

Research Article 05

Can financial literacy make a difference in individual investors' exposure to herd bias? Evidence from the Colombo Stock Exchange of Sri Lanka

K.V.A. Shantha

Department of Accounting and Finance, Faculty of Management Studies, The Open University of Sri Lanka, Nawala, Nugegoda, Sri Lanka.
<https://orcid.org/0000-0001-8773-1225>

Abstract

This study attempts to explore the relatively under-explored issue of how individual investors can mitigate herd bias that occurs when trading stocks. Although financial literacy is recognized in the literature as a potential mitigator of herd bias, the underlying cognitive and psychological mechanisms that integrate with financial literacy to reduce herd bias remain unclear. Based on the literature on cognitive psychology and behavioral finance, the study hypothesizes that investors can mitigate their herd bias by engaging in self-reflection on their past stock trading experiences, and their financial literacy plays a moderating role in this self-reflection effect. The data is collected through a self-administered questionnaire from 253 active individual investors at the Colombo Stock Exchange of Sri Lanka. The partial least square structural equation modelling technique was applied to analyze the survey data and test the hypotheses of the study. The results show that self-reflection has a large significant effect on reducing herd bias. The self-reflection improves largely with investors' desire for learning, while small improvements from their investment experience and interactions with advisors. The moderation analysis reveals that the effect of self-reflection on reducing herd bias is stronger at lower financial literacy than at higher financial literacy. It indicates that low financially literate investors are more prone to herd due to lack of financial literacy, however self-reflection helps them to recognize pitfalls of herding, thereby reducing their herd bias to a greater extent. Accordingly, the study concludes that individual investors can mitigate their herd bias by engaging in self-reflection which empowers them to be more financially literate to mitigate their herd bias. Based on these findings, this study outlines practical implications for individual investors and financial practitioners.

Keywords: Colombo stock exchange, financial literacy, herd bias, investor education, intuitive thinking, self-reflection

Introduction

Standard finance theories (for example, the Efficient Market Hypothesis of Fama (1970) and the Portfolio Theory of Markowitz (1952)), posit that market participants behave rationally, and pricing of securities is fair and unbiased, which result to efficient financial markets.

However, behavioral finance literature challenges these theories, demonstrating that market participants often act irrationally due to their cognitive and psychological limitations (for example, limited reasoning and fear) as well as external factors (for example, information asymmetry) (Che Hassan et al., 2023; Hirshleifer, 2015). This irrational behavior leads to deviations in security prices from their fundamentals, causing inefficiencies in financial markets (Filbeck et al., 2017; Goodell et al., 2023). Hence, financial markets are more dynamic and unpredictable than the standard finance theories suggest. Consequently, market participants frequently face complex decision-making situations under uncertainty, which, with their cognitive and psychological limitations, leads to numerous behavioral biases in their decisions (Filbeck et al., 2017; Maheshwari et al., 2023; Mittal, 2022).

One of the most pervasive behavioral biases is herd bias, where market participants imitate the actions of others, which often results in suboptimal investment choices (Maheshwari et al., 2023). Herd behavior can intensify market volatility and thereby cause to phenomena such as asset bubbles and market crashes. Consequently, prices of securities deviate from their fundamentals and financial markets become inefficient (Badola et al., 2024). Hence, understanding potential mitigators of this bias is critical. The behavioral finance literature has recognized financial literacy as one of the most significant mitigators of herd bias (Jain, 2023; Weixiang et al., 2022). Financial literacy encompasses a broad understanding of financial principles and facilitates the ability to make informed and effective decisions. Thus, theoretically, it should empower investors to analyze information critically, helping them to avoid the influence of behavioral biases such as herding. However, the literature presents mixed findings on the effect of financial literacy on reducing herd bias among individual investors (Ashfaq et al., 2024; Jain et al., 2023; Ranaweera & Kawshala, 2022). Accordingly, the underlying mechanism that enable financial literacy to mitigate herd bias remains unclear.

This study aims to fill this gap by exploring how financial literacy mitigates herd bias among individual investors. It hypothesizes that financial literacy acts as a moderator in enhancing the learning behavior of individual investors to reduce their herd bias. The model of learning behavior proposed by Shantha et al. (2018) is used to conceptualize the investors' learning behavior. A frontier stock market, the Colombo Stock Exchange (CSE) is chosen for conducting the study since, compared to developed and emerging markets, herding is expected to be more prominent in frontier markets due to higher volatility, lower transparency, dominance of noise trading, lower liquidity, and higher information asymmetry (Shantha, 2019). By investigating this phenomenon, the study seeks to contribute new insights to the behavioral finance literature and provide actionable strategies to mitigate herd bias, thereby improving individual investors' decision-making capabilities. The findings will provide a clear understanding of the cognitive and educational interventions to promote better investment practices, which support the development of more robust financial markets, ultimately contributing to long-term financial sustainability.

Literature Review and Hypothesis Development

Herd Bias of Individual Investors

According to Banerjee (1992), herding is "everyone doing what everyone else is doing, even when their private information suggests doing something quite different." In this case, investors imitate others' decisions and behavior by suppressing their own information and beliefs (Vieira & Pereira, 2015) defines herding as "a group of investors ignoring their own information and beliefs and following the decisions of other investors, imitating them." Patterson & Sharma (2007) states that "herding occurs when a group of investors trades on

the same side of the market in the same securities over the same period of time or when investors ignore their own private information and act as other investors do."

Herd behavior has extensively been examined in behavioral finance over the past few decades, which involves nature of herd behavior, underlying reasons for its presence, and its effects for the performance of financial markets (Guney et al., 2017; Spyrou, 2013). The previous research on frontier markets reveals that herd behavior is likely to inflate during different market conditions (for instance, up market vs. down market movement days, days of high volatility vs. low volatility, days of high trading vs. low trading volume), and with effect of changes in macro-economic forces (Guney et al., 2017; Shantha, 2018; Shantha, 2019b; Xiaofang & Shantha, 2018).

Bias-Learning Process of Individual Investors

The Adaptive Market Hypothesis (AMH) theory (Lo, 2004, 2005, 2012) presents an evolutionary perspective on investor behavior, indicating that investors can learn about their biases and adapt to market conditions over time. This view is also supported by psychological literature. For instance, De Neys and Pennycook (2019), through the review of experimental paradigms relating to the dual process theory, show that biased individuals demonstrate some sensitivity to their errors by intuitively processing logical principles without engaging in deliberate reasoning. This "intuitive logical thinking" emerges through a learning process where previously applied logical principles become automatized, leading to subsequent logical intuition (De Neys, 2012; Kahneman, 2012). Accordingly, it can be anticipated that individual investors are capable of minimizing their herd bias through a learning process, facilitated by intuitive logical thinking.

Shantha et al. (2018) and Shantha (2019a) suggest self-reflection as a potential means for reducing the impact of behavioral biases. Self-reflection enables investors to evaluate the validity of their thoughts, feelings, and behaviors, which, as the dual process theory predicts, can occur through their intuitive logical thinking process. Through self-reflection, investors may become more aware of the irrationality of herding and tend to avoid it in favor of making more logical informed decisions. Accordingly, it is hypothesized that self-reflection (SREF) reduces herd bias (HERD) of individual investors, as indicated by hypothesis 1.

Hypothesis 1 (H1): Higher the level of SREF by individual investors, the lower their HERD bias in stock trading decisions.

Shantha et al. (2018) theorize that investors' trading experience, affective states (for example, emotions experienced and attention to mistakes occurred during past stock trading and interest towards the learning attempt) and relationships with investment advisors strengthen the learning process. Supporting this view, Shantha (2019a) and Shantha (2024) find that investors' trading experience, desire for learning and relationship with investment advisors have direct positive influence on their self-reflection. Thus, based on this literature, it is hypothesized that investors' past investment experience (INVE), their desire for learning (DLRN), and authentic relationships with their investment advisors (ARAD) have positive influence on SREF, as given by the hypotheses 2, 3 and 4 below.

Hypothesis 2 (H2): INVE positively influences SREF.

Hypothesis 3 (H3): DLRN positively influences SREF.

Hypothesis 4 (H4): ARAD positively influences SREF.

Financial Literacy as a Mitigator of Herd Bias

Lusardi & Mitchell (2011) define financial literacy as “the knowledge of basic financial concepts and the ability to perform simple calculations.” According to Huston (2010), it covers both the knowledge of personal finance and the practical application of that knowledge. Broadly, the concept of financial literacy encompasses cognitive, psychological, and behavioral dimensions. Cognitively, it involves understanding financial concepts and principles that facilitate the processing of information for making financial decisions. Psychologically, financial literacy shapes how individuals perceive and respond to financial situations that affect their financial behaviors and attitudes. Behaviorally, financial literacy pertains to the practical application of this knowledge in making financial decisions.

Previous studies primarily focused on the behavioral dimension of financial literacy. Their findings consistently show that financial literacy improves the analysis skills for more effective investment management, leading to positive impacts on financial decisions and investment performance (Awais et al., 2016; Banks & Oldfield, 2007; Jappelli & Padula, 2013; Lusardi et al., 2010). Additionally, the literature reveals that financial literacy reduces herd bias among individual investors (Ashfaq et al., 2024; Jain et al., 2023). Moreover, financial literacy has been shown to mediate the relationship between herd bias and investment decision-making (Jain et al., 2023).

As a novel approach, this study focusses on cognitive and psychological dimensions of financial literacy. It predicts that financial literacy enhances intuitive logical thinking, thereby making self-reflection more effective in minimizing herd bias, as explained below. Financially literate individuals are more likely to identify their herd behavior. Their financial knowledge and skills enable them to better recognize irrationalities associated with herding and avoid it in subsequent stock trading decisions. When combined with self-reflection, this leads to resisting the desire to herd without sufficient rationale, which helps to mitigate irrational herding in decision-making (Hastings et al., 2013; Lusardi & Mitchell, 2011; Lusardi et al., 2010). Thus, it can be expected that self-reflection will more effectively reduce herd bias in individual investors with higher financial literacy compared to those with lower financial literacy. Accordingly, it is hypothesized that financial literacy (FINL) moderates the impact of self-reflection in reducing herd bias, as indicated by Hypothesis 5 below.

Hypothesis 5 (H5): FINL moderates the influence of SREF in reducing HERD bias.

Research Methodology

This study adopts an exploratory research design with a quantitative approach. The data is collected distributing a self-administrated questionnaire to a sample of 600 active individual investors of the CSE during the period August-December 2023. The valid responses received to the questionnaire was 253, representing a response rate of 42.2%. The questionnaire consists of 9 items to obtain information on the respondents' demography and investment characteristics. To ensure the content validity, the prior literature was adopted for measuring the model's constructs. INVE was measured by number of years of stock trading (Mishra & Metilda, 2015; Yalcin et al., 2016). SREF was measured 3 items relating to the process reflection and 4 items relating to the premise reflection (Kember et al., 2000). Based on the scales developed by Kengatharan & Kengatharan (2014), HERD was measured by 4 items. DLRN was measured by 10 items based on the self-directed learning readiness scale proposed by Fisher & King (2010) which, however, was reduced to 8 items since 2 items were excluded due to low factor loading found by indicator relevance test procedures (Sarstedt et al., 2017). Based on the scale used by Kale et al. (2000), the measurement of ARAD was consisted of 5

items. However, one item was dropped due to low factor loading. FINL was measured by 5 items on financial knowledge, skills and attitudes, by adopting the study of Dewi et al. (2020). Except for IEXP, all other constructs were measured by multiple items employing a five-point Likert scale: 1 for strongly agree and 5 for strongly disagree. The content validity was further ensured by a pilot study with a sample of 15 respondents. In the data analysis, first it is ensured that the data exhibits an acceptable level of reliability and validity. Then, the analysis is conducted using the partial square structural equation modelling technique, powered by SmartPLS version 4.1.0.2. The variance inflation factor (VIF) and Q2 values are used to check respectively multicollinearity issues and predictive accuracy of the research model.

Results and Interpretations

Sample Characteristics

Appendix 1 exhibits the demographic and behavioral characteristics of the survey participants. Accordingly, the majority (64.8 percent) is male investors, which aligns with the cultural norm in Sri Lanka where investment decisions are predominantly made by men. About 38 percent of respondents are below 35 years old, and roughly 50 percent are between 35 and 54 years old. Most respondents hold a bachelor's degree or higher. Regarding occupation, 75.9 percent work in the private sector, 10.3 percent in the public sector, 6.7 percent are self-employed, 4.7 percent are retired, and 2.4 percent are unemployed. Thus, the sample fairly represents the demographic of individual investors in the CSE.

The respondents have an average investment experience of about 10.5 years and the standard deviation 6 years. The sample includes both highly experienced investors (13 percent with 18+ years of experience) and less experienced ones (5.9 percent with 2 years or less). Only 13.4 percent trade stocks daily, with most trading once a week or less. About 30 percent have a low-risk appetite, and another 30 percent exhibit high risk-taking behavior. Many respondents appear to invest conservatively since 26.5 percent of the respondents are holding less than 5 percent of their wealth and 29.2 percent holding 5-15 percent in stocks. This low preference for stock investments is more likely to be caused by the recent economic crises, political instability, and the COVID-19 pandemic, leading to significant investment losses and increased risk aversion.

Descriptive Statistics

Appendix 2 presents the descriptive statistics of the constructs and their indicators. When considering the overall mean scores of the variables, desire for learning has the highest mean value of 4.027, followed by authentic relationship with investment advisors with a mean value of 3.838 on a five-point Likert scale. However, the mean score of herd bias construct has reported the lowest mean score (2.781), indicating that respondents had a lower tendency to herd during the study period. The skewness and kurtosis values of almost all indicator items of the constructs are between +1 and -1, which indicates that the data set is approximately normally distributed.

Evaluation of Measurement Model

After conducting indicator relevance test procedure (Sarstedt et al., 2017), all the constructs demonstrated satisfactory reliability for an exploratory study (Hulland, 1999). As given in Table 1, both Cronbach's alpha and composite reliability values exceeded 0.7, indicating strong internal consistency of all constructs (Gefen et al., 2000). Convergent validity was confirmed with AVE values above 0.5. Discriminant validity was ensured through the Fornell-

Larcker criterion (Table 2) and HTMT ratios below 0.85 (Table 3) (Fornell & Larcker, 1981; Henseler et al., 2015). In addition, no multicollinearity issues were present as VIF values are below five (Hair et al., 2011).

Table 1: Measurement Quality of Constructs

Construct	Cronbach's Alpha	Composite Reliability	AVE
ARAD	0.862	0.906	0.707
DLER	0.940	0.951	0.708
FINL	0.895	0.922	0.703
HERD	0.912	0.939	0.795
SREF	0.947	0.957	0.761

Source: SmartPLS output (2024)

Table 2: Fornell-Larcker Criterion for Discriminant Validity

Construct	ARAD	DLER	FINL	HERD	INVE	SREF
ARAD	0.841					
DLER	0.588	0.841				
FINL	0.543	0.637	0.839			
HERD	-0.544	-0.661	-0.495	0.892		
INVE	0.293	0.392	0.307	-0.394	1.000	
SREF	0.563	0.756	0.541	-0.747	0.448	0.872

Source: SmartPLS output (2024)

Table 3: Heterotrait-Monotrait (HTMT) Criterion for Discriminant Validity

Construct	ARAD	DLER	FINL	HERD	INVE	SREF
ARAD						
DLER	0.652					
FINL	0.604	0.690				
HERD	0.616	0.715	0.536			
INVE	0.312	0.405	0.320	0.413		
SREF	0.618	0.796	0.575	0.801	0.461	

Source: SmartPLS output (2024)

Note: A construct's discriminant validity is confirmed when the HTMT ratio of correlation values are less than 0.85 (Henseler et al., 2015).

Testing of Hypotheses

The variance explained (adjusted R^2) in SREF and HERD constructs are respectively 61.2% and 49.2% respectively. Q^2 values of SREF and HERD constructs are larger than zero, which mean an acceptable level of predictive accuracy of these constructs (Sarstedt, et al., 2017). Table 4 presents the estimates of path coefficients, their significance and f^2 effect sizes to examine the hypotheses H1 to H5.

The regression results shown in Table 4 show that investment experience has a significant

positive impact on self-reflection, however, with a small effect size ($\beta = 0.169$, $p < 0.01$, $f^2 = 0.070$), which supports the hypothesis H2. The findings also support the hypothesis H3 since the coefficient of the path $DLER \rightarrow SREF$ is significantly positive with a large effect size ($\beta = 0.592$, $p < 0.01$, $f^2 = 0.562$), which therefore suggests that investors' self-reflection is largely increased by their desire for learning. In addition, supporting hypothesis H4, the results reveal that investors' authentic relationship with their investment advisors have a significant positive effect on self-reflection, however, with a small effect size ($\beta = 0.167$, $p < 0.01$, $f^2 = 0.052$). These results supporting the hypotheses H2, H3 and H4 are consistent with Shantha et al. (2018) and Shantha (2019a). This explains that investors' self-reflection improves largely with their desire for learning, while small improvement from investment experience and interactions with advisors. The lower effects of investment experience and interactions with advisors can be attributed to the uncertainties in the investment environment highlighted during the study period. As discussed in section 4.1, many respondents exhibited low risk appetite, minimal stock holdings, and infrequent trading due to frustration and panic from market downturns and associated losses. Consequently, past experiences and advisor interactions had limited impact on their self-reflection process. The results presented in Table 4 further reveal that SREF has a significant negative impact on HERD, which appears to be a large effect as reflected by its f^2 value ($\beta = -0.581$, $p < 0.01$, $f^2 = 0.503$). Supporting the hypothesis H1, it indicates that self-reflection can substantially reduce herd bias occurred in individual investors when they trade stocks.

Table 4: Results of Regression Analysis

Hypothesis	Path	Coefficient	t-statistic	p-value	f^2
H1	SREF \rightarrow HERD	-0.581	8.892	0.000	0.503
H2	INVE \rightarrow SREF	0.169	3.417	0.001	0.070
H3	DLER \rightarrow SREF	0.592	12.233	0.000	0.562
H4	ARAD \rightarrow SREF	0.167	3.391	0.001	0.052
H5	FINL \times SREF \rightarrow HERD	0.183	2.615	0.009	0.082
	FINL \rightarrow HERD	-0.212	2.933	0.003	0.077

Source: SmartPLS output (2024)

Note: f^2 represents the effect-size of the path's predictor variable on its endogenous variable. As a rule of thumb, f^2 values greater than 0.02, 0.15, and 0.35 respectively indicate for small, medium and large effects for direct paths (Cohen, 2013). f^2 values greater than 0.005, 0.01, and 0.025 respectively for small, medium, and large effects of moderation (Kenny, 2018).

When the moderating effect, as indicated by hypothesis H5, is concerned, the results presented in Table 4 show that the interaction effect of financial literacy and self-reflection (as specified by the path $FINL \times SREF \rightarrow HERD$) is significant ($\beta = 0.183$, $p < 0.01$, $f^2 = 0.082$). Thus, the effect of self-reflection in reducing herd bias appears to be moderated by financial literacy, however with a smaller effect size. It can be better explained by following the approach suggested by Aiken & West (1991). Figure 1 shows the relationship between self-reflection and herd bias at higher level (green line), mean level (blue line) and lower level (red line) of financial literacy. All three lines show a negative slope, indicating that as self-reflection increases, herd bias decreases, regardless of the level of financial literacy. However, the steepness of the slope varies with different levels of financial literacy. Interestingly, at higher level of financial literacy (green line), it has the least steep negative slope, whereas the steepest slope at the lower level of financial literacy (red line). It explains that the effect of self-reflection in reducing herd bias appears to be stronger at lower level of financial literacy and

weaker at higher level of financial literacy.

A stronger self-reflection effect on herd bias at lower level of financial literacy suggests that self-reflection plays a crucial role in reducing herd bias of investors with low financial literacy. These investors engage in herding due to their lack of financial knowledge. However, self-reflection helps them to recognize the potential pitfalls of herding, thereby reducing their herd behaviour. However, for investors with high financial literacy, the effect of self-reflection on herd bias is weaker. More likely reason for this weaker effect is that these investors already possess the knowledge and skills to make informed decisions independently. Therefore, while self-reflection still helps, it does not add as much value in reducing herd behaviour because these investors are less prone to herd bias.

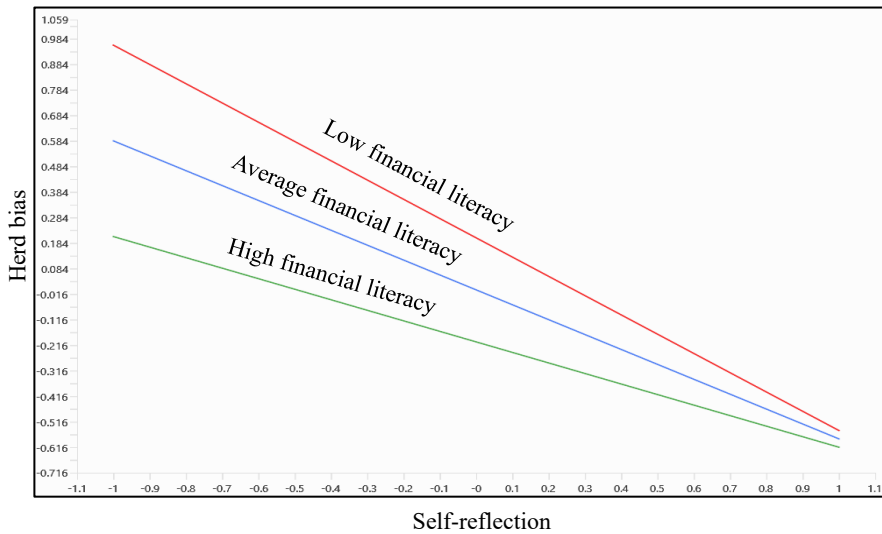


Figure 1: The moderating effect of financial literacy
Source: SmartPLS output (2024)

Conclusion and Recommendation

This study aims to explore how financial literacy mitigates herd bias among individual investors. It predicts that financial literacy acts as a moderator in enhancing the learning behavior of individual investors to reduce their herd bias. Supporting this prediction, the findings indicate that investors can reduce their herd bias by engaging in self-reflection on their past trading decisions, which is facilitated through their intuitive logical thinking. The results also show that financial literacy moderates this self-reflection process, which means financial literacy strengthens the intuitive logical thinking process, enabling investors to better involve in self-reflection to recognize and correct their herd bias. Particularly, the study shows that self-reflection plays a crucial role in reducing herd bias of investors with low financial literacy. Accordingly, it can be concluded that individual investors can mitigate their herd bias by engaging in self-reflection on their past stock trading experiences, which empowers them to be more financially literate to mitigate their herd bias.

In addition to providing new insights to the herding literature on cognitive and psychological mechanisms that mitigate herd bias, this study has some practical implications to individual

investors and financial practitioners as follows. Based on the findings, it can be suggested that individual investors should engage in self-reflection on their past trading decisions to minimize herd bias occurred with their financial decisions. The results of the study can also be used as inputs when designing and implementing training and awareness programs for individual investors. Such educational initiatives should emphasize the importance of self-reflection as a tool for better decision-making. By fostering both financial knowledge and self-reflection habits, investors can be better equipped to avoid herd behavior. Investment advisors should also encourage clients, especially those with lower financial literacy, to engage in self-reflection. This could involve reviewing past trades, understanding the reasons behind each decision, and learning from mistakes. These practical implications can eventually enhance the efficient functioning of capital markets, facilitating the achievement of sustainable economic development.

Acknowledgement

I am grateful to Professor L.P.S. Gamini for his guidance in the data analysis.

References

Aiken, L. S., West, S. G., & Reno, R. R. (1991). *Multiple regression: Testing and interpreting interactions*. sage.

Awais, M., Laber, M. F., Rasheed, N., & Khurshed, A. (2016). Impact of financial literacy and investment experience on risk tolerance and investment decisions: Empirical evidence from Pakistan. *International Journal of Economics and Financial Issues*, 6(1), 73-79.

Badola, S., Sahu, A. K., & Adlakha, A. (2024). A systematic review on behavioral biases affecting individual investment decisions. *Qualitative Research in Financial Markets*, 16(3), 448-476.

Banerjee, A. V. (1992). A simple model of herd behavior. *The quarterly journal of economics*, 107(3), 797-817.

Banks, J., & Oldfield, Z. (2007). Understanding pensions: Cognitive function, numerical ability and retirement saving. *Fiscal studies*, 28(2), 143-170.

Che Hassan, N., Abdul-Rahman, A., Mohd Amin, S. I., & Ab Hamid, S. N. (2023). Investment intention and decision making: A systematic literature review and future research agenda. *Sustainability*, 15(5), 3949.

De Neys, W. (2012). Bias and conflict: A case for logical intuitions. *Perspectives on Psychological Science*, 7(1), 28-38.

De Neys, W., & Pennycook, G. (2019). Logic, fast and slow: Advances in dual-process theorizing. *Current directions in psychological science*, 28(5), 503-509.

Dewi, V. I., Febrian, E., Effendi, N., Anwar, M., & Nidar, S. R. (2020). Financial literacy and its variables: The evidence from Indonesia. *Economics & Sociology*, 13(3), 133-154.

Fama, E. F. (1970). Efficient capital markets. *Journal of finance*, 25(2), 383-417.

Filbeck, G., Ricciardi, V., Evensky, H. R., Fan, S. Z., Holzhauer, H. M., & Spieler, A. (2017). Behavioral finance: A panel discussion. *Journal of Behavioral and Experimental Finance*, 15, 52-58.

Fisher, M. J., & King, J. (2010). The self-directed learning readiness scale for nursing education revisited: A confirmatory factor analysis. *Nurse education today*, 30(1), 44-48.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, 18(1), 39-50.

Gefen, D., Straub, D., & Boudreau, M. C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the association for information systems*, 4(1), 7.

Goodell, J. W., Kumar, S., Rao, P., & Verma, S. (2023). Emotions and stock market anomalies: a systematic review. *Journal of Behavioral and Experimental Finance*, 37, 100722.

Guney, Y., Kallinterakis, V., & Komba, G. (2017). Herding in frontier markets: Evidence from African stock exchanges. *Journal of International Financial Markets, Institutions and Money*, 47, 152-175.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2), 139-152.

Hastings, J. S., Madrian, B. C., & Skimmyhorn, W. L. (2013). Financial literacy, financial education, and economic outcomes. *Annu. Rev. Econ.*, 5(1), 347-373.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*, 43, 115-135.

Hirshleifer, D. (2015). Behavioral finance. *Annual Review of Financial Economics*, 7, 133-159.

Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic management journal*, 20(2), 195-204.

Huston, S. J. (2010). Measuring financial literacy. *Journal of consumer affairs*, 44(2), 296-316.

Jain, J., Walia, N., Kaur, M., Sood, K., & Kaur, D. (2023). Shaping investment decisions through financial literacy: do herding and overconfidence bias mediate the relationship?. *Global Business Review*, 09721509221147409.

Jappelli, T., & Padula, M. (2013). Investment in financial literacy and saving decisions. *Journal of Banking & Finance*, 37(8), 2779-2792.

Kahneman, D. (2012). The human side of decision making. *J Invest Consult*, 13, 9-14.

- Kale, P., Singh, H., & Perlmutter, H. (2000). Learning and protection of proprietary assets in strategic alliances: Building relational capital. *Strategic management journal*, 21(3), 217-237.
- Kengatharan, L., & Kengatharan, N. (2014). The influence of behavioral factors in making investment decisions and performance: Study on investors of Colombo Stock Exchange, Sri Lanka. *Asian Journal of Finance & Accounting*, 6(1), 1.
- Kember, D., Leung, D. Y., Jones, A., Loke, A. Y., McKay, J., Sinclair, K., ... & Yeung, E. (2000). Development of a questionnaire to measure the level of reflective thinking. *Assessment & evaluation in higher education*, 25(4), 381-395.
- Lo, A.W. (2004). The adaptive markets hypothesis: Market efficiency from an evolutionary perspective. *The Journal of Portfolio Management*, 30(5), 15-29.
- Lo, A. W. (2005). Reconciling efficient markets with behavioral finance: the adaptive markets hypothesis. *Journal of investment consulting*, 7(2), 21-44.
- Lo, A. W. (2012). Adaptive markets and the new world order (corrected May 2012). *Financial Analysts Journal*, 68(2), 18-29.
- Lusardi, A., & Mitchell, O. S. (2011). Financial literacy around the world: an overview. *Journal of pension economics & finance*, 10(4), 497-508.
- Lusardi, A., Mitchell, O. S., & Curto, V. (2010). Financial literacy among the young. *Journal of consumer affairs*, 44(2), 358-380.
- Maheshwari, H., Samantaray, A. K., & Jena, J. R. (2023). Unravelling Behavioural Biases in Individual and Institutional Investors Investment Decision-making: Intersection of Bibliometric and Systematic Literature Review. *South Asian Journal of Business and Management Cases*, 12(3), 275-299.
- Markowitz, H. (1952). The utility of wealth. *Journal of political Economy*, 60(2), 151-158.
- Mishra, K. C., & Metilda, M. J. (2015). A study on the impact of investment experience, gender, and level of education on overconfidence and self-attribution bias. *IIMB Management Review*, 27(4), 228-239.
- Mittal, S. K. (2022). Behavior biases and investment decision: theoretical and research framework. *Qualitative Research in Financial Markets*, 14(2), 213-228.
- Nia, V. M., Siregar, H., Sembel, R., & Zulfainarmi, N. (2024). Behavioral Finance in Psycho-Social Approaches: A Literature Review. In *International Conference on Business and Technology* (pp. 311-329). Springer, Cham.
- Patterson, D. M., & Sharma, V. (2007). Did herding cause the stock market bubble of 1998-2001. *University of Michigan-Dearborn*.
- Ranaweera, S. S., & Kawshala, B. A. H. (2022). Influence of behavioral biases on investment decision making with moderating role of financial literacy and risk attitude: A study based on Colombo Stock Exchange. *South Asian Journal of Finance*, 2(1), 56-67.

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2017). Treating unobserved heterogeneity in PLS-SEM: A multi-method approach. *Partial least squares path modeling: Basic concepts, methodological issues and applications*, 197-217.

Shantha, K. V. A. (2018). Shifts in herd mentality of investors in uncertain market conditions: New evidence in the context of a frontier stock market. *Journal of Economics and Behavioral Studies*, 10(3 (J)), 203-219.

Shantha, K. V. A., Xiaofang, C., & Gamini, L. P. S. (2018). A conceptual framework on individual investors' learning behavior in the context of stock trading: An integrated perspective. *Cogent economics & finance*, 6(1), 1544062.

Shantha, K. V. A. (2019a). Individual investors' learning behavior and its impact on their herd bias: an integrated analysis in the context of stock trading. *Sustainability*, 11(5), 1448.

Shantha, K. V. A. (2019b). The evolution of herd behavior: Will herding disappear over time?. *Studies in Economics and Finance*, 36(3), 637-661.

Spyrou, S. (2013). Herding in financial markets: a review of the literature. *Review of Behavioral Finance*, 5(2), 175-194.

Vieira, E. S., & Pereira, M. S. V. (2015). Herding behaviour and sentiment: Evidence in a small European market: Comportamiento gregario y sentimiento: la evidencia sobre un pequeño mercado europeo. *Revista de Contabilidad-Spanish Accounting Review*, 18(1), 78-86.

Weixiang, S., Qamruzzaman, M., Rui, W., & Kler, R. (2022). An empirical assessment of financial literacy and behavioral biases on investment decision: Fresh evidence from small investor perception. *Frontiers in psychology*, 13, 977444.

Xiaofang, C. & Shantha, K.V.A. (2018). Are market performance and volatility determining the evolution of herd mentality of investors in a frontier stock market? Evidence from the Colombo stock exchange of Sri Lanka. *Journal of Management Matters*, 5(1), 1-12.

Yalcin, K. C., Tatoglu, E., & Zaim, S. (2016). Developing an instrument for measuring the effects of heuristics on investment decisions. *Kybernetes*, 45(7), 1052-1071.

Appendix 1: Demographic and Behavioral Characteristics of Survey Respondents

Profile	Group	No. of Respondents	%
Gender	Male	164	64.8
	Female	89	35.2
Age	< 25 years	11	4.3
	25–34	85	33.6
	35–44	72	28.5
	45–54	53	20.9
	55 or above	32	12.7
Marital Status	Married	149	58.9
	Unmarried	104	41.1

Education	A/L	42	16.6
	Diploma	66	26.1
	Degree	103	40.7
	Postgraduate Diploma	14	5.5
	MBA/MSc	28	11.1
	Ph.D	0	0.0
Occupation	Private sector employee	192	75.9
	Public sector employee	26	10.3
	Retired	12	4.7
	Self-employed	17	6.7
	Unemployed	6	2.4
Investment experience	2 years or less	15	5.9
	3–7 years	67	26.5
	8–12 years	97	38.4
	13–17 years	41	16.2
	18 years or above	33	13.0
Trading frequency	Occasionally	51	20.2
	Once a month	41	16.2
	Once a week	85	33.6
	2–3 times a week	42	16.6
	Daily	34	13.4
Risk Appetite	Very low risk taker	44	17.4
	Low risk taker	32	12.6
	Average risk taker	103	40.8
	High risk taker	51	20.1
	Very high risk taker	23	9.1
Proportion of wealth invested in stocks	Less than 5%	67	26.5
	5–15%	74	29.2
	16–25%	43	17.0
	26–40%	31	12.3
	41–60%	26	10.3
	More than 60%	12	4.7

Source: SmartPLS output (2024)

Appendix 2: Descriptive Statistics

Construct	Item label	Mean	Standard deviation	Excess kurtosis	Skewness
Investment Experience (INVE)	TradeYrs	10.47	5.96	2.614	1.259
Authentic Relationship with investment advisors (ARAD) (Overall mean = 3.838)	Arad_1	3.933	0.884	0.716	-0.696
	Arad_2	3.870	0.967	-0.458	-0.447
	Arad_3	3.850	0.916	-0.934	-0.225
	Arad_5	3.700	0.798	0.909	-0.531
Desire for Learning (DLER) (Overall mean = 4.027)	DI_1	4.241	0.839	-0.699	-0.682
	DI_2	4.154	0.882	0.862	-0.932
	DI_3	4.032	0.871	-0.971	-0.351

	DI_4	4.004	0.887	-0.873	-0.316
	DI_6	3.743	0.796	0.878	-0.451
	DI_7	4.012	0.714	-0.082	-0.345
	DI_8	3.972	0.921	-0.154	-0.494
	DI_9	4.055	0.803	-0.932	-0.285
Financial Literacy (FINL) (Overall mean = 3.556)	Finl_1	3.644	0.932	-1.106	0.266
	Finl_2	3.534	0.988	-0.841	0.104
	Finl_3	3.640	0.983	-0.544	-0.032
	Finl_4	3.455	1.038	-0.519	-0.081
	Finl_5	3.506	0.818	-0.514	0.264
Herd bias (HERD) (Overall mean = 2.781)	Herd_1	2.652	1.202	-0.445	0.792
	Herd_2	2.700	1.214	-0.591	0.686
	Herd_3	2.561	1.236	-0.233	0.933
	Herd_4	3.209	1.241	-1.320	0.107
Self-reflection (SREF) (Overall mean = 3.785)	Sr_1	3.727	1.064	-0.724	-0.528
	Sr_2	3.593	1.073	-1.061	-0.214
	Sr_3	3.893	1.082	-0.375	-0.785
	Sr_4	3.897	1.073	-0.319	-0.798
	Sr_5	3.739	1.105	-1.086	-0.424
	Sr_6	3.846	1.123	-0.713	-0.653
	Sr_7	3.798	1.101	-0.707	-0.594

Source: SmartPLS output (2024)