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EVALUATION OF EFFECT OF FINANCIAL LITERACY AND HERDING BEHAVIOR ON INVESTMENT DECISION-MAKING.

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Abstract
Humans, as social beings, naturally tend to discuss their feelings and opinions with family members, friends, and colleagues. Investment decision-making is crucial; when grounded in proper fundamental and technical analysis, it can lead to profits. However, if influenced by herding behavior, it may result in unfavorable outcomes. Therefore, managing this behavioral tendency is essential to avoid losses caused by decisions that are not made independently.
Financial literacy is also a critical factor for those who wish to analyze investment choices independently, understand basic financial terms, and effectively use financial products. Thus, it is important to study the impact of herding behavior on investment decision-making and the moderating role of financial literacy. This study explores how herding behavior influences investment decisions and how financial literacy acts as a moderating factor.
Primary data were collected through structured questionnaires, which included 5-point Likert scale questions. The data comprises 209 responses, and descriptive statistics, correlation, and regression analyses were conducted using SPSS software. The study concludes that financial literacy moderates the effect of herding behavior on investment decision-making, with the impact of herding decreasing as financial literacy increases.

Keywords: Financial Literacy, Herding Behavior, Investment decision-making, Behavioral Finance, Retail Investors.

JEL: G41, G53, G11.

Introduction
Behavioral finance has emphasized the role of irrationality in decision-making, challenging the assumptions of traditional finance. Several factors contribute to this irrationality, including overconfidence, anchoring, confirmation bias, and herding behavior. Decision-making shortcuts can lead to significant financial losses, as is often the case when individuals follow others in making investment decisions, a phenomenon known as herding. Without applying fundamental or technical analysis, investors frequently mimic the choices of others, thereby influencing capital market investment decisions (Armansyah, R. F., 2022). Herding behavior, which has been studied for many years, became particularly familiar in the 19th century.
The term "herd behavior" was popularized in 1914 when Wilfred Trotter published his book Instincts of the Herd in Peace and War. Previously, this concept was referred to as crowd mentality or crowd psychology. Later, it was further familiarized by Polish psychologist Solomon Asch in 1952 through his studies in social psychology, which concluded that social pressure and normative conformity are traits in humans that cause them to follow the crowd (Solomon E. Asch, 1952).

Behavioral economics places significant importance on herd behavior by examining its impact on human decision-making. A notable instance where herding behavior went awry was during the 2008 financial crisis. Even today, herding behavior remains a critical area of study in academia, as it plays a

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crucial role in the volatility and risk associated with investment returns. While it is common for people to make financial decisions by following the crowd, the key question is whether this approach effectively leads to positive returns.

Financial literacy involves having an awareness of basic financial concepts such as personal finance, budgeting, saving, investment, and understanding financial markets and instruments. Developing a strong understanding of these concepts empowers individuals to manage their money wisely, make effective investment choices, and work toward their financial goals. Increasing financial literacy among retail investors can help them make rational and independent investment decisions. By being aware of their tendency toward herding behavior, they can actively attempt to combat it through thorough examination.

In India, the Financial Inclusion and Development Department of the RBI is actively working to improve financial literacy through a program called FAME (Financial Awareness Messages). This initiative targets various groups such as women, students, and farmers. To coordinate these efforts, the financial sector authorities, including the RBI, SEBI, IRDAI, and PFRDA, have established the National Centre for Financial Education (NCFE). The NCFE aims to enhance fundamental financial literacy among citizens. Additionally, SEBI guides individual investors on basic financial awareness topics related to personal finance and investments through the SEBI Investor Website. This platform promotes investment in the securities market and conducts investor awareness programs to educate existing investors about market movements.

The Financial Literacy and Inclusion Survey 2019, conducted by the National Centre for Financial Education, revealed that only 21% of people are aware of stocks and shares, with just 3% possessing knowledge about their holding and operation. This lack of understanding about the stock market is a major factor deterring investment. The survey also found that only 27% of respondents across India were financially literate. Therefore, it is crucial to study the level of financial literacy among individuals, as it significantly influences their ability to make informed investment decisions.

Neoclassical models and theories suggest that individuals require adequate information to make investment or decision-making choices. According to this theory, people are rational decision-makers who perfectly interpret market information and efficiently eliminate irrational behaviors, leading to rational market outcomes. The axioms of completeness and transitivity indicate that a rational individual has well-defined preferences and makes better decisions by choosing the optimal option based on available information and consistent preferences (Szyszka, A. 2013).

However, in the real world, information inadequacy and the lack of perfect information often lead to irrational behavior. Individuals frequently rely on heuristics or rules of thumb when making judgments. As social beings, people tend to share opinions and experiences within their social circles, including friends, family, colleagues, and on social media platforms. This social influence can lead investors to make irrational decisions, driven by peer pressure or the desire to conform, rather than by traditional financial principles. While this behavior may seem normal, it can significantly impact investment decisions when individuals rely more on their social environment than on independent analysis.

As investment patterns evolve, there is a noticeable shift from physical assets to capital markets. This trend became particularly evident during the COVID-19 pandemic when Indian retail investors continued to actively invest in the market. According to data from CRISIL's report titled "The Big Shift

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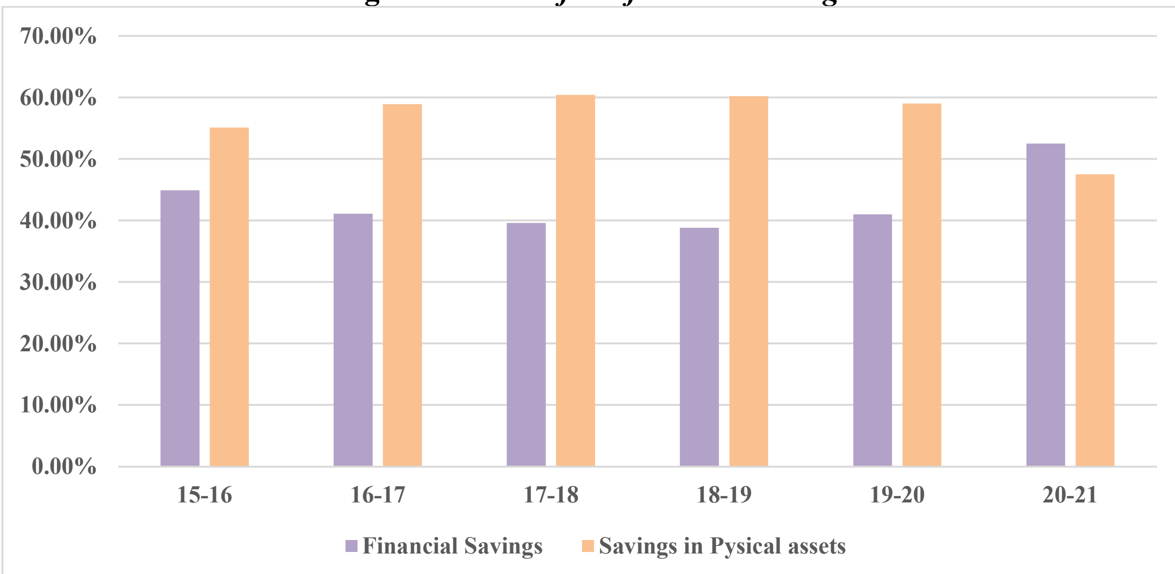
in Financialization" (Figure 1), there has been a significant shift in financial savings towards capital market instruments over the years.

Figure 1 ***Share of net financial savings***



Note. Financial savings include investments in equity, debt and mutual funds
Source.*https://www.crisil.com/content/dam/crisil/our-analysis/reports/Research/documents/2022/12/the-big-shift-in-financialisation.pdf*

From Figure 1, it is observed that savings in physical assets gradually decreased from the financial year 2019-20 to 2020-21. This decline indicates a growing attraction towards capital market instruments and other non-physical assets. The increase in financial savings during the financial year 2020-21 further supports this shift in investment preferences.

Figure 2 illustrates the asset allocation patterns in the investment industry for the financial years 2021-22 and 2016-17. It clearly shows a shift towards increased investment in equities among retail investors. This change can be attributed to factors such as the ease of access provided by technology, the digitalization of processes, and advancements in fintech. Additionally, social media, investments by peers, friends, and relatives play a significant role in influencing investment decisions. While motivation to invest can come from various sources, a critical evaluation reveals that herding behavior—where individuals are influenced by their social circle and social media—can have positive aspects. This influence often leads first-time investors to enter the market, driven by the actions and advice of those around them.

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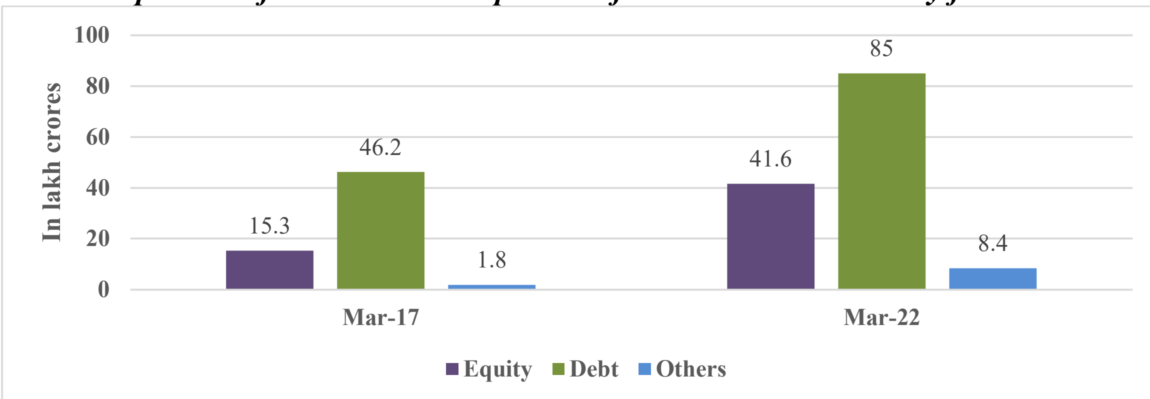
Figure 2 *Comparison of Asset allocation pattern of the Investment industry for FY17 and FY22*



Note. Others include investment in mutual funds, with gold, silver ETFs, and funds of funds
Source. Data is taken from the Market Intelligence & Analytics Research Report December 2019 of CRISIL

The data in Figure 2 shows that, compared to March 2017, there has been an increase in equity investments and investments in debt funds, as well as other alternatives such as mutual funds. With rising investments across various options like the stock market, mutual funds, and bank FDs, it is crucial to understand the role of financial knowledge in decision-making. Additionally, behavioral factors such as herding can significantly influence retail investors' investment choices. This study aims to address this knowledge gap by examining how financial literacy can moderate the effects of herding behavior on investment decision-making.

Literature review

The conceptual definition of financial literacy is described as follows: "Financial literacy is a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate short-term decision-making and sound long-range financial planning, while being mindful of life events and changing economic conditions" (David L. Remund, 2010). Only one in three adults worldwide understands basic financial concepts. This indicates that billions of people struggle to navigate the rapidly changing financial landscape. Although financial literacy tends to be higher among the wealthy, highly educated, and those who frequently use financial services, many countries still have low financial literacy rates (Klapper & Lusardi, 2019). Financial literacy is crucial for making informed decisions and is a key parameter for effective decision-making. A lack of financial literacy can lead to poor decision-making and challenging situations, such as difficulties during uncertain retirement (Lusardi & Mitchell, 2011). The study by Falah and Asandimitra (2023) found no significant relationship between financial literacy and investment decision-making. Despite the respondents exhibiting a moderate level of financial literacy and a high frequency of investment decisions, financial literacy did not appear to impact their investment choices. Additionally, while financial literacy is generally beneficial, it can sometimes lead to recklessness and risky behavior. For instance, it can foster overconfidence and biases, potentially resulting in poor financial decisions, such as risky investments that lead to financial losses or fraud. Therefore, understanding how financial literacy contributes to both positive and negative financial behaviors is crucial (Kawamura et al., 2021). The need to improve financial literacy remains crucial, as it enhances individuals' confidence in making better investment decisions. Putri and Simanjuntak (2020) found that while both Generation X and Y are capable of making sound investment choices, their financial literacy levels need improvement. This highlights the importance of increasing financial literacy rates among people. However, Koti (2019) presents a contrasting view, noting that women, in particular, exhibit

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careful investment practices and possess a good understanding of risk and volatility, aiming to achieve better financial goals. In a study by Rahayu et al. (2021) on investor herding behavior in Indonesia, it was found that, despite having the capacity to analyze stocks for investment, individuals are significantly influenced by herding behavior. The study also revealed that social factors and information availability impact herding behavior, leading investors to follow the crowd in their investment decisions. Higher financial literacy often leads to faster investment decision-making. However, investors with better financial knowledge may still exhibit significant herding behavior, choosing to follow others rather than relying on their own analytical skills. This tendency to conform, even with advanced financial understanding, can result in poor decision-making and financial losses (Tamara et al., 2022). Thus, herding behavior has a notable impact on investment decisions, often leading to suboptimal outcomes.

Research Methodology

To study the relationship between herding behavior and financial literacy in investment decision-making, a quantitative research approach was employed. This approach focuses on measuring both herding behavior and financial literacy among investors. Data was collected using a structured questionnaire, which included two sections: demographic details and a series of five-point Likert scale questions. The questionnaire consisted of 30 items assessing financial literacy, herding behavior, and investment decision-making. The five-point scale used was as follows: 1 - Strongly Disagree, 2 - Disagree, 3 - Neither Agree nor Disagree, 4 - Agree, and 5 - Strongly Agree. Data collection was carried out through Google Forms as well as physical distribution of the questionnaire, using a convenience sampling technique. The target population included investors from Tumakuru and Rural Bengaluru. Out of 250 distributed questionnaires, 220 were returned, and 209 responses were retained for analysis after data cleaning.

Objectives of the study

Following are the objectives of the study.

1. To study the effect of Herding behavior on investment decision-making
2. To analyze the influence of financial literacy on investment decision-making
3. To examine the association among herding behavior and financial literacy
4. To study the effect of financial literacy as moderating variable concerning investment decision-making and herding behavior

Hypothesis

Herding behavior and Investment decision-making

Herding behavior and investment behavior are strongly correlated. Confident investors often exhibit greater herding tendencies in response to positive market news, which can affect market efficiency and contribute to market fluctuations (Dheeraj Agrawal et al., 2016). While aggressive personality traits do not significantly influence herding behavior, cognitive ability positively impacts it, and motivational factors play a substantial role in shaping herding behavior (Candy & Novita, 2021). Volatility in stock prices can often be attributed to investors frequently mimicking the actions of others and relying more on public information than on personal research. Investors may follow others in hopes of acquiring accurate and relevant information (Adielyani & Mawardi, 2020). According to the study's findings, herding behavior has a significant positive impact on investment decisions. This suggests that a higher level of herding behavior increases the likelihood of making investment decisions (Shela Nindya Saputri et al., 2023). Resistance to feelings of regret can foster herding tendencies. Investors who have experienced losses in past investments may feel compelled to follow others or make decisions based on

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peer behavior in an attempt to recover previous losses. This tendency to follow the herd positively influences investment decisions (Adielyani & Mawardi, 2020). However, herding behavior can also significantly and negatively affect investment decision-making. Many investors rely on their peer groups for investment advice and mimic their actions. This reliance can sometimes lead to poor investment choices (Adil et al., 2021). Additionally, herding behavior does not always impact investment decision-making uniformly, as its effects can vary (Maulida & Permata Sari, 2023).

By analyzing above literatures H1 is formulated.
H1: There is an impact of herding behavior on investment decision-making

The findings indicate that most investors seek advice from friends or brokers before making investment decisions. Financial literacy is positively correlated with investment decision-making, meaning that higher financial literacy generally leads to better investment decisions (Novianggie & Asandimitra, 2019). A study of the Karachi Stock Exchange found that financial literacy is positively correlated with overconfidence. Herding bias also has a positive impact on investment decisions, with active investors showing overconfidence and passive investors exhibiting herding behavior (Amir Hayat & Muhammad Anwar, 2016). Dahiman (2020) demonstrated that financial literacy positively correlates with investment decision-making among investors at the Islamabad Stock Exchange. However, he also found that herding bias can negatively affect investment decisions. Low financial knowledge and prevalent behavioral biases influence individual stock investors' decisions. Weixiang et al. (2022) confirmed that financial literacy positively influences investment decisions and this relationship is statistically significant. Adil et al. (2021) found that herding behavior is often driven by overconfidence and prior investment experience.
Financial literacy moderates overconfidence bias, with higher financial literacy improving investment decisions by addressing herding behavior. Increasing financial literacy is emphasized as it helps reduce the impact of biases (Sabir et al., 2019). Tahira Iram et al. (2021) studied the relationship among heuristic biases, financial knowledge, and investment behavior among women entrepreneurs in Pakistan. They found that these women are influenced by overconfidence, availability, and representativeness biases, while anchoring bias was deemed insignificant. The study also indicated that financial literacy does not effectively reduce psychological biases in securities decision-making. It revealed that heuristic and herding factors positively influence stock investment decisions, though the study did not establish moderating relationships among variables (Wijaya et al., 2023). Additionally, Chairunnisa and Dalimunthe (2021) found no moderating role of financial literacy between herding behavior and influencer credibility. Overconfidence bias is prevalent in investment decision-making, and financial literacy moderates this bias. However, the study by Ranaweera and Kawshala (2022) lacks evidence for the moderating effects of risk attitude and financial literacy on overconfidence bias and herding behavior in investment decisions on the Colombo Stock Exchange. Lebdaoui et al. (2021) found that investors with prior financial education and expertise are more likely to achieve satisfying returns, and herding behavior is influenced by the level of financial knowledge. Arianti et al. (2019) examined the moderating role of income on investment decisions and financial literacy. They found that financial literacy does not significantly affect investment decisions. Instead, financial behavior and income impact decisions, but income does not play a moderating role.The above literature guided to the formation of H2 and H3 respectively.
H2: Investment decision-making has an influence of financial literacy
H3: Financial literacy plays a moderating role in assessing the impact of herding behavior on investment decision-making.

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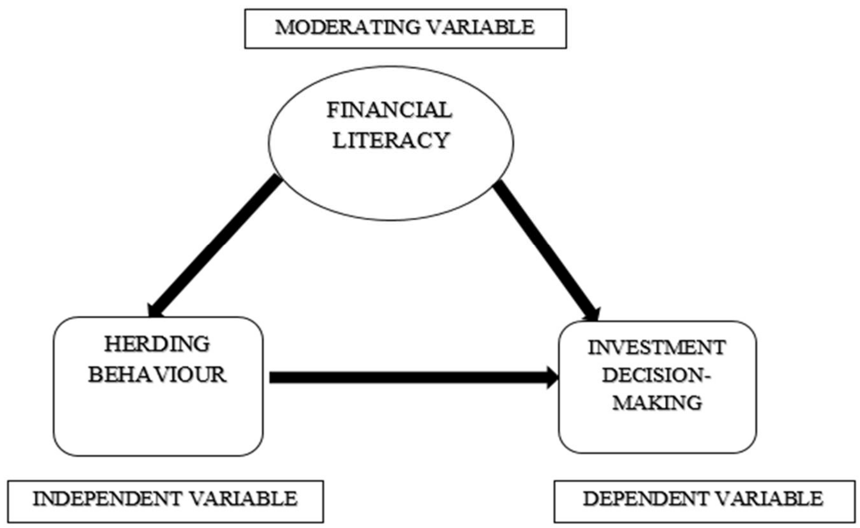
Conceptual Framework:

Figure 3 ***Conceptual model***



Note. The model is evolved from the author's assumption.

This study aims to investigate how financial literacy moderates the relationship between herding behavior and investment decision-making. The moderation effect will be assessed to determine whether the influence of financial literacy on this relationship is consistent across different groups (Farooq & Sandeep, 2017).

In this model, herding behavior is considered an independent variable, representing the tendency of individuals to follow and imitate others in their decision-making. Investment decision-making is the dependent variable, while financial literacy is treated as a moderating variable. Financial literacy plays a crucial role in influencing both investment decision-making and herding behavior, as the level of financial knowledge possessed by investors affects their investment choices. Herding behavior, which includes both rational and irrational aspects, is influenced by the investor's financial knowledge. The model aims to explore the relationship between these variables to determine how financial literacy moderates the effects of herding behavior on investment decision-making.

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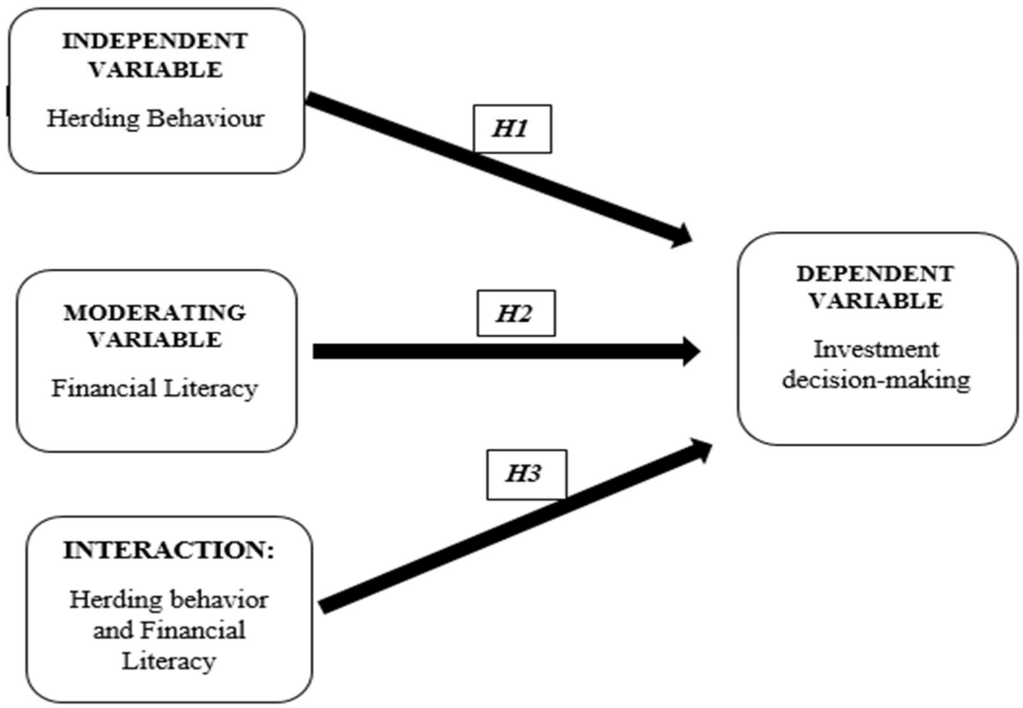
Statistical model

Figure 4 ***Statistical model***



Note. H1, H2, H3 indicate the hypothesis considered.

Figure 4 illustrates the statistical relationships among investment decision-making (the dependent variable), herding behavior (the independent variable), and financial literacy (the moderating variable). To evaluate Hypothesis 1 (H1), the association between herding behavior and investment decision-making is statistically assessed. For Hypothesis 2 (H2), the impact of financial literacy on investment decision-making is tested. Hypothesis 3 (H3) involves performing a moderation analysis to examine the interaction between financial literacy, herding behavior, and investment decision-making. This statistical model provides a framework for analyzing the relationships among these variables to achieve the study's objectives.

Analysis and Discussion

Reliability test

Reliability measures the internal consistency among variables. A construct is considered reliable if its Alpha (α) value is greater than 0.70 (Hair et al., 2013). Item reliability is assessed using Cronbach's Alpha. The results revealed an Alpha (α) value of 0.715, indicating a moderate level of internal consistency among the items on the scale.

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Table I ***Results of Reliability Statistics***

N of Items	Cronbach's Alpha	F statistics	Significance
30	.715	13.297	.000*

***p < .01**

As shown in Table I, the F statistic (F = 13.297, $p < 0.001$) indicates that the internal consistency among the different items is statistically significant and not due to random chance. This result confirms that the items are significantly different from those expected by random chance.

Frequencies

Table II displays the frequency distribution for the demographic questions in the questionnaire, including gender, age, investment experience, and frequency of investing. The data show that 52.6% of the respondents are male, which is higher than the percentage of female respondents. Additionally, the age group of 18-30 years comprises 50.2% of the study participants, making it the dominant age group in the sample.

Table II ***Results of Frequency distribution***

	Frequency	Percent
Gender		
Male	110	52.6
Female	99	47.4
Age		
18-30 years	105	50.2
31-40 years	54	25.8
41-50 years	46	22.0
51-60 years	4	1.9
Investment experience		
Less than 1 year (Beginner)	61	29.2
1-5 years (Intermediate)	87	41.6
5-10 years (Experienced)	44	21.1
More than 10 years	17	8.1
Frequency of investing		
Daily	9	4.3
Weekly	32	15.3
Monthly	53	25.4
Occasionally	57	27.3
Rarely	58	27.8
Total	209	100

Note. The table represents basic demographics questions asked of respondents.

Among the respondents, 61 have less than 1 year of investment experience, while 17 have more than 10 years of experience. Only 4.3% of respondents invest daily, whereas 58 out of 209 invest rarely. The sample population shows a fairly equal gender distribution with a noticeable bias towards younger individuals (18 to 30 years old). Investment experience levels vary, with a significant proportion having intermediate experience (1–5 years). Investment and trading frequency also vary, with many articipants engaging in regular or occasional trading and investing activities.

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Descriptive statistics

Descriptive statistics for the three variables provide insights into their characteristics and distribution. For financial literacy, the scores range from a minimum of 1, indicating low financial literacy among some respondents, to a maximum of 8.30, reflecting relatively higher financial literacy among others. The mean score is 3.5871, suggesting an average level of financial literacy among the respondents. The degree of variability in financial literacy is indicated by a standard deviation of 0.61439.

Table III ***Results of Descriptive statistics***

Items	N	Minimum	Maximum	Mean	Std. Deviation
Financial literacy	209	1.00	8.30	3.5871	.61439
Investment decisions	209	1.00	7.50	3.5746	.50113
Herding behavior	209	1.00	4.80	3.2282	.43690

Note. N represents the number of respondents

For investment decisions, the minimum score of 1 indicates that some respondents are very cautious in their investment decisions, while a maximum score of 7.50 suggests that some make riskier decisions. The mean score of 3.5746 reflects an average level of decision-making, with a standard deviation of 0.50113 showing the degree of variability among respondents.

For herding behavior, the mean score is 3.2282, indicating an average level of herding behavior within the sample. The scores range from a minimum of 1, representing very low herding behavior in some respondents, to a maximum of 4.80, reflecting higher levels of herding behavior in others.

Correlation

The correlation coefficient Financial Literacy, herding behavior, and investment decision making is represented in the table below.

Table IV ***Results of correlation***

	FIN	IND	HERD
FIN	1		
IND	.407**	1	
HERD	.259**	.330**	1

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

Note**:** FIN, IND, HERD represents Financial Literacy, Investment decision-making and Herding Behavior.

The correlation between financial literacy and investment decision-making is positive, with a correlation coefficient of 0.407. This indicates that individuals with higher financial literacy tend to make more informed investment decisions. In other words, as financial literacy increases, the quality of investment decision-making improves.

There is a weak positive correlation between financial literacy and herding behavior, with a correlation coefficient of 0.259. This suggests that while the association is not strong, individuals with high financial literacy may still be prone to herding behavior, occasionally relying on others for investment decisions.

Herding behavior and investment decision-making show a weak positive correlation of 0.330. This suggests that even individuals who make informed decisions using traditional methods may occasionally exhibit some degree of herding behavior.

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Financial literacy positively influences investment choices and has a weak positive relationship with herding behavior. This indicates that while individuals with higher financial literacy are likely to make better investment decisions, they may still occasionally rely on herding behavior. The weak correlation between herding behavior and investment decision-making suggests that even those with strong decision-making skills might be influenced by herding tendencies.

Regression

To test Hypothesis 1 (H1), investment decision-making was regressed on the predicting variable, herding behavior. The results show that herding behavior significantly predicts investment decision-making, with a beta coefficient of 0.379, indicating a positive impact. This suggests that as herding behavior increases, investment decision-making tends to change in a certain direction. Approximately 10.5% of the variability in investment decision-making can be attributed to herding behavior, as indicated by an R^2 value of 0.105. The relationship between herding behavior and investment decision-making is statistically significant, with an F-value of 25.378 and a p-value of 0.000. Therefore, H1 is accepted.

Table V *Results of regression analysis*

Hypothesis	Beta coefficient	R^2	F	t	p	Conclusion
H1	.379	0.105	25.378	5.038	0.000*	Supported
H2	.281	0.212	29.004	5.402	0.000*	Supported
H3	-0.214	0.245	23.512	-3.161	0.002*	Supported

*p<.05

To test Hypothesis 2 (H2), investment decision-making was regressed on the predicting variable, financial literacy. The results indicate that individuals with higher financial literacy are more likely to make informed and better investment decisions. The positive relationship between financial literacy and investment decision-making is demonstrated by a beta coefficient of 0.281, which shows that increased financial literacy leads to improved investment decisions.

With an R-squared value of 0.212, the results indicate that 21.2% of the variability in investment decision-making is attributable to financial literacy. The association between financial literacy and investment decision-making is statistically significant, with an F-statistic of 29.09 and a p-value of 0.000. Therefore, H2 is accepted, confirming a positive effect of financial literacy on investment decision-making.

The moderating role of financial literacy in the relationship between herding behavior and investment decision-making is statistically significant, with an F-statistic of 23.512 and a p-value of 0.002. The beta coefficient of 0.214 indicates that financial literacy moderates this relationship. The negative coefficient suggests that the positive change in investment decisions resulting from the interaction between herding behavior and financial literacy is less pronounced. The variability in investment decision-making explained by both herding behavior and financial literacy is 24.5%, as indicated by an R-squared value of 0.245. With a negative t-value of -3.161, the moderating effect of financial literacy on the relationship between herding behavior and investment decision-making is statistically significant.

H3 is accepted, as financial literacy moderates the effect of herding behavior on investment decision-making. The negative beta coefficient for the moderating variable indicates that as financial literacy increases, the relationship between herding behavior and investment decision-making weakens. This suggests that higher financial literacy may reduce or potentially eliminate the influence of herding

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behavior on investment decision-making. Thus, financial literacy has a moderating effect on the relationship between herding behavior and investment decision-making, and this effect is negative.

Conclusion

The study concludes that there is a positive relationship between investment decision-making and herding behavior, though the significance is relatively low. Herding behavior does influence rational decision-makers to some extent. Regression analysis indicates that higher financial literacy leads to better investment decision-making. Additionally, while herding behavior has an impact on investment decision-making, financial literacy plays a crucial role in mitigating this impact, with a negative moderating effect on both herding behavior and investment decision-making.

These findings are consistent with previous studies by Rahayu et al. (2021), Tamara et al. (2022), Candy and Novita (2021), Adielyani and Mawardi (2020), Shela Nindya Saputri et al. (2023), Adil et al. (2021), Novianggie and Asandimitra (2019), Dahiman (2020), and Sabir et al. (2019). However, they contradict the findings of Arianti et al. (2019), Chairunnisa and Dalimunthe (2021), and Wijaya et al. (2023).

Although herding behavior influences investment decision-making among retail investors, financial literacy moderates this effect, reducing the impact of herding behavior on decision-making. Therefore, it is crucial for financial intermediaries and governing bodies to implement measures to enhance financial literacy. By improving financial literacy, individuals can make more rational investment choices and mitigate the influence of heuristics and biases on their decision-making.

Scope for further study

As this study does not explore demographic and other behavioral factors, future research could investigate how financial literacy, as a moderating variable, impacts investment decision-making across different investor groups. Examining financial literacy levels in various demographic segments could provide valuable insights for the investment industry and policymakers to develop strategies that enhance public engagement in capital markets. Additionally, studying the mediating role of financial literacy with different demographic and behavioral factors could offer a deeper understanding of its influence on investment decision-making.

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