

THE EFFECT OF FINANCIAL LITERACY AND COGNITIVE BIAS ON GREEN INVESTMENT DECISIONS

^{*1}M. RIADUL AFKAR

²SYAHYUNAN

³AMLYS SYAHPUTRA SILALAH

^{*1}UNIVERSITY OF NORTH SUMATERA, MEDAN, NORTH SUMATERA, INDONESIA

² UNIVERSITY OF NORTH SUMATERA, MEDAN, NORTH SUMATERA, INDONESIA

³ UNIVERSITY OF NORTH SUMATERA, MEDAN, NORTH SUMATERA, INDONESIA

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ABSTRACT

This study examines the influence of financial literacy and cognitive bias on green investment decisions among individual investors in Indonesia. The rapid growth of sustainable finance instruments, including green bonds, ESG-based mutual funds, and environmentally oriented stocks, has attracted considerable academic and practitioner interest. However, individual investors' decision-making in this domain remains underexplored, particularly regarding the interplay between financial knowledge and psychological factors. Using a quantitative approach with survey-based data collection from 120 respondents selected through purposive sampling, this research employed Structural Equation Modeling – Partial Least Squares (SEM-PLS) as the analytical method. The findings reveal that financial literacy has a significant positive effect on green investment decisions, indicating that investors with higher financial knowledge are more inclined to allocate funds toward sustainable financial instruments. Conversely, cognitive bias—encompassing overconfidence bias, herding behavior, and loss aversion—exerts a significant negative effect on green investment decision-making. These results suggest that psychological distortions substantially impair rational evaluation of green investment alternatives. This study contributes empirical evidence to the growing literature on behavioral finance and sustainable investment, offering practical implications for financial educators, investment advisors, and policymakers in promoting informed and rational participation in green capital markets.

Keywords: Financial Literacy, Cognitive Bias, Green Investment, Behavioral Finance, SEM-PLS

BACKGROUND

Global climate change and the growing awareness of environmental sustainability have significantly transformed investment practices worldwide. Investors are increasingly concerned not only with financial returns but also with the environmental and social impacts of their investment decisions. This trend has contributed to the rapid growth of green investment, which refers to the allocation of capital to financial instruments and projects that support environmental protection and sustainable development (Zhang et al., 2023). In Indonesia, the development of green finance and sustainable investment has gained considerable momentum in line with the government's commitment to achieving the Sustainable Development Goals (SDGs) and net-zero emissions by 2060. As a result, various green financial instruments, including green bonds, Environmental, Social, and Governance (ESG)-based mutual funds, and environmentally responsible stocks, have become increasingly available to investors (Yousaf et al., 2024).

Despite the increasing availability of green investment instruments, investment decisions are not solely determined by market opportunities or regulatory support. Individual investor characteristics also play a critical role in shaping investment behavior. Among these characteristics, financial literacy has been widely recognized as a key determinant of investment decision-making. Financial literacy refers to an individual's ability to understand and effectively use financial knowledge and concepts when making economic decisions (Lusardi & Mitchell, 2014). In the context of investment, financial literacy

encompasses knowledge of financial products, risk management, portfolio diversification, and return evaluation. Investors with higher levels of financial literacy are generally better equipped to assess investment opportunities and make informed financial decisions (OECD, 2023).

Previous studies have consistently demonstrated the positive relationship between financial literacy and investment behavior. Financially literate investors tend to evaluate risks and returns more effectively and are more likely to participate in sophisticated investment activities (Selamet et al., 2024). Within the context of green investment, financial literacy becomes even more important because investors must understand not only conventional financial considerations but also sustainability-related information, such as ESG performance and environmental impacts. Nguyen et al. (2024) found that financial literacy serves as a mediating factor between environmental awareness and green investment decisions. Investors who possess a strong understanding of sustainable finance are more likely to integrate environmental values into their investment strategies. This finding is consistent with the Theory of Planned Behavior, which suggests that knowledge and attitudes influence an individual's intentions and actual behavior (Ajzen, 1991).

In addition to financial literacy, investment decisions are also influenced by psychological factors that are extensively discussed in behavioral finance theory. Unlike traditional finance, which assumes that investors behave rationally, behavioral finance acknowledges that decision-making is often affected by emotions, heuristics, and cognitive limitations (Kahneman, 2011). One of the most prominent concepts within behavioral finance is cognitive bias, which refers to systematic deviations from rational judgment that occur when individuals process information and make decisions (Tversky & Kahneman, 1974). Cognitive biases can lead investors to misinterpret information, underestimate risks, or make decisions based on subjective perceptions rather than objective analysis.

Several forms of cognitive bias are particularly relevant in investment contexts, including overconfidence bias, herding behavior, loss aversion, availability bias, and anchoring bias. Overconfidence bias occurs when investors overestimate their knowledge or predictive abilities, causing them to ignore relevant information and underestimate uncertainty. Herding behavior refers to the tendency of investors to follow the actions of others without conducting independent analysis. Loss aversion describes the tendency to weigh potential losses more heavily than equivalent gains, often resulting in suboptimal investment choices (Liu et al., 2024). Empirical evidence suggests that these biases negatively affect the quality of investment decisions and may discourage investors from making optimal portfolio allocations (Barberis & Thaler, 2003).

The influence of cognitive bias is particularly relevant in the context of green investment, which remains a relatively new investment domain in many emerging economies. Because green investment products often involve complex sustainability-related information and evolving regulatory frameworks, investors may be more vulnerable to psychological biases when evaluating such opportunities. Consequently, understanding the role of cognitive bias is essential for explaining why some investors adopt green investment instruments while others remain hesitant despite growing awareness of sustainability issues.

Based on the foregoing discussion, financial literacy and cognitive bias appear to be two important determinants of green investment decisions. Financial literacy enables investors to better understand the characteristics, risks, and benefits of sustainable financial products, thereby facilitating more rational investment decisions. In contrast, cognitive bias may impair judgment and reduce decision quality by encouraging irrational behavior. Therefore, this study aims to examine the effects of financial literacy and cognitive bias on green investment decisions among individual investors in Indonesia. The findings are expected to contribute to the growing literature on behavioral finance and sustainable investment while providing practical insights for policymakers, financial institutions, and market participants seeking to promote the development of a sustainable capital market ecosystem in Indonesia.

RESEARCH METHOD

This study employs a quantitative approach with a causal research design to examine the cause-and-effect relationships between the independent variables, namely financial literacy and cognitive bias, and the dependent variable, green investment decisions. Data were collected through a survey using a

structured questionnaire distributed to individual investors registered with the Indonesia Stock Exchange (IDX) who had invested in sustainable financial instruments.

The population of this study consisted of all individual investors registered at Indonesia Stock Exchange Investment Galleries in North Sumatra Province. A purposive sampling technique was employed based on the following criteria: (1) individual investors who had actively conducted investment transactions during the previous 12 months, (2) investors who had experience investing in green or sustainable financial instruments, and (3) individuals who were willing to participate as research respondents. Based on these criteria, a total of 120 respondents were selected as the research sample.

The research instrument was developed based on a comprehensive review of the relevant literature. The financial literacy variable was measured using 15 questionnaire items covering the dimensions of basic financial knowledge, investment knowledge, and understanding of sustainable financial instruments, adapted from the OECD/INFE Financial Literacy Framework (OECD, 2023). The cognitive bias variable was measured using 18 items representing the dimensions of overconfidence bias, herding behavior, and loss aversion. Meanwhile, the green investment decision variable was measured using 12 items covering investment intention, investment frequency, and the proportion of funds allocated to green investment instruments. All measurement items were assessed using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5).

Data analysis was conducted using the Structural Equation Modeling–Partial Least Squares (SEM-PLS) approach with the assistance of SmartPLS 4.0 software. This method was selected because of its ability to analyze complex models with relatively small sample sizes and its minimal requirements regarding data normality assumptions. Model evaluation was carried out in two stages: the measurement model (outer model) evaluation and the structural model (inner model) evaluation.

The outer model evaluation included assessments of convergent validity, discriminant validity, and reliability. Convergent validity was evaluated using factor loadings (> 0.70) and Average Variance Extracted ($AVE > 0.50$). Discriminant validity was assessed using the Heterotrait-Monotrait Ratio ($HTMT < 0.85$). Reliability was evaluated through Composite Reliability ($CR > 0.70$) and Cronbach's Alpha ($\alpha > 0.70$). The inner model evaluation included the assessment of the coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2) to determine the explanatory and predictive capabilities of the proposed research model.

RESEARCH FINDINGS

A total of 120 questionnaires were distributed and all were deemed valid for analysis. Based on the demographic characteristics, the majority of respondents were male (62.5%), aged between 25 and 35 years (48.3%), held a bachelor's degree (55.8%), and were employed in the private sector (41.7%). Regarding investment experience, 38.3% of respondents had invested for 1–3 years, while 35.8% had investment experience ranging from 3–5 years. The proportion of portfolio allocation to green investment instruments varied among respondents, with the largest group (43.3%) allocating between 10% and 30% of their investment portfolios to green assets.

The measurement model assessment demonstrated satisfactory validity and reliability. All indicators achieved the recommended threshold for convergent validity, with factor loadings ranging from 0.712 to 0.891. The Average Variance Extracted (AVE) values exceeded the minimum requirement of 0.50, with values of 0.573 for financial literacy, 0.544 for cognitive bias, and 0.591 for green investment decisions. Discriminant validity was confirmed through the Heterotrait-Monotrait Ratio (HTMT), with all values remaining below the threshold of 0.85. Furthermore, the Composite Reliability and Cronbach's Alpha values for all constructs exceeded 0.70, indicating a satisfactory level of internal consistency and reliability.

The structural model evaluation revealed an R^2 value of 0.614, indicating that financial literacy and cognitive bias jointly explained 61.4% of the variance in green investment decisions. In addition, the predictive relevance value ($Q^2 = 0.387$) suggested substantial predictive capability of the proposed model.

The hypothesis testing results indicated that financial literacy had a positive and statistically significant effect on green investment decisions ($\beta = 0.482$, $t = 7.341$, $p < 0.001$). Therefore, Hypothesis 1 (H1) was supported. Conversely, cognitive bias was found to have a negative and statistically significant effect on green investment decisions ($\beta = -0.331$, $t = 5.128$, $p < 0.001$), supporting Hypothesis 2 (H2). These findings confirm that higher levels of financial literacy enhance investors' propensity to engage in green investments, whereas stronger cognitive biases reduce the likelihood of making optimal green investment decisions.

DISCUSSION

The findings of this study provide empirical evidence that financial literacy plays a crucial role in influencing green investment decisions among individual investors in Indonesia. The positive and significant relationship between financial literacy and green investment decisions suggests that investors with greater financial knowledge are more capable of evaluating the characteristics, risks, and long-term benefits of sustainable financial instruments. Such investors are better equipped to interpret environmental, social, and governance (ESG) information, assess sustainability reports, and incorporate non-financial considerations into their investment strategies. This finding is consistent with previous studies conducted by Nguyen et al. (2024) and Selamet et al. (2024), which highlighted the importance of financial literacy in promoting sustainable investment behavior. The result also supports the Theory of Planned Behavior (Ajzen, 1991), which posits that knowledge and attitudes significantly influence individuals' intentions and actual behaviors. In the context of green investment, enhanced financial literacy appears to strengthen investors' confidence and ability to make informed investment decisions aligned with sustainability objectives.

The study also reveals that cognitive bias negatively affects green investment decisions. This finding supports the core assumptions of behavioral finance theory, which argues that investment decisions are often influenced by psychological factors rather than purely rational considerations (Kahneman, 2011). Investors who exhibit higher levels of cognitive bias are more likely to make suboptimal decisions due to distorted information processing and judgment errors. Specifically, overconfidence bias may lead investors to overestimate their ability to assess emerging green investment opportunities while underestimating associated risks. Herding behavior may encourage investors to follow prevailing market trends without conducting adequate independent analysis, whereas loss aversion may cause investors to avoid green investment instruments because of concerns regarding short-term volatility despite their potential long-term benefits. These findings are in line with Liu et al. (2024), who demonstrated that cognitive biases collectively undermine the quality of investment decision-making.

Furthermore, the relatively high explanatory power of the model ($R^2 = 0.614$) indicates that financial literacy and cognitive bias are important determinants of green investment decisions. However, approximately 38.6% of the variance remains unexplained, suggesting that other factors may also influence investors' decisions. Variables such as environmental awareness, risk perception, social influence, trust in financial institutions, and ESG preferences may contribute to green investment behavior and should be explored in future research.

Overall, the findings highlight the importance of integrating behavioral finance perspectives into the study of sustainable investment. Green investment decisions are not solely driven by financial considerations but are also shaped by investors' cognitive capabilities and psychological tendencies. Therefore, efforts to promote green investment participation should extend beyond improving technical financial knowledge and include educational initiatives aimed at increasing awareness of cognitive biases and developing debiasing strategies. By enhancing financial literacy while simultaneously reducing the influence of cognitive biases, policymakers, financial institutions, and investment educators can foster more rational and sustainable investment behavior among individual investors.

CONCLUSION

This study successfully confirms the two proposed hypotheses regarding the determinants of green investment decisions among individual investors in Indonesia. First, financial literacy was found to

have a positive and significant effect on green investment decisions. Investors with a higher level of financial knowledge and a better understanding of investment products, risk management, and sustainability principles are more likely to make informed decisions and allocate a greater proportion of their funds to green financial instruments. This finding highlights the critical role of financial literacy in promoting sustainable investment behavior and supporting the growth of green financial markets.

Second, cognitive bias was found to have a negative and significant effect on green investment decisions. Psychological biases, particularly overconfidence bias, herding behavior, and loss aversion, reduce the quality of investment decision-making by encouraging irrational judgments and limiting investors' ability to objectively evaluate green investment opportunities. These findings reinforce the relevance of behavioral finance theory in explaining investor behavior within the context of sustainable finance.

The results of this study have several important practical implications. For regulators and capital market authorities, the findings emphasize the need for comprehensive and well-structured financial literacy programs that incorporate sustainable finance concepts and green investment instruments. For financial institutions and investment managers, understanding investors' cognitive biases can facilitate the development of products, advisory services, and communication strategies that better align with investors' behavioral characteristics and decision-making processes. For academics, this study contributes to the growing body of literature on behavioral finance and sustainable investment by demonstrating the combined influence of financial literacy and cognitive bias on green investment decisions.

Despite its contributions, this study has several limitations. The use of purposive sampling limits the generalizability of the findings beyond the selected sample of investors. In addition, the cross-sectional nature of the data prevents the examination of changes in investment behavior over time and restricts the ability to establish long-term causal relationships. Future research is therefore encouraged to adopt longitudinal research designs, expand the geographical scope of the study, and incorporate additional variables that may influence green investment decisions. Potential factors include income level, risk tolerance, environmental awareness, social influence, and ESG preferences. Examining moderating and mediating variables may also provide a deeper understanding of the mechanisms through which financial literacy and cognitive bias shape sustainable investment behavior.

Overall, this study demonstrates that promoting green investment participation requires not only improving investors' financial literacy but also addressing the psychological biases that may hinder rational decision-making. A balanced approach that combines financial education with behavioral awareness initiatives can contribute to more informed investment decisions and support the long-term development of sustainable financial markets.

REFERENCE

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Barberis, N., & Thaler, R. (2003). A survey of behavioral finance. In G. Constantinides, M. Harris, & R. Stulz (Eds.), *Handbook of the Economics of Finance* (Vol. 1, pp. 1053–1128). Elsevier.
- Kahneman, D. (2011). *Thinking, fast and slow*. Farrar, Straus and Giroux.
- Liu, X., Wang, Y., & Zhao, H. (2024). Cognitive biases and sustainable investment decision making: Evidence from emerging markets. *Journal of Behavioral Finance*, 25(1), 45–61.
- Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature*, 52(1), 5–44. <https://doi.org/10.1257/jel.52.1.5>
- Nguyen, T. H., Tran, P. Q., & Le, M. D. (2024). Financial literacy, environmental awareness, and green investment decisions among retail investors. *Sustainability*, 16(4), 1825.
- OECD. (2023). *OECD/INFE international survey of adult financial literacy*. OECD Publishing.
- Selamet, R., Hidayat, A., & Prasetyo, B. (2024). Financial literacy and sustainable investment behavior among Indonesian investors. *Journal of Sustainable Finance & Investment*, 14(2), 210–225.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124–1131. <https://doi.org/10.1126/science.185.4157.1124>

- Yousaf, I., Ali, S., & Riaz, Y. (2024). Determinants of green investment behavior: A behavioral finance perspective. *Finance Research Letters*, 63, 105421.
- Zhang, L., Chen, Y., & Wang, Z. (2023). Green investment and sustainable development: A global perspective. *Environmental Economics and Policy Studies*, 25(3), 411–429.