



The Moderating Role of Locus of Control on the Links Between Availability Bias, Herding, and Investment Decisions

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Abstract. This study aims to determine the effect of availability bias and herding on investment decision-making with the moderating role of locus of control. Data was collected by distributing questionnaires to individual investors on the Jakarta Indonesia Stock Exchange (IDX), with a sample of 281 people. This study uses the Structural Equation Modeling (SEM)-LISREL 8.8 approach. This study finds that availability bias and herding significantly affect investment decision-making. Locus of control plays a moderating role between availability and herding bias in investment decision-making. This research helps individual investors understand the existence of rational or irrational behavior, analyze all the information available in the market, and always verify the data received so that investors have the knowledge and can act rationally before making investment decisions.

Meanwhile, policymakers can conduct investment training and awareness programs, conduct research for individual investors more intensively, and develop information networks to facilitate investors' information needs. The limitation of this study is that it only investigates individual investors. For further research, institutional investors could be tested to explore the behavior of institutional investors moderated by locus of control.

Keywords: Availability Bias, Herding, Investment Decision, Locus of Control.

1 Introduction

Investment strategies can increase investors' profits and trigger investors to invest in profitable securities. Rational investors can take advantage of investment opportunities in profitable securities not recognized by irrational investors [27]. Investor experience, friendship/work environment, family background, income, and others can influence a person to make investment decisions [7].

Information that comes to the market changes stock prices significantly due to the demand and supply of securities in the market [14]. Investors make decisions based on available information, which creates an availability bias. The sources of information available are social media, the actions of friends, and the influence of interactions. This makes irrational investment decision-making because investors react quickly to information and observe the behavior of others [6].

A common mistake occurs when investors tend to follow the decisions most investors take. Investors tend to care more about what other people think of their investment decisions. As a result of herding behavior, investors lose their individuality in decision-making [9]. Herding refers to an individual's tendency to imitate judgments (rational and irrational) made by others. Thus, investors herding behavior will lead to bubbles forming in the financial market [8].

Investors who perceive the desired outcome to be determined by external forces such as chance, luck, fate, and the power of others are known as external locus of control. In contrast, investors who believe that the desired investment returns come from their efforts, skills, and characteristics are known as internal locus of control. The locus of control encourages everyone to make rational investment decisions so that financial behavior can be controlled [15].

Most studies in developed countries have linked behavioral finance biases and investment decisions. Several empirical studies have been conducted in developing countries, such as research by [6] and [18]. Investors' differing financial behavior can cause issues, such as whether availability bias and herding behavior, which we frequently meet, can influence investors' investment decisions.

The locus of control is a key moderator in this study that has never been evaluated in the decision-making of individual investors. To avoid illogical decisions that can harm investors, additional moderators must be introduced. The purpose of this study is to determine whether the role of locus of control can mitigate the relationship between availability bias, herding behavior, and investment decisions. Because there are cultural variations between Indonesian and Western cultures, empirical research on these behavioral biases is required to eliminate irrational decision-making by individual investors.

2 Literature Review

2.1 Investment Decision Making

The classic investment method advises investors to invest in instruments with a high likelihood of return. However, investors need to know how risk will be quantified. [10] research, dubbed "portfolio selection," paved the way for developing a new theory in this subject.

Traditional literature assumes that investors' investment decisions are made based on rational expectations to renew their beliefs after the arrival of new information and maximize the expected return for a certain level of risk [11]. [10], argues that risk cannot be reduced simply by increasing the number of financial instruments but can be significantly reduced by an inverse correlation between investment instruments and diversifying the investment instruments available in an investor's portfolio.

Decision-making includes processes and steps to analyze various investment options to obtain future benefits from resources and funds where investor decisions are strongly influenced by behavioral factors [2]. Investors who invest their money tend to aim to achieve a significant rate of return by minimizing the risk as much as possible [17]. As a result, most investors make decisions irrationally rather than rationally [18].

Investor behavior generally deviates from rational or logical decisions and is influenced by behavioral biases due to a lack of ability to process information.

Behavioral bias is caused by the use of some mental shortcuts by investors, referred to as heuristics (rules of thumb) or beliefs, judgments, and preferences. Psychological factors include cognitive or heuristic information processing shortcuts, memory errors, emotional and motivational influences, and social influences such as community culture [17].

2.2 Availability Bias and Investment Decision Making

The first authors to study the factors included in heuristics were Tversky and Kahneman [25]. One of the factors he introduced is availability bias, which is a decision maker's preference for information or events that are easy to remember or assess the probability of an event occurring. Investors make decisions based on information that is readily available in the market. This is called availability bias. Most investors invest in well-known stocks because the information is readily available, which is against financial principles such as diversification, causing availability bias [4]. Sources of information available include social media, friends' actions, observing others' behavior, and the influence of interactions that make investors irrational in making investment decisions because they react quickly to information [8].

Research by [18] revealed that investors prefer to buy stocks that provide more readily available information than perform a complete analysis of all available and relevant information. Investors also rely on information from friends and family without doing any verification. Investors prefer to buy local stocks on local exchanges where investors are more familiar or information about them can be easily obtained. As a result of this heuristic effect, investors mistakenly believe that a good company's stock will lead to higher returns.

Research by [24] explains that investors need to allocate adequate time and effort to seeking and gathering the information needed to make investment decisions. Instead, they rely on readily available information. Their primary source of information is their friends and relatives, and they choose a known investment (local stock). Based on the results of the research above, the following hypotheses can be proposed:

H₁: There is an effect of availability bias on investment decision-making.

2.3 Herding and Investment Decision Making

Herding's behavior, initially identified by [23], is the behavior of a person who follows the decisions of other groups of people due to emotional impulses and decides independently based on his personal information. Herding behavior mimics the actions of large groups because people are easy to get along with and generally seek acceptance from the group rather than being a standout person. Investors who think that large groups cannot misbehave with the herd with the illusion that the herd may know something they do not know [5]. Traders' emotions are also determined by social influences, particularly herding in financial markets, which often has a strong influence in situations where prospects for financial assets are uncertain and complex to predict [3]. According to [16], interacting with each other is important in stock and investment markets because it allows stockbrokers to communicate with other

stockbrokers and their clients. Retail investors also seek and share information about investments with family members, friends, and neighbors.

The research found by [19] explains that herding is one of the most influential factors in investor decision-making and suggests that investors use group investment patterns. The effect of herding behavior among investors is seen when, before buying shares, investors need a consultation with other parties such as family, friends, or colleagues, and also follow several stock communities to make investment decisions so that the decisions of other investors also impact investment decisions for buying and selling certain shares and stock volumes. Herding behavior is also proven by research from [12], which is caused by a need for more information for individual investors about market conditions. When the market is bullish, investors fear making investment decisions, so they follow the crowd as a shield against losing unexpected returns. Based on the results of the research above, the following hypotheses can be proposed:

H₂: There is an effect of herding behavior on investment decision-making.

2.4 Locus of Control

The locus of control theory was introduced by [20], explaining individual perceptions of how much control a person exerts over life events. People who believe they control their lives have an internal locus of control. Investors with high internal locus of control are less likely to have emotional problems. Meanwhile, people with an external locus of control believe that other people, fate, or luck control the rewards they receive. They believe that they are powerless concerning outside forces [22].

In their study, [26] revealed that in stock trading, investors prefer to invest in local companies familiar with investors whose information is easy to obtain. The research successfully revealed by [21] explained that the availability of information from stock equity portfolios as a proportion of total financial wealth made investors see the impact of the locus of control as positively related to investment decisions in risky assets. Investors believe in their skills and abilities to make careful investment plans and ensure their investments are successful. They can influence and control the results obtained, so they prefer to make investment decisions based on the availability of information. Based on the results of the discussion above, the following hypotheses can be proposed:

H₃: Locus of control moderates the relationship between availability bias and investment decision-making.

The research by [28] proves that herding behavior exists in the Chinese securities market. Other people and external reinforcements will easily influence investors with herding behavior and rely too much on public opinion rather than their information when making investment decisions. Investor decision-making influenced by friends and colleagues also proves herding behavior, as the research reveals [1]. This is possible because investors with a low locus of control will depend on others and feel powerless to make investment decisions. Investors generally trust friends, relatives, and colleagues when making decisions and are also influenced by recommendations given by popular analysts. This explains that the market price reflects the collective valuation of investors, and as a result, the actual value of the market may need to be corrected. Thus, high herding behavior can strengthen the tendency of investors with a low locus of control to make investment decisions. Based on the discussion above, the following hypotheses can be proposed:

H₄: Locus of control moderates the relationship between herding behavior and investment decision-making.

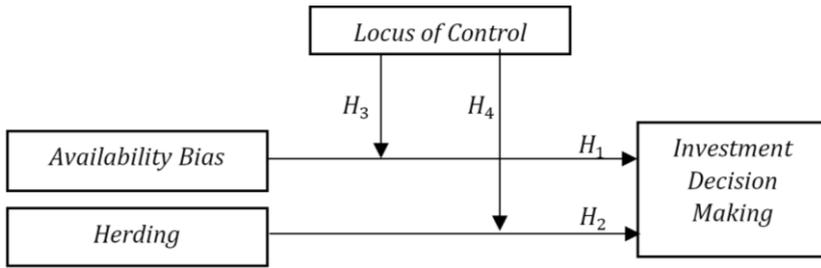


Fig. 1. Conceptual framework.

3 Research Methods

Data was collected by distributing questionnaires among investors in Jakarta so that a sample of 281 respondents was obtained according to the SEM-LISREL model. The data collection technique in this study was convenience sampling. The sample criteria were retail investors who traded on the Indonesia Stock Exchange and had more than one year of investment experience. The measurement of the variables in this study uses a six-point Likert Scale where 1 represents "Strongly Disagree," and six represents "Strongly Agree." This study uses four variables: availability bias, herding, locus of control, and decision-making. Availability bias consists of five items referring to [18]; [24]. [19] describe herding as consisting of five items. The locus of control consists of six items, referring to [18] and [21]. Decision-making consists of five items, referring to [15].

3.1 Validity and Reliability Measurement Testing

Testing the validity of all measurement indicators of the measured variables revealed that they were all valid (capable of measuring the desired) because the standardized loading factor of all indicators was more significant than 0.5 or 0.70. Reliability testing was carried out using AVE (Average Variance Extracted), which resulted in a value above 0.5 and CR (Construct Reliability) above 0.7 for each variable so that it was proven that all measurement indicators were reliable (consistent). The results of validity and reliability testing using CFA (Confirmatory Factor Analysis) are shown in Table 1.

Table 1. Results of testing the validity and reliability of research variables.

Item		Estimasi Loading Factor	AVE	CR
Availability			0.67	0.91
AB1	Buy stocks when the stock market index goes up.	0.90		
AB2	Sell shares when the stock market index goes down.	0.84		

AB3	Information is readily available.	0.80		
AB4	Invest in local stocks.	0.77		
AB5	Buy shares on IDX	0.76		
Herding			0.55	0.86
HE1	Follow other investors' decisions regarding trading volume	0.76		
HE2	Follow other investors' decisions to buy and sell shares.	0.74		
HE3	React quickly to other investors' decisions or follow theirs.	0.75		
HE4	It depends on other people's decisions regarding the type of stock.	0.74		
HE5	Buy shares and consult with others (family, friends, or colleagues).	0.72		
Locus of Control			0.56	0.88
LC1	Careful investment	0.80		
LC2	A successful investment plan	0.80		
LC3	Success through hard work	0.77		
LC4	Investment returns depend on ability.	0.80		
LC5	Inheriting money makes people rich.	0.59		
LC6	Rich because investing in stocks has nothing to do with luck.	0.71		
Investment Decision Making			0.61	0.89
DM1	Expected return on stock investment	0.85		
DM2	The rate of return is equal to or higher than the market average rate of return.	0.78		
DM3	Investment decisions (including selling, buying, holding, selecting shares, and deciding share volume)	0.84		
DM4	Only buy shares if stock market conditions are clear.	0.72		
DM5	Invest money in stocks.	0.71		

4 Results and Discussion

4.1 Characteristics of Respondents

From a total of 381 respondents, the results of the respondent profile are as follows: the number of male respondents is 56.6%, while female respondents are 43.4%. Respondents with S1 education were 39.1%, those with S2 were 35.6%, and others were 25.3%. Job positions as non-managerial employees are 49.5% (mainly investing in stocks), managers are 31.7%, and the rest are supervisors, directors, and others.

4.2 Hypotheses Testing Result and Discussion

A more detailed description of hypothesis testing can be summarized in Table 2 below:

Table 2. Hypothesis testing results.

Hypothesis	Path	Estimate	t-value	Finding
H ₁	Availability Bias → Decision Making	-0.20	-4.94	Significant

H ₂	Herding behavior → Decision Making	0.64	13.52	Significant
H ₃	Availability Bias → Decision-Making in the Locus of Control Moderation	0.08	4.82	Significant
H ₄	Herding Behavior → Decision-Making in the Locus of Control Moderation	0.08	2.16	Significant

The effect of availability bias on investment decision-making is negative and significant, as indicated by the estimated coefficient value of -0.20 with a t-value of -4.94 (t-value > 1.96). This means the higher the availability bias, the lower the investment decision-making. Investors on the IDX who are affected by the availability bias are generally more likely to choose investments in Indonesian companies traded on the IDX because they rely heavily on readily available information, and their primary sources of information are their friends, relatives, consultants, or seniors, which can result in investors making the wrong decision. The decision is due to not actively verifying the information obtained, so it would be caused by returns that are not in line with expectations and returns that are lower than the market average. The results of this study support the research of [18] and [24].

The effect of herding behavior on investment decision-making is positive and significant, as indicated by the estimated coefficient value of 0.64 with a t-value of 13.52 (t-value > 1.96). It means the higher the herding behavior, the higher the investment decision-making. Herding behavior on the IDX can also be seen in investors who often follow market trends or require consultation with other parties such as securities analysts, friends, or colleagues who have a good track record in stock trading. Investors are also included in stock groups on social media, which often provide recommendations regarding the types of stocks that are in an uptrend in the volume of shares bought and sold. When information enters the stock exchange, investors quickly react to changes in other investors' decisions. Investors expect an adequate return on investment or at least the same as the market through this herding behavior. The results of this study support research by [19] and [12].

The effect of availability bias on investment decision-making moderated by locus of control is positive and significant, as indicated by the estimated coefficient value of 0.08 with a t-value of 4.82 (t-value > 1.96). It means that the higher the locus of control, the stronger the influence of availability bias on investment decision-making. Investors who are dominated by investors who have non-managerial employment positions, which is 49.5% of all respondents, believe that they can control their investment returns by preferring to trade on the Indonesian stock exchange and investing their money in shares of Indonesian companies that have been registered. Due to the availability of easily obtainable information such as on social media, websites, and mass media (newspapers, stock news channels on television or radio), thus influencing investment decisions to obtain high returns (profits) and according to investors' expectations, by research conducted by [26] and [21].

The effect of herding behavior on investment decision-making moderated by locus of control is positive and significant, as indicated by the estimated coefficient value of 0.08 with a t-value of 2.16 (t-value > 1.96). It means that the higher the locus of control, the stronger the influence of herding behavior on investment decision-making. Investors generally plan their investments carefully and work hard to find and exchange market information about the investments they are interested in. On the

other hand, there is investor herding behavior on the IDX, which is shown in the contact or mutual communication between investors through social media or brokers with their clients. The disadvantage of herding behavior is that it causes investors to depend too much on public opinion rather than their information when making investment decisions, which leads to incorrect and irrational conclusions. Investors in IDX, although their education level is dominated by bachelor's degrees, do not discourage herding behavior in trading or investing in stocks. In an uncertain environment, investors are tempted to follow the decisions of others. Even though investing carefully is difficult, it strengthens investors' herding behavior in several ways, such as consulting with other parties such as family, friends, or colleagues; following several stock communities to make investment decisions; and determining the type of stock, share volume, and decisions to buy and sell certain shares. Herding behavior in the stock market is a short-term event caused by fast and dynamic investor behavior. Therefore, investors believe they can control the desired return. This was based on research conducted by [28].

5 Conclusion

The results of this study indicate that the direct relationship between availability bias and herding behavior has a significant effect on investment decision-making. This study also shows that the availability bias and herding variables are proven to be moderated by the locus of control in investment decision-making. An interesting finding in this study is that investments made carefully by IDX investors further strengthen herding behavior. The most common thing investors do is to follow several stock communities to determine the type of stock share volume and follow other investors' decisions in trading investment decisions. Certain stocks are bought, which causes investors to believe they can control the expected return. This could be due to IDX investors' strong culture of social interaction.

The managerial implication of this research is to help individual investors better understand the existence of rational or irrational investor behavior in consideration of all available market information. Investors should have neutral emotions before making investment decisions to avoid losing the money invested by making their analysis and research not based on rumors or suggestions from other investors. Meanwhile, policymakers can carry out more intensive investment training and awareness programs for individual investors to foster a research culture and must develop information networks to facilitate investors' information needs. The limitation of this research is that it only investigates individual investors. For further research, institutional investors can be tested to explore the behavioral factors of institutional investors moderated by locus of control.

References

1. Antony, A., & Joseph, A. I.: Influence of Behavioural Factors Affecting Investment Decision — An AHP Analysis. *Metamorphosis* 16(2), 107–114. <https://doi.org/10.1177/0972622517738833> (2017).
2. Anum, & Ameer, B.: Behavioral Factors and their Impact on Individual Investors' Decision Making and Investment Performance: Empirical Investigation from Pakistani Stock Market. *Global Journal of Management and Business Research*, 17(1), 1–12.

Retrieved from https://globaljournals.org/GJMBR_Volume17/8-Behavioral-Factors-and-their-Impact.pdf (2017).

3. Baddeley, M.: *Behavioural Economics and Finance* (Second Edition), Routledge, New York (2019).
4. Bakar, S., Ng, A., & Yi, C.: The Impact of Psychological Factors on Investors' Decision Making in Malaysian Stock Market: A Case of Klang Valley and Pahang. *Procedia Economics and Finance*, 35(2016), 319–328. [https://doi.org/10.1016/S2212-5671\(16\)00040-X](https://doi.org/10.1016/S2212-5671(16)00040-X) (2016).
5. Hirshleifer, D., & Hong Teoh, S.: Herd behavior and cascading in capital markets: A review and synthesis. *European Financial Management*, 9(1), 25–66. <https://doi.org/10.1111/1468-036X.00207> (2003).
6. Ikram, Z.: An Empirical Investigation on Behavioral Determinants, Impact on Investment Decision Making, Moderating Role of Locus of Control. *Journal of Poverty, Investment and Development*, 26, 44–50. Retrieved from <https://iiste.org/Journals/index.php/JPID/article/viewFile/31771/32643> (2016).
7. Jonathan, R., & Sumani, S. (2022), 'Millennial Investment Decision Analysis', *Business and Entrepreneurial Review*, 21(2), 279–296. <https://doi.org/10.25105/ber.v21i2.10409>
8. Malhotra, S. K.: Strategies to Mitigate Behavioural Risk in Investment Decision Making. *SR Journal of Business and Management (IOSR-JBM)*, 20(2), 60–65. <https://doi.org/10.9790/487X-2002096065> (2018).
9. Malik, B. C., & Sahu, L.: Behavioral Finance: Development and Emergence Trends in India. *International Journal of Management and Social Science Research Review*, 1(34), 20–24. Retrieved from <http://ijmsrr.com/Downloads/020520174.Pdf> (2017).
10. Markowitz, H.: Portfolio Selection. *The Journal of Finance*, 7(1), 77–91. <https://doi.org/10.1111/j.1540-6261.1952.tb01525.x> (1952).
11. Metawa, N., Hassan, M. K., Metawa, S., & Safa, M. F.: Impact of behavioral factors on investors' financial decisions: case of the Egyptian stock market. *International Journal of Islamic and Middle Eastern Finance and Management*, 12(1), 30–55. <https://doi.org/10.1108/IMEFM-12-2017-0333> (2019).
12. Mishra, P. K., & Mishra, S. K.: Do Banking and Financial Services Sectors Show Herding Behaviour in Indian Stock Market Amid COVID-19 Pandemic? Insights from Quantile Regression Approach. *Millennial Asia*, 1–31. <https://doi.org/10.1177/09763996211032356> (2021).
13. Nalurita, F.: The Effect of Profitability Ratio, Solvability Ratio, Market Ratio on Stock Return. *Business and Entrepreneurial Review*, 15(1), 73–94. <https://doi.org/10.25105/ber.v15i1.2080> (2015).
14. Nalurita, F.: Impact of Eps on Market Prices and Market Ratio. *Business and Entrepreneurial Review*, 15(2), 111–130. <https://doi.org/10.25105/ber.v15i2.4629> (2019).
15. Nalurita, F., Leon, F. M., & Hady, H.: Factor Influencing Investor's Decision Making in Indonesia: Moderating the Role of Locus of Control. *International Journal of Business and Applied Social Science*, 6(4), 19–56. <https://doi.org/10.33642/ijbass.v6n4p6> (2020).
16. Nofsinger, J. R.: *The Psychology of Investing* (Sixth Edit). Routledge, New York (2018).
17. Pompian, M. M.: *Behavioral Finance and Wealth Management: How to Build Investment Strategies That Account for Investor Biases* (Second Edi). John Wiley & Sons, Inc., New Jersey (2015).
18. Rasheed, M. H., Rafique, A., Zahid, T., & Akhtar, M. W.: Factors influencing investor's decision making in Pakistan: moderating the role of locus of control. *Review of Behavioral Finance*, 10(1), 70–87. <https://doi.org/https://doi.org/10.1108/RBF-05-2016-0028> (2018).
19. Raut, R. K., Das, N., & Mishra, R.: Behaviour of Individual Investors in Stock Market Trading: Evidence from India. *Global Business Review*, 21(2), 1–16. <https://doi.org/10.1177/0972150918778915> (2018).

20. Rotter, J. B.: Generalized Expectancies For Internal Versus External Control Of Reinforcement. *Psychological Monographs: General and Applied*, 80(1), 1–28. <https://doi.org/10.1037/h0092976> (1966).
21. Salamanca, N., Grip, de A., Fouarge, D., & Montizaan, R.: Locus of Control and Investment in Equity. *IZA – Institute of Labor Economics*, 016(10407), 1–46. Retrieved from <http://ftp.iza.org/dp10407.pdf> (2016).
22. Schultz, D. P., & Schultz, S. E.: *Theories of Personality (Eleventh E)*. Cengage Learning, Boston (2017).
23. Shiller, R. J.: *Irrational Exuberance (3rd editio)*, Princeton University Press, New Jersey (2015).
24. Subramaniam, A., & Velnampy, T.: The Role of Behavioural Factors in the Investment Decisions of Household Investors. *International Journal of Accounting and Financial Reporting*, 7(1), 392–412. <https://doi.org/10.5296/ijafr.v7i1.11421> (2017).
25. Tversky, A., & Kahneman, D.: Judgment under Uncertainty: Heuristics and Biases. *Science*, 185(4157), 1124–1131. <https://doi.org/https://doi.org/10.1126/science.185.4157.1124> (1974).
26. Waweru, N. M., Mwangi, G. G., & Parkinson, John, M.: Behavioural factors influencing investment decisions in the Kenyan property market. *Afro-Asian Journal of Finance and Accounting*, 4(1), 26–49 (2014).
27. Zahera, S. A., & Bansal, R.: Do investors exhibit behavioral biases in investment decision making? A systematic review. *Qualitative Research in Financial Markets* 10(2), 210–251. <https://doi.org/https://doi.org/10.1108/QRFM-04-2017-0028> (2018).
28. Zhang, Y., & Zheng, X.: A Study of Herd Behavior Based on the Chinese Stock Market. *Journal of Applied Management and Investments* 5(2), 131–135. Retrieved from <http://www.jami.org.ua/abstracts5-2.htm> (2016).

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