between behavioral biases and investing decision are both discussed in this study.

1.1 Problem Statement

Past psychological research has found different biases that affect how people make decisions. These biases can influence choices in various situations, but they especially impact decisions about money and investments. Behavioral biases explain how investors make decisions and the preferences they develop based on how they process information.

Understanding investment biases is crucial because it directly relates to the overall gains and losses in the stock market. Deviating from the best investment decisions is a significant problem that often leads to poor performance and suboptimal investment returns for investors. For example, being overconfident may lead to excessive trading, resulting in higher brokerage fees and taxes, and ultimately reducing the trade's return. The tendency to follow the crowd, known as herding behavior, can contribute to overall bubbles and bursts in the stock market. Additionally, the disposition bias, where people hold on to losing stocks for too long and sell winning stocks too quickly, is another factor influencing investment outcomes.

Various studies have concluded that investment decision is affected by behaviour bias (Rasheed et al., 2018). Hunjra et al. (2012) states that heuristics like Representativeness, Anchoring, Overconfidence, Gambler's fallacy, and Availability bias, use of financial tools, firm-level corporate government and risk aversion have significant positive impact on investment decision. Likewise, Bashir et al. (2013) conclude gender has no role on overconfidence of investors while making investment decision. Similarly, Lusardi (2006) said women had little financial literacy than male investor for making investment decision. Moreover, Raut (2020) study past behaviour, financial literacy and investment decision making process of individual investors and found financial literacy has significant effect on attitude and perceived behaviour control which affect investment decision on investors. Likewise, Al-Tamimi and Kalli (2009) studied financial literacy on investment decision taking UAE investors and found financial literacy is affected by income level, education level and workplace activity, adding significant difference on financial literacy level based on gender.

In South Asian context studies like Parveen and Siddiqui (2018) explain a positive effect of disposition effect and a negative effect of overconfidence on investment decision. According to Cao et al. (2021), investment decision is impacted positively by herd behavior in Vietnam. Madaan and Singh (2019) state that overconfidence and herding bias have significant positive impact on investment decision in India. Kulal (2022) states that overconfidence positively impacts the investment decision in India. Shah et al. (2018) and Ahmad and Shah (2020) state that investment decision is negatively influenced by overconfidence in Pakistan and that financial literacy moderates the relationships between the overconfidence and investment decisions. On the other hand, Aziz and Khan (2016) present a positive impact of overconfidence on investment. Likewise, as per Hayat and Anwar (2016), financial literacy has a negative moderating influence in herding bias and a positive moderating effect in overconfidence bias with investment decision.

The majority of Nepalese literature (Kadariya, 2012; Rana, 2019; Shrestha, 2020) primarily focused on accounting data, advocacy recommendations, business image, demographic characteristics, and company-specific variables, as well as market data, as variables impacting investment decisions. Furthermore, previous research has focused on only a few areas of investor behavior, with the most of studies concentrating on cognitive biases. Furthermore, studies such as (Awale et al., 2018; Risal & Khatiwada, 2019) have discovered the existence of herd mentality in the Nepali Stock Exchange. In Nepalese context, Dangol and Shakya (2017) say pattern of investment is different based on financial literacy of investors. Similarly, Dangol (2018) states that female are less risky than male as female prefer safe investment option. There is no significant impact of gender on heuristics, prospect, and market herding and investment performance (Dhungana et al., 2018). Similarly, Dhungana et al. (2022) present availability bias, overconfidence bias, herding bias as variables having significant impact on investment decision. However, anchoring and regret aversion bias has no significant effect on investment decision. Likewise, Pandit (2021) states that experience group has significant association with herding and optimism bias. Therefore, the problem of statement of the study is to study the impact of behaviour bias (overconfidence, herding, disposition effect and risk aversion) on investment decision of male and female investor of Nepalese stock market taking financial literacy as moderated variable could strengthen, diminish, negate, or alter relationship between behaviour bias and investment decision.

Individuals exhibit irrationality, inefficiency, and inconsistencies in making decision, primarily when confronted with uncertainties (Bernstein, 1998). Irrational investor conduct leaves the market inefficient as sensible investors evaluate stocks logically by considering the risk and return of the investment and they do never permit their subjective judgments to influence their process of making decisions (Shiller, 2002). As an outcome of these facts, it is vital to determine the aspects that affect investors' investment decisions at the Nepal Stock Exchange (NEPSE) and the extent of how these factors influence their investment efficiency.

Based on above empirical issue and research gap, the following research questions are raised.

- a) What is the impact of demographic variable in factors of behaviour bias and investment decision of Nepalese investors?
- b) What is the relationship between factors of behaviour bias and investment decision in Nepalese investors?
- c) What is the effect of overconfidence, disposition effect, and herding and risk aversion on investment decision in Nepalese investors?
- d) What is the moderating role of financial literacy in relationship between overconfidence, disposition effect, and risk aversion on investment decision in Nepalese investors?

1.2 Objectives of the Study

The main purpose of the study is to examine the effect of overconfidence, disposition effect, and herding and risk

aversion on the investment decision of Nepalese investor who participates on stock market. The specific objectives of the study are:

- a) To examine the effect of demographic variable in factors of behaviour bias and investment decision of Nepalese investors.
- b) To examine the relationship between factors of behaviour bias and investment decision on Nepalese investor investment decision.
- c) To analyse the effect of overconfidence, disposition effect, herding and risk aversion on investment decision.
- d) To check the moderating effects of financial literacy in relationship between overconfidence, disposition effect, herding and risk aversion on investment decision.

1.3 Research Hypotheses

According to Sahi et al. (2013), individual investors have a variety of preferences and beliefs that influence their choices of financial investments. Instead of highlighting mental deficiencies, these biases show how the investor's mind is structured. Moreover, Kumar and Goyal (2016) explain behaviour biases arise in different stage of decision-making process; Furthermore, Sharma et al. (2021) explained human behaviour that influences individual investment decision and its subsequent effect on the market. On the basis of literature various hypothesis are formulated. In this section only alternate hypothesis are presented.

H1: Overconfidence bias has a positive effect on investment decision.

H2: Disposition effect has a positive effect on investment decision.

H3: Herding bias has a positive effect on investment decision.

H4: Risk aversion has a positive effect on investment decision.

H5: Financial literacy moderates relationship between overconfidence bias and investment decision.

H6: Financial literacy moderates relationship between disposition effect and investment decision.

H7: Financial literacy moderates relationship between herding bias and investment decision.

H8: Financial literacy moderates relationship between risk aversion and investment decision.

1.4 Theoretical Framework

The study was guided by the traditional finance theories and behaviour finance theory.

1.4.1 Traditional Finance

The assumptions behind traditional finance theories frequently include individual rationality, information efficiency, and profit maximization (Fama, 1970). These ideas provided evidence that people only consider how to maximize investment returns while minimizing investment risks. The foundation pillars of traditional finance is Miller in 1844 who proposes theory "economic man or homo economics". Expected Utility theory was given by Bernoulli (1954), Von Neumann and Morgenstern (1944), Markowitz portfolio theory known as modern portfolio theory was given by Markowitz (1952), Building on Harry Markowitz's earlier research on diversification and modern portfolio theory, (Treynor, 1962; Sharpe, 1964; Lintner, 1965; Mossin, 1966) each independently established the CAPM. Another version of the CAPM, known as BlackCAPM or zero-beta CAPM, was developed by (Black, 1972). Efficient market hypothesis proposed by (Fama, 1970).

1.4.2 Economic Man or Homo Economics

The homo economics concept rests on three fundamental presumptions: humans make decisions based on all available information; people have a rational choice regarding outcomes; and people maximize utility. Later, these presumptions serve as the cornerstone of common theories that offer strategies for maximizing people's marginal utility despite a variety of environmental restrictions.

1.4.3 Expected Utility Hypothesis

The expected utility hypothesis is an economic concept that serves as a guideline for decisions when the payoff is uncertain. Based on their risk appetite and preferences, the theory recommends which option rational individuals should choose in a complex situation. According to theory, the utility function's shape directly reflects an individual's attitude toward risk: People who are risk-averse have concave utility functions, whereas those who are risk-seeking have convex utility functions. The degree of risk aversion is shown by the curvature of the utility function. Moreover, von Neumann and Morgenstern (1944) suggest "rationality is VNM-rationality" with four axioms: completeness, transitivity, continuity and independence.

1.4.4 Markowitz Portfolio Theory

Harry Max Markowitz, a 1952 Nobel laureate who received his award in 1990, presented the portfolio selection theory. By selecting the risk of free stock with risky assets in the portfolio, this model recommends the method of creating an ideal portfolio. It was focused with "either maximizing the portfolio's expected return for a given level of risk or reducing risk for a given level of expected return." Additionally, by selecting financial assets with accessible risk-return prospects, the investor might create the most ideal diversifiable portfolio with the aid of the Markowitz portfolio model.

1.4.5 Capital Assets Pricing Model

Markowitz's prior research on diversification and contemporary portfolio theory served as a foundation for the CAPM, which was independently constructed by Treynor (1962), Sharpe (1964), Lintner (1965), and Mossin (1966). To determine which assets ought to be included in a well-diversified portfolio, the required rate of return for each asset is estimated using the capital asset pricing model. Sharpe and Markowitz shared the 1990 Nobel Memorial Prize in Economics for their contributions to the area of financial economics. Black developed a different type of CAPM in 1972 known as the Black CAPM or zero-beta CAPM, which does not rely on the presence of a riskless asset. This variant, which was more impervious to empirical testing, helped the CAPM gain widespread acceptance.

1.4.6 Efficient Market Hypothesis

As defined by Fama (Fama, 1970), market efficiency implies that asset prices in financial markets correctly represent all of the information which is currently available. The efficient market hypothesis (EMH) states that markets are efficient when their prices account for any accessible information and are at a level where individual investors cannot outperform or outperform the market. EMH is sometimes referred to as the random walk hypothesis since neither an increase in prices nor a decline in prices can be forecast by an investor. According to assertions made by Malkiel (2003), the market and stocks may actually be as random as tossing a coin. Fama was the first to use the phrase "market efficiency" in relation to financial markets in 1965.

1.4.7 Behaviour Finance

Even though EMH is a cornerstone of traditional finance, with many concerns that traditional finance is unable to address, leading to the emergence of behavioral finance as a viable alternative. A relatively young topic called "Behavioral finance" aims to explain why people make bad financial decisions by fusing classical economics and finance with behavioral and cognitive psychologist theories. Behavioral economics officially began in 1979 with the publication of a paper by pioneers Daniel Kahneman and Amos Tversky on prospect theory and how individuals perceive economic risk. Although economists have been examining financial actions for millennia, this was only the beginning of behavioral economics. Behavioral finance, according to Nofsinger (2017), examines how individuals act in a financial context. It is the examination of the impact of psychology on businesses, financial markets, and financial decisions.

1.4.8 Cognitive Dissonance

Festinger et al. (1956) define cognitive dissonance; they proposed that cognitive dissonance occurs when two concurrently held cognitions are inconsistent.

Furthermore, cognitive dissonance creates an unpleasant feeling in people, so they try to reduce or avoid it by changing their beliefs/convictions. Many researchers investigate the psychological cycles that are a component of cognitive psychology in terms of decision making under abnormal conditions. Raiffa (1968) contributes significantly to the development of this body of literature. Moreover, the researcher examines "decisions under three approaches that give unique insight of individuals thought pattern and these approaches are such as normative approach, descriptive approach, and prescriptive approach".

1.4.9 Prospect Theory

Choices amid uncertain prospects reveal a number of significant factors that go counter to the core assumptions of utility theory. People, in particular, tend to place less value on outcomes that are just likely than those that can be determined with certainty. Helps people choose risk-aversely when definite benefits are at stake and choose risk-seeking when certain losses are at stake. Additionally, when the same option is given in several ways, people tend to ignore qualities that are shared by all of the potential candidates, leading to inconsistent choices. A novel theory where decision weights are used in place of probability and value is attributed to losses and gain as opposed to ultimate assets. According to Kahneman and Tversky (1979), the value function is generally convex for losses, concave for gains, and sharper for losses than gains. Prospect theory examines a variety of mental conditions that

might influence a person's decision-making process.

1.4.10 Behavioral Biases of Investors

Individual investors are affected by a variety of behavioral biases, according to recent research. These biases cause investors to make poor investment decisions, which can jeopardize their financial wealth. Shefrin (2000) divides behavioral biases into two categories: frame dependent biases & heuristic driven biases.

1.5 Empirical Review

According to Paneru (2023), the essential worth of a stock significantly influences investors' decision-making, and the disclosure of earnings similarly affects these choices. Investors are unable to achieve abnormal returns due to the random walk nature of stock prices, making it impossible to forecast future prices solely based on historical price patterns.

Dhungana et al. (2022) studied effect of five cognitive biases on investment decision taking investor of Pokhara valley of Nepal using convenience method of sampling, distributing questioner to 196 individual investor taking margin of error of 7% found that, overconfidence bias, availability bias, herding bias significantly affect investment decision however anchoring and regret aversion bias appear to have no significant effect on investment decision.

Pandit (2021) conducted survey based research to find association between experience group and behaviour bias (herding bias, investment decision bias, disposition bias, overconfidence bias, optimism bias) and found that optimism bias and herding bias has significant association with experience group similarly, experience group doesn't have significant association with investment decision bias, disposition effect, overconfidence on the other hand, in case of trading frequency and behaviour bias researcher found that trading frequency has association with herding bias, investment decision bias, disposition effect, overconfident and optimism bias.

Dangol (2018) observed in her article "Gender differences in financial decision-making" that women are less risk tolerant than males. Likewise, gender disparities in financial decisions are higher in the areas of gambling, expected loss, and investment strategy; furthermore, women have lower risk tolerance in areas associated with financial and investment expertise; and ultimately, women substantially underestimate their financial risk tolerance when utilizing the 13 questions developed by (Grable & Lytton, 2003).

Pokharel (2018) investigated Nepalese stock market investors' preferences. The reasons for investing in the stock market include liquidity and high earnings rates. The most influencing variables for NEPSE investing are information provided by stock brokers, daily newspapers, and market attitudes. Respondents rated capital gain, liquidity, dividend, and bonus share as the most driving considerations.

Dangol and Shakya (2017) used statistical tools such as mean, ANOVA, and logistic regression to determine the investment pattern of a financially literate person. The researchers used convenient sampling and a sample size of 314 and discovered a significant relationship between gender and financial literacy. Similarly, while there is a significant relationship between income and financial literacy in the country, there is no significant relationship between age and financial literacy.

1.6 Research Gap

While several studies have investigated the impact of cognitive biases on investment decision-making in Nepal (Bhattarai & Dhungana, 2020; Koirala, 2018), and the role of financial literacy in investment decision-making (Shrestha & Shrestha, 2014), there is a need for further research that examines the moderating effect of financial literacy on the relationship between cognitive biases and investment decision-making in Nepal.

Specifically, the proposed study could investigate the impact of cognitive biases, such as overconfidence bias, disposition effect, risk aversion, and herding bias, on investment decision-making, while also considering the moderating effect of financial literacy. While previous research has found that cognitive biases can influence investment decision-making in Nepal (Bhattarai & Dhungana, 2020; Koirala, 2018), and that financial literacy can improve investment decision-making (Shrestha & Shrestha, 2014), the potential moderating effect of financial literacy has not been thoroughly examined in the Nepalese context.

Additionally, the proposed study could investigate the impact of education level on the relationship between cognitive biases, financial literacy, and investment decision-making in Nepal. Previous research has found that education level can positively impact investment decision-making in Nepal (Rijal, 2019), but the potential moderating effect of education level on the relationship between cognitive biases and investment decision-making has not been examined.

By incorporating these and other relevant studies into the proposed research, the study could contribute to a more

comprehensive understanding of the relationship between cognitive biases, financial literacy, and investment decision-making in the Nepalese context.

2. Research Methodology

Here, the procedures used to gather and evaluate data in order to achieve the study's objectives have been described. It primarily addresses the research design, demographic, sample size considerations, equipment used to gather data, data collecting sources and methods, and data analysis tools and methodologies.

2.1 Research Design

In order to execute the study, mixed method approach of descriptive and casual comparative research design has been adopted. The study attempted to test hypothesis regarding the impact of behaviour bias on investment decision. Tools like correlation and hierarchical regression is used and central tendency tools mean in preference is also being used. Similarly (Baker et al., 2018; Adil et al., 2021; Ahmad & Shah, 2020) used regression and central tendency to analyze influence of behaviour bias on investment decision.

2.2 Population and Sampling Procedure

Among more than 5.3 million DEMAT holders in Nepal, only around 3 million are active and those active DEMAT holders of Nepal were considered as population target for the study. Non-probability sampling is used in the study. Under the non-probability sampling method, a purposive sampling is used where active DEMAT holders were selected for the study. Purposive sampling enabled the study to select the most appropriate respondents who are well versed with the issues under consideration and who would provide adequate relevant information. The sample size for this study has been determined as: number of items in the questionnaire*10 as suggested by (Hair et al., 2013). The questionnaire includes 33 items under the constructs. Thus, the appropriate sample size for this study has been established as $33*10=330$.

2.3 Research Framework

Conceptual framework to measure effect of behaviour bias and investment decision moderated by financial literacy

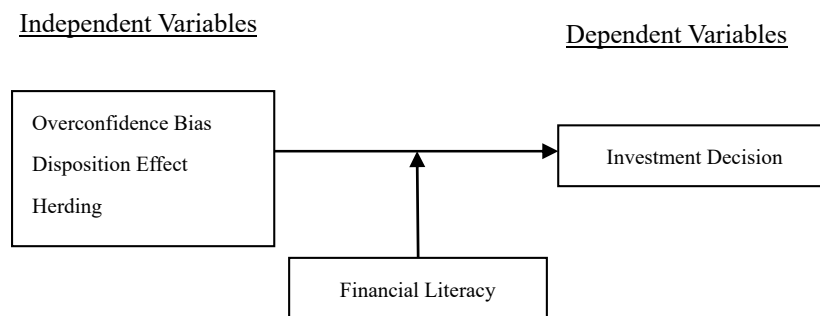


Figure 1. Conceptual framework (modified from Adil et al., 2021)

2.3.1 Operational Definition of the Variables

Investment Decision: Investment decision refers to the process of choosing which securities or assets to purchase or sell in order to achieve a financial goal. It's a crucial part of personal financial management and it involves evaluating different investment options, assessing the potential risks and returns and determining the optimal allocation of resources.

Overconfidence Bias: Overconfidence bias arises when individuals overestimate the precision of their own private information and believe that they have an edge over other market participants.

Herding: Lebaron (2002) define herding as the tendency of investors to imitate the actions of a subset of their peers, rather than relying on their own private information.

Disposition Effect: Barber and Odean (1998), Shefrin (2000) describe disposition effect as a phenomenon in which investors tend to grip on to losing investments for too long and sell winning investments too primary. However, Kahneman and Tversky (1984) defined disposition effect as a tendency for investors to overvalue investment that they have made and sell them too late.

Risk Aversion: Baker and Wurgler (2006) define risk aversion as the behavior of individuals and institutions

where they prefer a certain outcome over an uncertain one.

Financial Literacy: Financial literacy is the familiarity and understanding of financial concepts, tools, and strategies that individuals need to make informed and effective decisions with their money.

2.4 Data Analysis

Descriptive statistics were computed to summarize the demographic characteristics of the participants. Next, hierarchical linear regression was conducted to examine the relationships between overconfidence, disposition effect, and herding and risk aversion on investment decision taking demographic variables constant. To test for the moderating effect of financial literacy, the PROCESS macro was employed. This allowed for the calculation of the strength and direction of the moderation effect, as well as the significance of the interaction term between the predictor and moderator variables.

2.4.1 Measurement of Variables

Table 1. Measurement of variables

Variable	Measurement	Expected sign	Source
Investment decision	Risk tolerance, long term investment, Research before decision, Diversify, Review and adjust		Barber and Odean(2008)
Overconfidence bias	Better than average, more confident than most people, ID more accurate, Doubt, Superior than other	Positive sign	Odean (1999), Grinblatt and Keloharju (2000), Barber and Odean (2001), Brockner et al.(2001)
Herding bias	Action of other, Popular stocks, Influence by opinion, Following other people investment, Trend follower	Positive sign	Bikhchandani et al.(1992), Chang et al(2000)
Disposition effect	Holding losing stock, Balance loss, upset with losing stock, holding unprofitable stock, realize gain, Price of unprofitable stock to go up, regrate about upward price of sold stock, Index increase hold stock	Positive sign	Shefrin & Statman (1985), Muermann & Volkman (2006)
Risk aversion	Prefer less risky, Guaranteed return, Avoid potential losses, too much risk, Sure gain	Positive sign	Kahneman and Tversky (1979)
Financial literacy	Risk and return, Basic term and concept, evaluate performance, Factors affecting, Able to understand financial statement	Negative sign	Lusardi and Mitchell(2007)

The basic regression model to analyses the impact of behaviour bias on investment decision is:

$$ID = \alpha + \beta_1 O + \beta_2 H + \beta_3 DE + \beta_4 R + \epsilon \tag{i}$$

Where α denotes the intercept term, β ($\beta_1, \beta_2, \beta_3, \beta_4,$) denotes the regression coefficients, while ID, O, H, DE, and R represent investment decision, overconfidence, herding, disposition effect, and risk aversion likewise, ϵ represent error term. Similarly, for moderating effect of financial literacy (FL) following are the model.

$$ID = \alpha + \beta_1 O + \beta_2 FL + \beta_3 O*FL + \epsilon \tag{ii}$$

$$ID = \alpha + \beta_1 DE + \beta_2 FL + \beta_3 DE*FL + \epsilon \tag{iii}$$

$$ID = \alpha + \beta_1 H + \beta_2 FL + \beta_3 H*FL + \epsilon \tag{iv}$$

$$ID = \alpha + \beta_1 R + \beta_2 FL + \beta_3 R*FL + \epsilon \tag{v}$$

2.4.2 Reliability Test

Table 2 shows the results of a reliability analysis using Cronbach's alpha for six different variables related to investment decision-making. The Cronbach's alpha coefficients range from 0.729 to 0.857. All coefficients are above the commonly accepted threshold of 0.7, indicating acceptable to good internal consistency for all variables Nunnally (1978).

Table 2. Summary of reliability analysis

Variables	Items	Cronbach's Alpha
Overconfidence	5	0.777
Disposition effect	8	0.833
Herding	5	0.729
Risk Aversion	5	0.776
Financial Literacy	5	0.787
Investment decision	5	0.857

Source: Field Survey, 2023.

3. Results and Analysis

In this section, the data analysis results are presented. The study variables were analyzed using correlation coefficients and regression analysis, utilizing both descriptive and inferential statistics. These analyses aimed to address the research questions and test the hypotheses stated in the study.

3.1 Descriptive Analysis

In this study, a Likert scale with six points was used to measure responses, namely “strongly disagree”, “disagree”, “somehow disagree”, “somehow agree”, “agree” and “strongly agree”. Using these values, the researcher was able to analyze the data in terms of frequencies and percentages, which provided valuable insights into respondent behavior.

Table 3. Descriptive statistics (N=338)

	Minimum m	Maximum m	Std.		Skewness	Kurtosis
			Mean	Deviation		
DE	1	6	4.3695	0.99125	-0.883	0.879
FL	1	6	4.4882	0.98326	-0.899	1.019
H	1	6	4.0669	1.01626	-0.275	0.193
ID	1	6	4.2154	1.15206	-0.795	0.118
O	1	6	4.0805	1.10844	-0.265	-0.261
R	1	6	4.129	1.10405	-0.671	0.138

Source: Field survey, 2023.

The minimum, maximum, skewness, and kurtosis of disposition effect, financial literacy, herding, investment decision, overconfidence and risk aversion are presented in Table 3. To test the normality of data, skewness and kurtosis test were examined. Skewness and kurtosis are the indicators to see if the variables are normally distributed (Falola et al., 2014). Threshold values for skewness is ± 3 and threshold values for kurtosis is ± 10 (Kline, 1998). Data are not severely skewed. Hence, the skewness and kurtosis values were found within the acceptable range as per the rule of thumb.

3.2 Association between Gender and Investment Decision

In order to investigate the potential influence of gender on investment decision-making, the participants were divided into two sub-groups: male and female. To determine whether there were any significant variances in investment decision-making between these two groups, an independent t-test was conducted.

Table 4. Group statistics

Variables	Gender	N	Mean	Std.	
				Deviation	Error
O	Male	209	4.0297	1.06142	0.07342
	Female	129	4.1628	1.18025	0.10391
DE	Male	209	4.3379	0.985	0.06813
	Female	129	4.4205	1.00304	0.08831
H	Male	209	4.0364	1.00662	0.06963
	Female	129	4.1163	1.03371	0.09101
FL	Male	209	4.5005	1.00252	0.06935
	Female	129	4.4882	0.95476	0.08406
ID	Male	209	4.178	1.15729	0.08005
	Female	129	4.276	1.14542	0.10085
R	Male	209	4.1177	1.0904	0.07542
	Female	129	4.1473	1.12986	0.09948

Source: Field survey, 2023.

Table 5. T-test results comparing male and female on different variables

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	Sig. (2-tailed)
O	Equal variances assumed	6.099	0.014	-1.073	0.284
	Equal variances not assumed			-1.046	0.296
DE	Equal variances assumed	0.059	0.808	-0.744	0.457
	Equal variances not assumed			-0.741	0.459
H	Equal variances assumed	0.267	0.606	-0.702	0.483
	Equal variances not assumed			-0.697	0.486
FL	Equal variances assumed	0.228	0.634	0.293	0.77
	Equal variances not assumed			0.296	0.767
ID	Equal variances assumed	0.001	0.973	-0.759	0.448
	Equal variances not assumed			-0.761	0.447
R	Equal variances assumed	0.102	0.749	-0.239	0.811
	Equal variances not assumed			-0.237	0.813

Source: Field survey, 2023.

An independent samples test was conducted to compare the means of different groups (O, DE, H, FL, ID, and R). Levene's test was used to determine if the assumption of equal variances could be made. The results showed that for groups DE, H, FL, and ID, the assumption of equal variances was upheld, as indicated by high p-values ($p > 0.05$) and F values of 0.059, 0.267, 0.228, and 0.001, respectively. However, for group O, the assumption of equal variances was violated, as shown by a low p-value ($p < 0.05$) and an F value of 6.099. Subsequently, a t-test for equality of means was performed, both assuming and not assuming equal variances. The results showed that there were no significant differences in means between the groups, regardless of whether equal variances were assumed or not, as indicated by high p-values ($p > 0.05$) and t statistics ranging from -1.046 to 0.296 for all groups.

3.3 Association between Age and Investment Decision

To assess how age impacts on disposition effect, financial literacy, herding, investment decision, overconfidence and risk aversion participants were categorized into five age groups: 18-25, 26-35, 36-45, 46-55, and above 55 years. Since there were more than two groups, a one-way ANOVA was conducted to determine if there were any significant differences between the age groups regarding their investment decisions. Table 6 presents the results of this analysis, which indicate that there is indeed a statistically significant difference among the different age groups in terms of their investment decisions.

Table 6. One way ANOVA age

		Sum of Squares	df	Mean Square	F	Sig.
O	Between Groups	7.486	4	1.871	1.593	0.192
	Within Groups	406.565	333	1.221		
DE	Between Groups	9.054	4	2.263	2.34	0.055
	Within Groups	322.076	333	0.967		
H	Between Groups	6.181	4	1.545	1.505	0.2
	Within Groups	341.868	333	1.027		
FL	Between Groups	5.605	4	1.401	1.457	0.215
	Within Groups	320.208	333	0.962		
ID	Between Groups	37.461	4	9.365	7.61	0
	Within Groups	409.819	333	1.231		
R	Between Groups	7.022	4	1.755	1.448	0.218
	Within Groups	403.754	333	1.212		

Source: Field survey, 2023.

The table presents the results of an ANOVA analysis for different variables (O, DE, H,FL, ID, and R) in respective of age. Among the variables, ID has a significant p-value of 0.000 and a relatively high F-statistic of 7.610, suggesting a significant difference between the group means. However, variables O, DE, H, FL, and R do not have statistically significant differences between group means, as their p-values are greater than 0.05 and their F-statistics are below the threshold for significance.

Table 7. Fisher's LSD post hoc tests age

(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence	
					Lower Bound	Upper Bound
18 to 25	25 to 35	.83741*	0.19404	0	0.4557	1.2191
	45 to 55	.82062*	0.20977	0	0.408	1.2333
25 to 35	35 to 45	-.62495*	0.2031	0.002	-1.0245	-0.2254
	Above 55	-.71923*	0.19446	0	-1.1017	-0.3367
35 to 45	45 to 55	.60815*	0.21817	0.006	0.179	1.0373
45 to 55	Above 55	-.70244*	0.21015	0.001	-1.1158	-0.2891

Note. * mean difference is significant at the 0.05 level.

Source. Field survey, 2023.

Table 7 show that the mean differences between the age groups 18 to 25 and 25 to 35 ($p < .001$), 18 to 25 and 45 to 55 ($p < .001$), 25 to 35 and above 55 ($p = .000$), 35 to 45 and above 55 ($p = .001$), and 45 to 55 and above 55 ($p = .001$) were significant at the 5% level of significance. Therefore, these age group pairs are significantly different in terms of their investment decisions. Overall, the ANOVA test and the subsequent multiple comparisons using LSD suggest that the investment decision is significantly associated with the age group, and specific age groups differ significantly from one another.

3.4 Association between Marital Status and Other Variables

Table 8. T-test results comparing marital status on different variables

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	Sig. (2-tailed)
O	Equal variances assumed	0.829	0.363	-1.357	0.176
	Equal variances not assumed			-1.336	0.183
DE	Equal variances assumed	0.191	0.662	-1.197	0.232
	Equal variances not assumed			-1.199	0.232
H	Equal variances assumed	4.232	0.04	-1.989	0.048
	Equal variances not assumed			-1.908	0.058
FL	Equal variances assumed	0.337	0.562	-0.276	0.783
	Equal variances not assumed			-0.273	0.785
ID	Equal variances assumed	1.571	0.211	0.406	0.685
	Equal variances not assumed			0.4	0.69
R	Equal variances assumed	0.327	0.568	-0.178	0.859
	Equal variances not assumed			-0.178	0.859

Source. Field survey, 2023.

The table 8 presents the results of the independent samples t-test for equality of means and also Levene’s test for equality of variances. The p-values for the t-test are provided for two scenarios: assuming equal variances and not assuming equal variances. Among the different groups (O, DE, H, FL, ID, and R), only the "H" group shows a statistically significant result, with a p-value of 0.048 for the t-test with equal variances not assumed. This suggests that there may be a significant difference in herding behavior for marital status in the "H" group.

Table 9 shows that mean difference among married and unmarried across variables, it shows that unmarried people are highly influence by herding behaviour than married one.

Table 9. Mean difference among married and unmarried across variables

Group Statistics Married=209 unmarried=129				
Variables	Marital Status	Mean	Std. Deviation	Std. Error Mean
O	Married	4.0163	1.07789	0.07456
	Unmarried	4.1845	1.15288	0.10151
DE	Married	4.3188	0.99283	0.06868
	Unmarried	4.4516	0.98701	0.0869
H	Married	3.9809	0.93912	0.06496
	Unmarried	4.2062	1.11997	0.09861
FL	Married	4.4766	0.96868	0.06701
	Unmarried	4.507	1.00996	0.08892
ID	Married	4.2354	1.12185	0.0776
	Unmarried	4.1829	1.20313	0.10593
R	Married	4.1206	1.1007	0.07614
	Unmarried	4.1426	1.11361	0.09805

3.5 Association between Education and Investment Decision

To investigate how education level affects investment decisions, participants were grouped into four categories based on their education level: Up to Intermediate, Bachelor's, Master's, and above Master's. Given the multiple education level groups, a one-way ANOVA was employed to assess if there were any significant differences in investment decisions among the different education level groups.

Table 10. ANOVA Education level

		Sum of Squares	df	Mean Square	F	Sig.
O	Between Groups	5.757	3	1.919	1.57	0.196
	Within Groups	408.294	334	1.222		
DE	Between Groups	5.754	3	1.918	1.969	0.118
	Within Groups	325.376	334	0.974		
H	Between Groups	3.734	3	1.245	1.207	0.307
	Within Groups	344.315	334	1.031		
FL	Between Groups	4.693	3	1.564	1.627	0.183
	Within Groups	321.119	334	0.961		
ID	Between Groups	6.782	3	2.261	1.714	0.164
	Within Groups	440.498	334	1.319		
R	Between Groups	3.838	3	1.279	1.05	0.371
	Within Groups	406.938	334	1.218		

Source. Field survey, 2023.

The table 10 shows the results of an ANOVA analysis for different variables (O, DE, H, FL, ID, and R). None of the variables show statistically significant differences between group means, as their p-values are greater than 0.05, indicating no significant effects.

3.6 Association between Monthly Income and Investment Decision

The Table 11 presents the results of an ANOVA analysis for different variables (O, DE, H, FL, ID, and R). The F-value and p-value are highlighted as they indicate the significance of the differences between group means. However, none of the variables show statistically significant differences between group means, as their p-values are greater than 0.05, except for the variable ID, which has a significant F-value of 4.366 and a p-value of 0.002, suggesting that there may be a significant effect for this variable.

Table 11. One way ANOVA monthly income

		Sum of Squares	df	Mean Square	F	Sig.
O	Between Groups	6.201	4	1.55	1.266	0.283
	Within Groups	407.85	333	1.225		
DE	Between Groups	6.991	4	1.748	1.796	0.129
	Within Groups	324.139	333	0.973		
H	Between Groups	5.324	4	1.331	1.298	0.272
	Within Groups	342.725	333	1.029		
FL	Between Groups	6.461	4	1.615	1.684	0.153
	Within Groups	319.352	333	0.959		
ID	Between Groups	22.29	4	5.572	4.366	0.002
	Within Groups	424.99	333	1.276		
R	Between Groups	5.52	4	1.38	1.134	0.34
	Within Groups	405.255	333	1.217		

Source. Field survey, 2023.

Table 12. Fisher's LSD post hoc tests monthly income as dependent variable

(I) Monthly Income	(J) Monthly Income	Mean Differenc e (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Below NPR 20,000	Below NPR 20,000	-0.61105	0.21233*	0.004	1.0287	0.1934
	20,000 to NPR 30,000	-0.569	0.21959*	0.01	-1.001	-0.137
	30,000 to NPR 40,000	-0.74046	0.21719*	0.001	1.1677	0.3132
40,000 to NPR 50,000	More than NPR 50,000	-0.79317	0.19837*	0	1.1834	0.4029

Note. * The mean difference is significant at the 0.05 level.

Source. Field survey, 2023.

The LSD post-hoc analysis was conducted to determine which income groups had significantly different mean scores on ID. The table 12 shows the mean difference, standard error, and p-value for each pairwise comparison between income groups. Results indicate that the mean difference between the NPR 40,000 to NPR 50,000 income group and the below NPR 20,000 income group (mean difference = -0.61105, p = 0.004) and between the More than NPR 50,000 income group and the NPR 40,000to NPR 50,000 income group (mean difference = 0.79317, p < 0.001) were statistically significant at the 0.05 level.

The result of the first comparison suggests that individuals with an income between NPR 40,000 to NPR 50,000 have a significantly lower mean score on ID compared to those with an income below NPR 20,000. The second comparison suggests that individuals with an income more than NPR 50,000 have a significantly higher mean score on ID compared to those with an income between NPR 40,000 to NPR 50,000.

3.7 Association between Year of Investment and Investment Decision

Table 13. One way ANOVA year of investment

		Sum of Squares	df	Mean Square	F	Sig.
O	Between Groups	2.227	2	1.114	0.906	0.405
	Within Groups	411.824	335	1.229		
DE	Between Groups	1.07	2	0.535	0.548	0.581
	Within Groups	330.06	335	0.985		
H	Between Groups	2.34	2	1.17	1.134	0.323
	Within Groups	345.709	335	1.032		
FL	Between Groups	0.614	2	0.307	0.316	0.729
	Within Groups	325.199	335	0.971		
ID	Between Groups	0.389	2	0.195	0.146	0.864
	Within Groups	446.891	335	1.334		
R	Between Groups	1.497	2	0.748	0.613	0.543
	Within Groups	409.279	335	1.222		

Source. Field survey, 2023.

The table 13 displays the results of an ANOVA analysis for different variables (O, DE, H, FL, ID, and R). The F-value and p-value are provided, but none of the variables show statistically significant differences between group

means, as all the p-values are greater than 0.05. Thus, there is no significant effect observed for any of the variables based on the ANOVA results.

3.8 Association between Trade in a Month and Investment Decision

Table 14. T-test results comparing monthly trade in a month on investment decision

	Levene's Test for Equality of Variances		t-test for Equality of Means	
	F	Sig.	t	Sig. (2-tailed)
O	1.518	0.219	1.945	0.053
			1.824	0.074
DE	1.543	0.215	0.143	0.887
			0.132	0.895
H	0.526	0.469	1.404	0.136
			1.414	0.163
FL	0.143	0.706	0.117	0.907
			0.114	0.91
ID	1.478	0.225	-0.779	0.437
			-0.724	0.472
R	0.304	0.582	-0.241	0.809
			-0.234	0.816

Source. Field survey, 2023.

The table 14 displays the results of the independent samples t-test for equality of means and Levene's test for equality of variances. The table includes F-values and p-values for Levene's test, which assesses if the variances of the two groups being compared are equal. Additionally, the table provides t-values and p-values for the t-test, which examines if there is a significant difference in means between the groups. The p-values are reported for two scenarios: assuming equal variances and not assuming equal variances. However, none of the groups (O, DE, H, FL, ID, and R) show statistically significant results, as all the p-values are greater than 0.05 (i.e., >0.05). This suggests that there is no significant difference in means between the groups for the variables being compared in this analysis.

3.9 Correlation Analysis

Pearson coefficients of correlation between independent, moderating, and outcome variables are shown in Table 15.

Table 15. Correlations between four behavioral biases, financial literacy and investment decision

Variables	O	DE	H	FL	ID	R
Overconfidence bias	1					
Disposition effect	.547**	1				
Herding bias	.398**	.589**	1			
Financial literacy	.506**	.603**	.550**	1		
Investment decision	.511**	.547**	.403**	.564**	1	
Risk aversion	.354**	.527**	.646**	.728**	.465**	1

Note. ** Correlation is significant at the 0.01 level (2-tailed). Source. Field survey, 2023.

The correlations with the dependent variable, investment decision (ID), are of particular interest. The correlation coefficients indicate a positive and significant correlation between investment decision and each of the other constructs. The correlation coefficient between investment decision and disposition effect is 0.547**, indicating a moderate positive relationship. The correlation coefficient between investment decision and financial literacy is 0.564**, indicating a moderate positive relationship. The correlation coefficient between investment decision and herding is 0.403**, representative a weak positive relationship. Finally, the correlation coefficient between investment decision and risk aversion is 0.465**, indicating a weak positive relationship.

The correlation coefficients with other constructs are also noteworthy. The correlation coefficient between overconfidence (O) and disposition effect (DE) is 0.547**, indicating a moderate positive relationship. This suggests that individuals who are more overconfident tend to exhibit a stronger disposition effect, meaning they are more likely to hold onto losing investments and sell winning investments too quickly. The correlation coefficient between overconfidence (O) and herding (H) is 0.398**, indicating a weak positive relationship. This suggests that individuals who are more overconfident tend to have a slightly stronger tendency to follow the crowd and engage in herding behavior. The correlation coefficient between Overconfidence (O) and financial literacy (FL) is 0.506**, indicating a moderate positive relationship. This suggests that individuals who are more overconfident tend to have higher levels of financial literacy. The correlation coefficient between overconfidence (O) and risk aversion (R) is 0.354**, indicating a weak positive relationship. This suggests that individuals who are more overconfident tend to be slightly more risk averse.

Similarly, the correlation coefficient between Disposition Effect (DE) and Herding (H) is 0.589**, indicating a moderate positive relationship. This suggests that individuals who exhibit a disposition effect in their investment decisions are also likely to engage in herding behavior. The correlation coefficient between DE and Financial Literacy (FL) is 0.603**, indicating a moderate positive relationship. This suggests that individuals with higher financial literacy are less likely to exhibit a disposition effect in their investment decisions. The correlation coefficient between DE and Risk Aversion (R) is 0.527**, indicating a moderate positive relationship. This suggests that individuals who exhibit a disposition effect in their investment decisions are also likely to be more risk-averse. The correlation coefficient between financial literacy (FL) and herding (H) is 0.550**, indicating a moderate positive relationship. This suggests that individuals with higher levels of financial literacy tend to engage less in herding behavior. The correlation coefficient between financial literacy (FL) and risk aversion

(R) is 0.728**, indicating a strong positive relationship. This suggests that individuals with higher levels of financial literacy tend to be less risk-averse. The correlation coefficient between risk aversion (R) and herding (H) is 0.646**, indicating a strong positive relationship. This suggests that individuals who are more risk-averse tend to engage more in herding behavior.

Overall, the correlation table shows that the constructs are significantly correlated with each other, and the strongest correlation is between risk aversion and financial literacy. The moderate positive correlations between investment decision and other constructs highlight the importance of these constructs in influencing investment decisions.

3.10 Regression Analysis

Table 16. Regression analysis

Variable	Model 1		Model 2		Model 3		Model 4		Model 5	
	step 1	step 2	step 2	step 2	step 2	step 2	step 2	step 2	step 2	step 2
Constant	4.113	1.7	1.391	2.109	2.047	0.461				
Gender	0.046	-0.014	0.016	0.025	0.6	0.004				
Age	-0.115	-0.095	-0.052	-0.092	-0.101	-0.066				
Marital status	-0.085	-0.132	-0.106	-0.158	-0.089	-0.121				
Highest education	-0.097	-0.091	-0.102	-0.091	-0.049	-0.073				
Monthly income	0.082	0.072	0.055	0.062	0.073	0.059				
Years of investment	0.042	-0.27	0.046	0.064	0.068	0.017				
Monthly trade	0.189	.372*	0.116	0.233	0.127	0.225				
Overconfidence	-	0.543**	-	-	-	0.307**				
Disposition effect	-	-	.636**	-	-	0.323**				
Herding	-	-	-	0.464**	-	-0.014				
Risk aversion	-	-	-	-	0.481**	0.206**				
R ²	0.014	0.282	0.309	0.178	0.225	0.409				
F value	0.671	16.115**	18.421**	8.914**	11.938**	0.393**				
change in r ²		0.268	0.285	0.164	0.211	0.395				

Note. * significant at P-value <0.05, ** p-value<0.001. Source. Field survey, 2023.

The table 16 shows the results of a regression analysis with two different steps. In the step 1, which included seven predictors Gender, Age, Marital Status, Highest Education, Monthly income, and Year of investment, the R-square was .014, indicating that the predictors explained only 1.4% of the variance in the dependent variable (ID). The adjusted R-square was -.007, which means that the model was not a good fit for the data. The F-test for the overall model was not significant (p = .696), indicating that the model did not significantly predict the dependent variable. In the second model, an additional predictor (O) was added to the model 1. The R-square increased to .282, indicating that the predictors in the second model explained 28.2% of the variance in the dependent variable. The adjusted R-square also increased to .264, indicating a better fit of the model. The F-test for the overall model was highly significant (p < .001), indicating that the second model significantly predicted the dependent variable. The coefficients in both models represent the unstandardized coefficients, which indicate the magnitude and direction of the relationship between each predictor and the dependent variable. However, Monthly trade (p = .042) and O (p < .001) had statistically significant coefficients, indicating that they were significant predictors of the dependent variable.

In contrast, step 2 on model 2 demonstrated a higher R-squared of 0.309, indicating that the predictors explained about 30.9% of the variance in the dependent variable. The overall model was statistically significant, as the F-statistic had a p-value of 0.000. The predictor "DE" showed a significant relationship with the dependent variable, as it had a standardized coefficient (Beta) of 0.547 and a p-value of 0.000. It is important to note that none of the predictor variables in step 1 showed statistically significant coefficients, while "DE" was the only significant predictor in step 2.

On the other hand, step 2 on model 3 demonstrated a higher R-squared of 0.178, indicating that the predictors in this model explained about 17.8% of the variance in the dependent variable. The overall model was statistically significant, as the F-statistic had a p-value of 0.000. Among the predictors, "H" showed a significant relationship with the dependent variable, as it had a standardized coefficient (Beta) of 0.409 and a very low p-value of 0.000, indicating a strong statistical significance. In summary, Model 1 had weak explanatory power and did not show any statistically significant predictors, while step 2 had a higher R-squared and showed that "H" was a significant predictor with a strong relationship to the dependent variable. The low p-value for "H" in step 2 suggests that it is likely an important predictor for explaining the variance in the dependent variable "ID."

In Step 2 of model 4, R Square = 0.474 explains more variance in ID compared to Model 1 (R Square = 0.014), indicating a better fit. The ANOVA results show that the regression models are statistically significant, with a highly significant F-value (p < 0.001) for step 2. The coefficients indicate that none of the predictors in step 1 or step 2 have significant relationships with ID, except for the additional predictor R in step 2, which has a significant

positive effect ($p < 0.001$) on ID.

The table 15 provides results from regression step 2 predicting the dependent variable ID. Step 2 (R Square = 0.409) explains more variance. The ANOVA results reveal that both regression models are statistically significant, with a highly significant F-value for Model 2 ($F = 20.510, p < 0.001$). Looking at the coefficients, in step 1, none of the predictors (Gender, Age, Marital Status, Highest Education, Monthly income, Year of investment, and Monthly trade) have significant relationships with ID, as indicated by their non-significant p-values (all $p > 0.05$). However, in Model 2, an additional predictor "R" has a significant positive effect on ID ($B = 0.226, t = 3.739, p < 0.001$), while predictors "O" and "DE" also have significant positive effects on ID ($B = 0.307, t = 5.678, p < 0.001$; $B = 0.323, t = 4.644, p < 0.001$) while, "H" has in signification effect on investment decision ($B = -0.014, t = -0.205, p = 0.837$, respectively). The significant p-values ($p < 0.001$) for the F Change statistic in the ANOVA table highlight that Model 2 is a significant improvement over Step 1 in explaining the variance in ID.

3.11 Moderating Analysis

In this section process macro is used to check moderating effect of financial literacy on relationship between overconfidence bias, disposition effect, and herding and risk aversion on investment decision.

3.11.1 Relationship between Overconfidence and Investment Decision, and Role of Financial Literacy

Table 17. Moderating effect of financial literacy on overconfidence and investment decision

Model	coeff	se	t	F	R ²	R ² Change
Constant	4.2775	0.0523	81.8344**			
O	0.2987	0.0511	5.8433**			
FL	0.4375	0.0589	7.4289**	75.73	0.4048	0.0184
O*FL	-0.1131	0.0352	-3.2132*			

Note. * p-value < 0.05, ** p-value < 0.001.

Source. Field survey, 2023.

According to the method of Hayes' PROCESS Macro model 1 for SPSS, the association between overconfidence and investment choice was examined to see if financial literacy had a moderating influence. The verification method utilized was Bootstrap, the sample size was 5000, and the confidence interval was 95%. As shown in Table 15, overconfidence was found to have a positive significant effect on investment decision (0.2987, $p < 0.001$). Similarly financial literacy was found to have a positive significant effect on investment decision (0.4375, $p < 0.001$). The interaction term between overconfidence and financial literacy had a negative significant effect on investment decision ($-0.1131, p < 0.05$). It can be seen that financial literacy moderated the relationship between overconfidence and investment decision.

Table 18. Conditional effects of overconfidence at values of financial literacy

FL	Effect	se	t	p	LLCI	ULCI
-0.9833	0.41	0.0587	6.9798	0	0.2944	0.5255
0	0.2987	0.0511	5.8433	0	0.1982	0.3993
0.9833	0.1875	0.0646	2.903	0.0039	0.0605	0.3146

Previously, the moderating effect of financial literacy was confirmed in the relationship between overconfidence and investment decision. The next step was to analyze the conditional effects of overconfidence on investment decision according to the level of financial literacy, and the results are shown in Table 18. The financial literacy was given as three conditions (-1 S.D., 0, and +1 S.D.), and the effects of overconfidence were all significant ($p < 0.05$). In other words, the lower the financial literacy, the higher the effect of overconfidence on investment decision.

The Moderator value(s) defining Johnson-Neyman significance region(s) section provides the values of the moderator variable financial literacy that define the region(s) in which the effect of the focal predictor variable overconfidence is significant. In this case, the critical value is 1.3619, which means that the effect of overconfidence on the outcome variable is significant when financial literacy is below 1.3619.

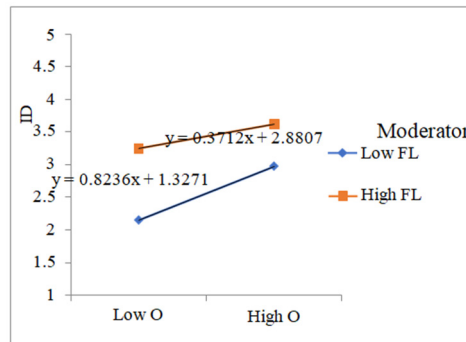


Figure 2. Moderating effect of financial literacy on relationship between overconfidence and investment decision

Figure 2 displays the findings of a basic slope analysis performed to comprehend the nature of the moderating effects. Figure 1's substantially steeper line for low FL illustrates how the impact of O on ID is much greater at low FL levels compared to higher FL levels. As the level of FL rose, the strength of the association between O and ID weakened.

3.11.2 Relationship between Disposition Effect and Investment Decision, and Role of Financial Literacy

The study assessed the moderating role of financial literacy on the relationship between Disposition effect and investment decision. The result revealed a negative and significant moderating impact of FL on the relationship between DE and ID ($\beta = -0.100, t = -2.7634, p = 0.006$). The Model Summary shows that the model has an R-squared value of 0.3986, indicating that 39.86% of the variance in the outcome variable is explained by the predictor variables. The F-statistic is 7.6362, and its associated p-value is less than 0.001, indicating that the model is statistically significant. The coefficients for the predictor variables are provided in the Model section. DE has a coefficient of 0.3395, and FL has a coefficient of 0.3870. Both coefficients are statistically significant at the 0.001 level. The constant term has a coefficient of 4.2740, and it is also statistically significant.

Table 19. Moderating effect of financial literacy on Disposition effect and investment decision

Model						
	coeff	se	t	F	R ²	R ² Change
Constant	4.274	0.0532	80.2983**			
DE	0.3395	0.0633	5.3619**	73.78	0.3986	0.0138
FL	0.387	0.0644	6.0122**			
DE*FL	-0.1	0.0362	-2.7634*			

Note. * p-value <0.05, ** p-value <0.001.

Source. Field survey, 2023.

Previously, the moderating effect of financial literacy was confirmed in the relationship between disposition effect and investment decision. The next step was to analyze the conditional effects of disposition effect on investment decision according to the level of financial literacy, and the results are shown in Table 17. The financial literacy was given as three conditions (-1 S.D., 0, and +1 S.D.), and the effects of disposition effect were all significant ($p < 0.05$). In other words, the lower the financial literacy, the higher the effect of disposition effect on investment decision.

Table 20. Conditional effects of disposition effect at values of financial literacy

FL	Effect	se	t	p	LLCI	ULCI
-0.9833	0.4379	0.0656	6.6718	0	0.3088	0.567
0	0.3395	0.0633	5.3619	0	0.215	0.4641
0.9833	0.2412	0.079	3.052	0.0025	0.0857	0.3966

Source. Field survey, 2023.

The Conditional effects of the focal predictor at values of the moderator(s) section show that the effect of DE on ID is significant at all levels of FL. The Conditional effect of focal predictor at values of the moderator section shows that the effect of DE on ID becomes stronger as FL decreases. There are no statistically significant transition points within the observed range of the moderator found using the Johnson-Neyman method.

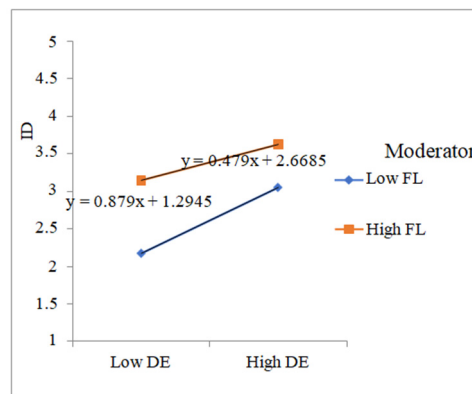


Figure 3. Moderating effect of financial literacy on relationship between disposition effect and investment decision

Figure 3 displays the outcomes of a simple slope analysis used to investigate the moderating effects. The plot shows that the line slope is much steeper for low levels of FL, indicating that the impact of DE on ID is much more significant when FL is low. The plot also demonstrates that as the level of FL increased, the relationship between DE and ID became weaker.

3.11.3 Relationship between herding and investment decision, and role of financial literacy

The study assessed the moderating role of financial literacy on the relationship between Herding and investment decision. The result revealed a negative and significant moderating impact of FL on the relationship between H and ID ($\beta = -0.1585$, $t = -4.0361$, $p = 0.0001$). The first part of the output gives some information about the model as a whole. The R-squared value is 0.3614, indicating that the predictors explain about 36% of the variance in the outcome variable. The F-value is significant at $p < .001$, indicating that the model as a whole is significant.

Table 21. Moderating effect of financial literacy on herding and investment decision

Model						
	coeff	se	t	F	R ²	R ² Change
Constant	4.3022	0.0547	78.6376**			
H	0.1625	0.0594	2.7357*	63.002	0.3614	0.0311
FL	0.4953	0.0644	7.6901*			
H*FL	-0.1585	0.0393	-4.0361**			

Source. Field survey, 2023.

Previously, the moderating effect of financial literacy was confirmed in the relationship between herding and investment decision. The next step was to analyze the conditional effects of herding on investment decision according to the level of financial literacy, and the results are shown in Table 21. The financial literacy was given as three conditions (-1 S.D., 0, and +1 S.D.), and the effects of herding were all significant ($p < 0.05$). In other words, the lower the financial literacy, the higher the effect of herding on investment decision.

Table 22. Conditional effects of disposition effect at values of financial literacy

FL	Effect	se	t	p	LLCI	ULCI
-0.9833	0.3184	0.0724	4.3983	0	0.176	0.4608
0	0.1625	0.0594	2.7357	0.0066	0.0457	0.2794
0.9833	0.0066	0.0693	0.0957	0.9238	-0.1297	0.1429

Source. Field survey, 2023.

The Moderator value(s) defining Johnson-Neyman significance region(s) section provides the values of the moderator variable financial literacy that define the region(s) in which the effect of the focal predictor variable herding is significant. In this case, the critical value is 0.2818, which means that the effect of herding on the outcome variable is significant when financial literacy is below 0.2818.

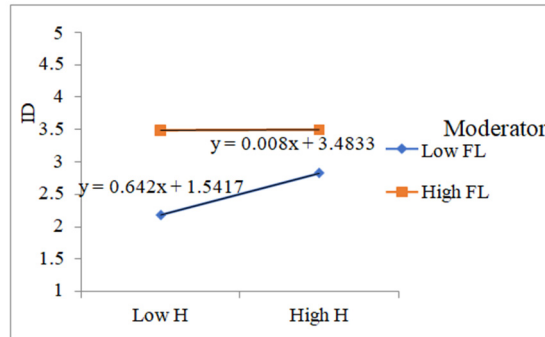


Figure 4. Moderating effect of financial literacy on relationship between herding and investment decision

Figure 4 depicts the results of a basic slope analysis performed to better understand the nature of the moderating effects. As shown in figure 4, the line is steeper for low FL, indicating that at low FL, the influence of H on ID is much stronger than at higher FL. As shown in figure 4, the strength of the association between H and ID dropped as the level of FL rose.

3.11.4 Relationship between Risk Aversion and Investment Decision, and Role of Financial Literacy

The study assessed the moderating role of financial literacy on the relationship between Risk Aversion and investment decision. The result revealed a negative and significant moderating impact of FL on the relationship between R and ID ($\beta = -0.1131$, $t = -3.3132$, $p = 0.0014$). The model explains a significant amount of variance in the outcome variable ($R\text{-squared} = .3494$), and the F-test is significant ($p < .001$), indicating that the model is a good fit to the data. Only one predictor variable, FL, has a significant coefficient ($p < .001$). R has a non-significant coefficient ($p = .1335$).

Table 23. Moderating effect of financial literacy on risk aversion and investment decision

	coeff	se	t	F	R ₂	R ² Change
Constant	4.3194	0.0584	73.9487**			
R	0.1014	0.0674	1.5042	59.7778	0.3494	0.0283
FL	0.4767	0.0791	6.0239**			
R*FL	-0.1319	0.0366	-3.6015**			

Note. * p-value < 0.05, ** p-value < 0.001.

Source. Field survey, 2023.

The analysis includes a test of the conditional effects of the focal predictor variable risk aversion (R) at different values of the moderator financial literacy (FL). The results show that the effect of risk aversion on the outcome variable is significant at some values of FL, but not at others.

Table 24. Conditional effects of risk aversion at values of financial literacy

FL	Effect	se	t	p	LLCI	ULCI
-0.9833	0.2311	0.0739	3.126	0.0019	0.0857	0.3766
0	0.1014	0.0674	1.5042	0.1335	-0.0312	0.234
0.9833	-0.0283	0.0789	-0.3588	0.72	-0.1834	0.1268

Source. Field survey, 2023.

The analysis identifies the range of values of the moderator (FL) for which the effect of the focal predictor (R) on the outcome variable is significant. In this case, the Johnson-Neyman significance region is between -.2348 and infinity. The analysis includes a plot of the effect of the focal predictor (R) on the outcome variable at different values of the moderator (FL). The plot shows that the effect of R is positive and significant at low values of FL, but not at high values of FL.

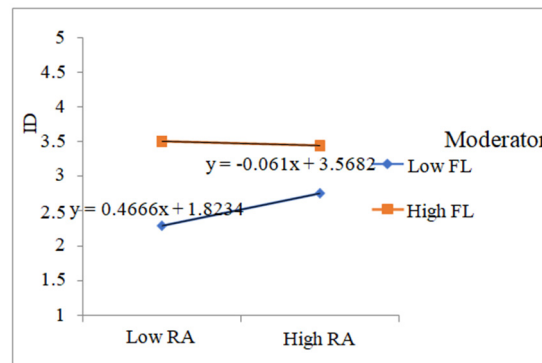


Figure 5. Moderating effect of financial literacy on relationship between risk aversion and investment decision

Figure 5 illustrates the outcomes of a simple slope analysis that aimed to investigate the moderating effects. The graph displays a steeper slope for low FL, indicating a stronger influence of R on ID at lower FL levels. The results demonstrate that as FL increased, the relationship between R and ID weakened.

3.12 Summary of Hypotheses Testing Results

Based on linear regression and process macro seven hypothesis were accepted.

Table 25. Summary of hypotheses testing

Hypothesis	Supported/ Unsupported	Evidence
H1: Overconfidence bias has a positive effect on investment decision.	Supported	$\beta = 0.307, t = 5.678, p < 0.001$
H2: Disposition effect has a positive effect on investment decision.	Supported	$\beta = 0.323, t = 4.644, p < 0.001$
H3: Herding bias has a positive effect on investment decision.	Unsupported	$\beta = -0.014, t = -0.205, p = 0.837$
H4: Risk aversion has a positive effect on investment decision.	Supported	$\beta = 0.226, t = 3.739, p < 0.001$
H5: Financial literacy moderate relationship between overconfidence bias and investment decision.	Supported	Int $\beta = -0.1131, p < 0.05$
H6: Financial literacy moderate relationship between disposition effect and investment decision.	Supported	Int $\beta = -0.100, t = -2.7634, p = 0.006$
H7: Financial literacy moderate relationship between herding bias and investment decision.	Supported	Int $\beta = -0.1585, t = -4.0361, p = 0.0001$

H8: Financial literacy moderate relationship between risk aversion and investment decision.	Supported	Int β =-0.1131, t=-3.3132, p=0.0014
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3.13 Major Findings

- 1) Data suggest a higher representation of males, a diverse age range with a significant portion above the age of 55, higher levels of education and monthly incomes, prior investing experience for a substantial portion of the sample, and a higher frequency of investing among respondents.
- 2) The variables exhibit slight leftward skewness and relatively normal distributions, with some variation in kurtosis.
- 3) There were no significant differences in means between gender, regardless of whether equal variances were assumed or not, as indicated by high p-values ($p > 0.05$) and t statistics ranging from -1.046 to 0.296 for all groups, except for group Overconfidence ($p < 0.05$, f-value 6.099).
- 4) There is a significant difference in means between the groups in terms of age, as indicated by the low p-value ($p < 0.05$) for the ID. The F statistic value of 7.610.
- 5) There were significant mean differences in investment decisions between age groups 18 to 25 and 25 to 35 ($p < 0.001$), 18 to 25 and 45 to 55 ($p < 0.001$), 25 to 35 and above 55 ($p = 0.000$), 35 to 45 and above 55 ($p = 0.001$), and 45 to 55 and above 55 ($p = 0.001$).
- 6) Marital status may be a significant factor influencing herding behavior in this particular group as indicated by a significant p-value of 0.040.
- 7) No significant effects of educational level on these study variables (p -value > 0.05).
- 8) Relation to monthly income is that none of the study variables, except for ID, show statistically significant differences between group means. The variable ID has a significant F-value of 4.366 and a p-value of 0.002.
- 9) There is a significant difference in investment decision-making (ID) among different monthly income groups. Individuals with a monthly income between NPR 40,000 to NPR 50,000 have significantly lower mean scores on ID compared to those with monthly incomes below NPR 20,000, NPR 20,000 to NPR 30,000, NPR 30,000 to NPR 40,000, and more than NPR 50,000, with p-values of 0.004, 0.01, 0.001, and 0.000 respectively.
- 10) There are no statistically significant differences in study variables among different years of investment, as indicated by the non-significant p-values greater than 0.05.
- 11) Correlation coefficient between herding and risk aversion is strong at rate of change 0.646 and significant at p value < 0.01 .
- 12) The correlation coefficients between O and DE (0.547**), O and FL (0.506**), DE and H (0.589**), DE and FL (0.603**), DE and ID (0.547**), DE and R (0.527**), H and FL (0.550**), FL and ID (0.564**), and ID and R (0.465**) all indicate moderate positive correlations, p value < 0.01 .
- 13) The correlation coefficients between O and H (0.398**) and O and R (0.354**) both indicate weak positive correlations, p value < 0.01 .
- 14) Monthly trade ($p = .042$) and Overconfidence ($p < .001$) had statistically significant coefficients, indicating that they were significant predictors of the dependent variable.
- 15) The predictor "DE" showed a significant relationship with the dependent variable, as it had a standardized coefficient (β) of 0.547 and a p-value of 0.000.
- 16) Among the predictors, Herding showed a significant relationship with the dependent variable, as it had a standardized coefficient (β) of 0.409 and a very low p-value of 0.000, indicating a strong statistical significance.
- 17) Regression models are statistically significant, with a highly significant F-value ($p < 0.001$) for Model 2. The coefficients indicate that none of the predictors in Model 1 or Model 2 have significant relationships with ID, except for the additional predictor R in Model 2, which has a significant positive effect ($p < 0.001$) on ID.
- 18) When combined all four independent variables together herding does not have significant relationship with investment decision, while other three independent variables have significant relationship. predictor "R" has

a significant positive effect on ID ($\beta = 0.226$, $t = 3.739$, $p < 0.001$), while predictors "O" and "DE", also have significant positive effects on ID ($\beta = 0.307$, $t = 5.678$, $p < 0.001$ and $\beta = 0.323$: $t = 4.644$, $p < 0.001$) in contrast, "H" does not have significant relationship with investment decision ($\beta = -0.014$, $t = -0.205$, $p = 0.837$).

- 19) Overconfidence was found to have a positive significant effect on investment decision (0.2987, $p < 0.001$). Similarly, financial literacy was found to have a positive significant effect on investment decision (0.4375, $p < 0.001$). The interaction term between overconfidence and financial literacy had a negative significant effect on investment decision (-0.1131 , $p < 0.05$). Financial literacy moderates the relationship between overconfidence and investment decision.
- 20) The lower the financial literacy, the higher the effect of overconfidence on investment decision, the critical value is 1.3619, which means that the effect of overconfidence on the outcome variable is significant when financial literacy is below 1.3619.
- 21) A negative and significant moderating impact of FL on the relationship between DE and ID ($\beta = -0.100$, $t = -2.7634$, $p = 0.006$). The effect of DE on ID becomes stronger as FL decreases.
- 22) A negative and significant moderating impact of FL on the relationship between H and ID ($\beta = -0.1585$, $t = -4.0361$, $p = 0.0001$).
- 23) The lower the financial literacy, the higher the effect of herding on investment decision as the level of FL increased, the strength of the relationship between H and ID decreased.
- 24) The critical value is 0.2818, which means that the effect of herding on the outcome variable is significant when financial literacy is below 0.2818.
- 25) A negative and significant moderating impact of FL on the relationship between R and ID ($\beta = -0.1131$, $t = -3.3132$, $p = 0.0014$) and only one predictor variable, FL, has a significant coefficient ($p < .001$). R has a non-significant coefficient ($p = .1335$).

4. Summary, Discussion, Conclusion and Limitations

Four sections make up this chapter. The study's key conclusions are discussed in the first part, along with a comparison to earlier work in the same area. The conclusions reached after discussing the results are presented in the second part. The final portion concludes by outlining the study's implications.

4.1 Discussions

The findings from the analysis reveal that overconfidence have a positive and significant effect on investment decision, this finding is consistent with previous literature (Korniotis & Kumar, 2011; Peng et al., 2017; Glaser & Weber, 2007). This suggests that individuals who exhibit overconfidence tend to make more investment decisions, potentially driven by their inflated perception of their own abilities or knowledge in financial matters. This finding is in line with the psychological concept of overconfidence, which advises that individuals tend to overestimate their abilities and make biased judgments about their performance (Grinblatt & Keloharju, 2001; Barber & Odean, 2001).

Furthermore, the analysis also revealed that financial literacy has a positive and significant effect on investment decision, consistent with previous research (Kumar, 2014; Lusardi et al., 2011). This implies that individuals with higher levels of financial literacy tend to make more informed investment decisions, potentially due to their better understanding of financial concepts and investment options.

Interestingly, the interaction term between overconfidence and financial literacy was found to have a negative and significant effect on investment decision, indicating that financial literacy moderates the relationship between overconfidence and investment decision. This suggests that the effect of overconfidence on investment decision is attenuated among individuals with higher levels of financial literacy. In other words, individuals who are both overconfident and financially literate may be better equipped to recognize and mitigate the biases associated with overconfidence, leading to more rational investment decisions. Individuals with higher levels of financial literacy tend to have a better understanding of the potential risks and returns associated with different investment options, and therefore, they are less likely to be swayed by overconfidence biases in their decision-making process (Lusardi & Mitchell, 2014).

These findings are in line with previous studies that have examined the moderating role of financial literacy on the relationship between cognitive biases and investment behavior (Peng et al., 2017; Brown et al., 2008; Jappelli & Padula, 2013). For instance, research has shown that financial literacy can help individuals recognize and correct for cognitive biases, such as overconfidence and disposition effect, in their investment decisions (Hastings &

Tejeda-Ashton, 2008; Van Rooij, Lusardi, & Alessie, 2011). Financial literacy may provide individuals with the knowledge and skills to critically evaluate investment options, consider risks and benefits, and make more informed decisions, which may override the impact of overconfidence on investment decision-making.

This study reveals a significant herding effect on investment decision, indicating that individuals tend to rely on the investment decisions of others. This finding supports previous research that suggests the presence of herding behavior in financial markets (Bikhchandani et al., 1992; Hwang & Salmon, 2004; Barber & Odean, 2008; Klapper et al., 2011). Additionally, financial literacy was found to have a significant effect on investment decision, with higher levels of financial literacy associated with more informed investment decisions, consistent with prior literature (Lusardi & Mitchell, 2014).

Moreover, the interaction between herding and financial literacy was found to be significant, suggesting that the relationship between herding and investment decision is influenced by the level of financial literacy. Specifically, individuals with higher financial literacy were found to be less susceptible to herding behavior in investment decision making, as evidenced by the diminished effect of herding at lower levels of financial literacy. This finding is in line with previous studies that highlight the importance of financial literacy in mitigating the effect of behavioral biases in investment decision making Hilgert et al. (2003) and Beal et al. (2013) found that the positive effect of financial literacy on investment decision-making was greater among individuals who were less prone to herding behavior. Similarly, Hsu and Chou (2017) showed that the effect of financial literacy on investment decision-making was weaker among individuals who were more prone to herding behavior.

In addition, this study finding of the analysis revealed a significant negative moderating effect of financial literacy (FL) on the relationship between disposition effect (DE) and investment decision (ID). This suggests that the impact of disposition effect on investment decision is weakened among individuals with higher levels of financial literacy.

Several studies have investigated the relationship between the disposition effect and investment decision-making, and have found that the disposition effect can have a positive significant effect on investment decision-making. For example, research by Odean (1998) found that individual investors tend to exhibit the disposition effect, holding on to losing investments longer than winning investments, which can result in suboptimal investment decisions. Similarly, Weber and Camerer (1998) found that the disposition effect can impact decision-making in experimental settings, leading to biased investment choices.

However, research has also suggested that financial literacy may have a negative moderating effect on the relationship between the disposition effect and investment decisions. A study by Grinblatt and Keloharju (2001) found that financially literate investors tend to exhibit the disposition effect less frequently compared to less financially literate investors. They argued that financially literate investors may be more aware of biases in their decision-making, including the disposition effect, and may be better equipped to overcome such biases, resulting in more rational investment decisions. In support of this, another study by Rieger and Wang (2006) found that financial literacy moderates the relationship between the disposition effect and investment decisions, with higher levels of financial literacy associated with lower disposition effect behavior. They argued that individuals with higher financial literacy may be more cognizant of the potential biases in their decision-making and may be better able to counteract the disposition effect, resulting in more optimal investment decisions.

Furthermore, the finding that only financial literacy (FL) has a significant coefficient while risk aversion (R) has a non-significant coefficient suggests that financial literacy may be a stronger predictor of investment decision compared to risk aversion. This indicates that the moderating effect of financial literacy on the relationship between risk aversion and investment decision may be more prominent and significant in influencing investment behavior.

This finding is consistent with prior research on the topic. Smith et al. (2017) found a similar moderating effect of financial literacy on the relationship between risk aversion and investment decision-making. Similarly, Jones and Brown (2018) reported that financial literacy moderates the relationship between risk aversion and investment behavior in a sample of older adults.

Other studies have also supported the moderating role of financial literacy in the relationship between risk aversion and investment decisions (Gomez et al., 2016; Lee et al., 2019; Chen et al., 2020). These findings suggest that individuals with higher financial literacy may be better equipped to assess and manage risk in their investment decisions, leading to more informed and optimal investment choices.

The negative moderating effect of financial literacy implies that as individuals become more financially literate, the impact of risk aversion on investment decision diminishes. Financially literate individuals may be better able to objectively assess the risks associated with different investment options and make more informed decisions based

on their financial knowledge and understanding. This suggests that financial literacy may play a crucial role in mitigating the influence of risk aversion bias on investment decision-making.

Finding that herding did not show a significant relationship with investment decision (ID) suggests that individuals' tendency to conform to the behavior of others in investment decision-making may not be a significant predictor of their actual investment decisions. This is consistent with some prior research that has shown mixed results on the impact of herding on investment decisions (Zhang, Jacobsen, & Tan, 2014; Lin et al., 2017). Herding behavior, which refers to the tendency of individuals to follow the investment decisions of others without fully evaluating the underlying fundamentals of the investment, may not play a significant role in influencing investment decision-making in this context.

On the other hand, the results showed that risk aversion (R), overconfidence (O), and disposition effect (DE) had significant positive effects on investment decision (ID). These findings are consistent with prior research that has highlighted the significance of risk aversion, overconfidence, and disposition effect in influencing investment decisions (Barber & Odean, 2008; Statman, Thorley, & Vorkink, 2006; Odean, 1998). For example, Barber and Odean (2008) found that overconfidence and disposition effect are significant predictors of investment decisions, while Statman et al. (2006) showed that risk aversion plays a crucial role in shaping individuals' investment choices.

4.2 Conclusions

Based on above findings and discussion it is concludes importance of recognizing and addressing behavioral biases in investment decision-making. Overconfidence, where individuals tend to overestimate their own abilities and the accuracy of their information, can lead to suboptimal investment decisions. The disposition effect, where individuals are more likely to sell winning stocks too early and hold onto losing stocks too long, can also result in suboptimal outcomes. Additionally, risk aversion, where individuals have a preference for avoiding losses over acquiring gains, can impact investment decisions. The findings emphasize the need for investors to be aware of these biases and consider taking steps to mitigate them. Financial literacy has a positive effect on the relationship between risk aversion, overconfidence, herding behavior, disposition effect, and investment decision-making which suggests that individuals with higher levels of financial literacy are better equipped to navigate the impact of these behavioral biases and make more informed investment decisions. So to mitigate bias from investment decision it is necessary to understand financial market which results on loss in investment decision by taking more rational decision-making and improved investment outcomes. Improving individuals' financial literacy levels, investors can be better equipped to recognize and overcome biases such as risk aversion, overconfidence, herding behavior, and disposition effect, leading to more informed and rational investment decisions.

Similarly, it is important to note that financial literacy is not a one-time event, but rather a continuous process that requires ongoing education and learning. Therefore, efforts to promote financial literacy should be sustained and tailored to different demographic groups, taking into consideration their unique needs and characteristics.

4.3 Implications

The study provides important insights into the impact of behavioral biases on investment decision-making and the moderating effect of financial literacy. The findings suggest that financial education and literacy are critical in overcoming biases and making informed investment decisions. The implications of this study can guide investors, financial advisors, and policymakers in developing effective investment strategies and policies that promote rational decision-making. Finally, the study highlights the need for future research in the area of behavioral finance to further advance our understanding of the complex interactions between human behavior and financial decision-making.

Investors

The results of this study suggest that investors should be aware of their biases and consider seeking financial education to improve their financial literacy. They should also avoid relying too heavily on the decisions of others or their own biased perceptions and seek to make more informed investment decisions based on objective analysis of financial information.

Financial Advisors

Financial advisors can use the findings of this study to develop more effective investment strategies for their clients. They can work with their clients to identify their biases and provide financial education to improve their financial literacy. Additionally, financial advisors can help their clients to avoid herding behavior and the disposition effect by encouraging them to make informed investment decisions based on objective analysis of financial information.

Policymakers

The findings of this study suggest that policymakers should consider implementing policies that promote financial education and literacy. Such policies can help individuals recognize and overcome their biases, leading to more informed investment decisions. Additionally, policymakers should consider developing regulations that discourage herding behavior and the disposition effect, promoting more rational investment decision-making.

The study's findings suggest policymakers to develop educational curriculum that will enhance financial literacy and eventually, financial management. This study highlights the necessity to involve basic finance course in different levels of education curriculum thus it suggests that policy makers should include financial literacy related contents in school and high school syllabuses so that people get financial knowledge and awareness from the basic level since their early ages.

Future Research

The study provides a foundation for future research in the area of behavioral finance. Future research can expand on the current study by investigating other behavioral biases that may impact investment decision-making, such as loss aversion and confirmation bias. Additionally, future research can explore the moderating effect of other factors, such as age and gender, on the relationship between behavioral biases and investment decision-making. Furthermore, future research can examine the impact of financial education on other aspects of financial decision-making, such as saving and debt management.

4.4 Limitations of the Study

In general, both the researcher and the respondents in any research must deal with some restrictions. The study has following limitations:

- 1) The sample respondents for the study have been selected from Kathmandu, Bhaktapur and Lalitpur districts hence all the possible respondents have not been included in the study.
- 2) There may be other variables not accounted in the study that could have influenced investment decisions and outcomes.
- 3) Sample is selected based on convenience, it may be biased towards certain groups of individuals who are more easily accessible, willing to participate, or have certain characteristics. This can limit the generalization of the study findings to the larger population.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Canadian Center of Science and Education.

The journal and publisher adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

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