

The Determinants of Irrational Investment Decisions Among Individual Investors in Indonesia Stock Exchange

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ABSTRACT

The purpose of this study is to examine and analyze financial literacy, representative bias, and availability bias in predicting irrational investment decisions. This study also analyses the moderating effect of internal locus of control on the prediction of representative bias and availability bias on irrational investment decisions. The sample of this study is collected with a non-probability sampling method, which is purposive sampling, and the data is collected by questionnaire. This study uses Smart PLS version 3.3.3 to process the collected data. The results of this study find that representative bias and availability bias have a significant prediction on irrational investment decisions, whereas financial literacy has no significant prediction. This study also finds that internal locus of control has no moderating role in the prediction of representative bias and availability bias on irrational investment decisions.

Keywords: *Financial literacy, representative bias, availability bias, irrational investment decision, internal locus of control*

1. INTRODUCTION

Increased implementation of technology in the financial sector, can increase the number of individual investors. This is supported by data from the Indonesian Central Securities Depository [1] that shows a significant increase of individual investors since 2018, of over 250% by 2021. In addition to its role, technological developments have also made financial markets and financial products more complex [2]. To compensate for the complexity of financial markets and financial products, an investor must have an adequate level of financial literacy and be able to make the right decision. With a such level of financial literacy, investors are expected to make a perfectly rational decision. On the other hand, in practice, investors act irrationally [3]. With the help of behavioral finance which states that investors act normally rather than rationally, it helps this study to analyze the factors behind the irrational decision. With normal investor behavior, investors can be affected by various factors that lead to mistakes and irrational decisions. According to Kahneman and Tversky [4], the basic factors in decision making are certainty, ignoring the same thing in various decisions (isolation effect), and loss aversion. However, Behavioural Finance states that investors can be influenced by their emotions, feelings (self-deception), and intuition (heuristics). Emotions, feelings, and intuition can cause bias when making investment decisions [3]. Bias is the tendency of investors to make mistakes [5]. This bias

can cause investors to make mistakes in making the decision. This study will focus more on two heuristic biases that are often used in decision making, namely, representative bias and availability bias [6]. In addition, these two biases are not only found in novice investors but also in experienced investors [6].

Previous researches show that there is a significant relationship between financial literacy and irrational investment decision [7]; representative bias and irrational investment decision [3]; availability bias and irrational investment decision [8]. Even though there is also research that state contrarily, which an insignificant relationship between financial literacy and irrational investment decision [9]. Moderation role of internal locus of control also contradicts as significant with representative bias and irrational investment decision [10]; availability bias and irrational investment decision [11]. As well as, an insignificant relation between representative bias and irrational investment decision [12]; availability bias and irrational investment decision [10].

Based on this background, this research has five objectives. The first three is to empirically test financial literacy, representative bias, and availability bias as a predictor of individual investors' investment decisions on the Indonesia Stock Exchange. The last two is to empirically test the internal locus of control as a moderator of representative bias and availability bias in predicting investment decisions of individual investors on the Indonesia Stock Exchange.

1.1. Theoretical Review

Three theories can be used as a basis of this study, namely are prospect theory, heuristics decision-making theory, and financial literacy theory. In the prospect theory, Daniel Kahneman and Amos Tversky [4] explained how people take alternative actions with risks and uncertainties involved. It focuses on the fact that investors are not always rational, have limits of self-control, and are influenced by their own biases. Thus, this study focuses more on behavioral finance which is part of prospect theory. In behavioral finance, some factors influence investment decisions that can result in irrational decisions. The factors are emotion, self-deception, and intuition (heuristics).

Those factors bring us to the next theory, heuristics decision-making theory. Gerd Gigerenzer and Wolfgang Gaissmaier [13] describe heuristics decision making as an efficient cognitive process by ignoring a piece of information consciously or unconsciously in decision making. Further, the theory finds that individuals often rely on adapted heuristics and result in the neglect of information, leading to more subjective judgments.

The next theory is more about the opposite of the previous two, financial literacy theory focus on delivering more rational decision making. Annamaria Lusardi and Olivia S. Mitchell in their theory explain the importance of financial literacy in improving welfare [2]. With financial literacy, investors will make a decision based on their financial knowledge that bridges the determination of their welfare.

Financial literacy is the ability to make effective money allocation and management decisions based on informed considerations [14]. OECD [15] states that financial literacy is knowledge of finance and the ability to apply this knowledge in making an effective financial decision to improve economic conditions and play a role in the economy. Based on this opinion, financial literacy can be the ability and knowledge of an investor in making a rational and effective financial decision based on information.

Representative bias is a mental shortcut taken by investors so that investment decisions are based on the popularity of the company, historical returns, and so on [3]. Representativeness bias is a bias in investment decision-making that makes investors misinterpret the good characteristics of a company [16]. Based on this opinion, representative bias is a situation when investors take shortcuts by following stereotypical thinking according to investors' mental views in making an investment decision.

Availability bias is the situation of investors who fail to develop a diversified portfolio because investors limit investment opportunities to instruments that have historically unattractive returns [8]. Availability bias is a bias that causes investors to use information that is already available rather than repeating procedures in testing an investment [3]. Based on this opinion, availability bias is the actions of investors who prefer to believe in existing data on investment rather than fully analyzing the information that is already available so that it will have an impact on the irrational decision.

Investment is a commitment to entrust investors' funds to the issuer of investment instruments within a certain period [17]. Investment is a process of investing money with the hope of a return that should be done rationally for the success of the investment [10]. Behavioral finance [4] state that investor is not always rational, thus this study is focused on the irrational for a better understanding. Based on this opinion, the irrational investment decision is the actions of investors in making a decision that is influenced by other factors, so that the expectation of maximum returns in the future will not be fulfilled.

Internal locus of control is the encouragement of someone who thinks that desires can be realized by their efforts [11]. Internal locus of control is belief in the results obtained from one's actions [18]. Based on this opinion, the internal locus of control is the level of investor confidence in his ability to make an investment decision.

1.2. Relationship Between Variables

1.2.1. The prediction of financial literacy on irrational investment decisions

Based on financial literacy theory [2], a person's welfare is determined by their financial knowledge as a form of financial literacy. Investment bridges financial literacy to achieve welfare. Financial literacy state has a significant role in achieving rational investment decisions as a state by Al-Tamimi and Kalii [7]. Arianti [9] said that financial literacy has an insignificant influence on investment decisions.

While previous studies reap the pros and cons, the theory of financial literacy states financial literacy as the basis for welfare as a result of the investment.

Based on this explanation, an alternative hypothesis can be formulated as follows:

H₁: Financial literacy negatively predict the irrational investment decision of individual investors on the Indonesia Stock Exchange.

1.2.2. The prediction of representative bias on irrational investment decisions.

Based on behavioral finance [4] and heuristics decision-making theory [13], investors are act normally and individuals often using adapted heuristics in making an investment decision. Heuristics as representative bias is often used by investors while making an investment decision [6]. Rasheed, et al. [3] stated that representative bias has a significant positive impact on irrational investment decisions. Yusbardini and Andani [19] explained that representative bias can arise and affect the investment decision. Chang et al, [20] also stated a significant impact of representative bias over irrational decisions.

Based on this explanation, an alternative hypothesis can be formulated as follows:

H₂: Representative bias positively predict the irrational investment decision of individual investors on the Indonesia Stock Exchange.

1.2.3. The prediction of availability bias on irrational investment decisions.

Heuristic decision-making theory [13] and behavioral finance [4] agreed that heuristics lead to subjective judgment as a result of taking shortcuts in making investment decisions. Availability bias makes a person decide to use available data instead of fully analyzing it all over again. Shah et al [8] stated a significant impact of availability bias on irrational investment decisions, and more real on the active trader. Dangol and Manandhar [11] stated that investors are significantly affected by availability bias when making an investment decision.

Based on this explanation, an alternative hypothesis can be formulated as follows:

H₃: Availability bias positively predicts the irrational investment decision of individual investors on the Indonesia Stock Exchange.

1.2.4. Internal locus of control moderates in the prediction of representative bias on irrational investment decisions.

According to prospect theory [4], investors while taking action is having a limit of self-control and are not always rational. However, investors should be optimistic about their actions or decision if they are going to trust their money to any third party. The optimistic or belief in their decision is referring to the internal locus of control [18]. Ikram [10] said that the relation between representative bias and investment decision is significantly moderated by an internal locus of control. However, Cuandra and Tan [12] stated that there was an insignificant moderating effect of internal locus of control on the relationship between representative bias and investment decision. Concerning concerns that irrational decisions are made based on investors' belief that their decision is not affected by bias, internal locus of control has played a part in the investment decision.

Based on this explanation, an alternative hypothesis can be formulated as follows:

H₄: Internal locus of control can positively moderate representative bias to predict the irrational investment decision of individual investors on the Indonesia Stock Exchange.

1.2.5. Internal locus of control moderates in the prediction of availability bias on irrational investment decisions.

In line with the moderating role of representative bias and irrational investment decisions, internal locus of control makes investors believe that the results will never betray their actions and decision [11]. Internal locus of control

drives investors in their decision even when they are affected by their own biases. Dangol and Manandhar [11] state a significant positive impact of internal locus of control on moderate the availability bias and investment decision. Ikram [10] states contrarily as an insignificant impact. However, the internal locus of control is the result of the investor's belief and interfere in the investment decision making.

Based on this explanation, an alternative hypothesis can be formulated as follows:

H₅: Internal locus of control can positively moderate availability bias to predict the irrational investment decision of individual investors on the Indonesia Stock Exchange.

1.3. Research Framework

Based on the theory and the relationship between these variables, the research framework can be developed as follows.

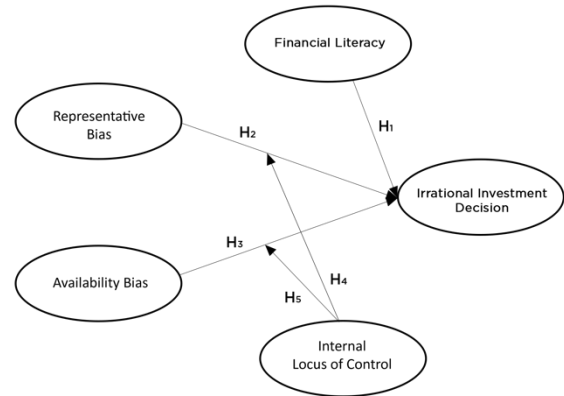


Figure 1 Research Framework

1.4. Methodology

This study is quantitative research with a non-experimental research design. The sample of the study is using a non-probability sampling method with a purposive sampling technique. The sample criteria are individual investors in Indonesia Stock Exchange to represent the population of all investors on the Indonesia Stock Exchange. According to Roscoe [21], in determining the number of samples from a study without sub-samples and non-experiments, a rule of thumb can be used, namely, the number of samples is more than 30 to less than 500, and the sample size is recommended 10 times of the number of variables in a multivariate study. Thus, this study will use a sample size of 50 to less than 500 individual investors who invest in the Indonesia Stock Exchange. The number of respondents was 75 individual investors. Data was collected using a questionnaire with Google Form. Alternative answers to the questionnaire using a Likert scale between a score of 1 which indicates strongly disagree to 5 which indicates strongly agree. The data analytical method is using PLS-SEM and is processed using Smart PLS version 3.3.3.

In measuring variables, the variable indicators of financial literacy are adapted from Arif [22], other variables (representative bias, availability bias, irrational investment decision, and internal locus of control) are adapted from Rasheed et al [3].

2. THE RESULT OF DATA ANALYSIS AND DISCUSSION

2.1. Descriptive Statistics of Respondents' Demographics

The demographic characteristic of 75 respondents is served in Table 1. As mentioned in the table below, the status of

Table 1 The characteristics of respondents

Status		Gender		Employment		Investment Experience	
Type	Amount (%)	Type	Amount (%)	Type	Amount (%)	Interval (years)	Amount (%)
Single	89%	Female	36%	Full-time job	28%	0 - 6	92,0%
Married	11%	Male	64%	Permanent half-time job	4%	6 - 15	3%
				Independent professional	1%	> 15	5%
				Self-employed	16%		
				Student	49%		
				Pension	1%		

2.2. Convergent Validity Test

In convergent validity, a measuring instrument meets if it has a loading factor value of more than 0.70, and the required averaged variance extracted (AVE) value must be 0.50 or more [23]. In this study, the smallest loading factor is from an indicator of irrational investment decision with a score of 0.718. The loading factor proves that the indicators are valid and fulfill the requirements of the convergent validity test. The AVE score of all variable is valid with a score larger than 0.5, which mean that the indicators can measure the latent variable constructs. The final result of the convergent validity test verifies the validity of the variables' indicators.

2.3. Discriminant Validity Test

Furthermore, a measuring instrument meets discriminant validity if it meets the requirements of cross-loading, namely the loading of each indicator on the construct is higher than the cross-loading on other constructs [23]. In addition, it is necessary to meet the requirements of Fornell-Lacker that is, a construct must have more variance with its indicators than other constructs. To meet these requirements, the AVE of each construct must be more than the highest squared correlation with other constructs [23]. In this study, all indicator on the constructs is larger than the cross-loading on other constructs. Furthermore, the AVE of

respondents with a majority of 89% is single and the other 11% is married. The majority of the respondent is male and about 36% is female. Then, nearly half of the respondent is a student, followed by 28% full-time job employee and 16% self-employed. Can be concluded that the majority of the respondent is still adolescence to early adulthood. Almost all of the respondents have only 0 to 6 years of experience in investing. While 5% is more than 15 years and the rest 3% experienced 6 until 15 years. The years of experience show that the respondent majority is novice investors.

each construct is greater than the highest squared correlation with other constructs. This means that the indicators also meet the requirement of Fornell-Lacker. Thus, the indicators fulfill the cross-loading and Fornell-Lacker requirements, which means that the discriminant validity test approves the indicators of variables are valid.

2.4. Reliability Test

The reliability test uses the outer model reliability analysis. So this study uses Cronbach's alpha and composite reliability. A test is said to be reliable if Cronbach's alpha test results have a score above 0.7 and the composite reliability test results get a score above 0.7. In this study, Cronbach's alpha and composite reliability of all constructs are above 0.7 with the smallest being financial literacy with 0,710 and Cronbach's alpha and irrational investment decision with a 0.712 composite reliability. Thus, the reliability analysis of Cronbach's alpha and composite reliability tell that the test is reliable or has been designed can measure the variables studied accurately.

2.5. Test the Coefficient of Determination (R-Square (R²))

The coefficient of determination (R²) is used to measure the predictive accuracy of a model [23]. The coefficient of determination is categorized into 3 parts, 0.75 has

substantial predictive accuracy, 0.5 has moderate predictive accuracy, and 0.25 has weak predictive accuracy [24][25]. The R^2 value of irrational investment decision shows a score of 0.698, which refer to moderate to substantial predictive accuracy. It means that 69.8% of irrational investment decisions can be explained by the variation of financial literacy, representative bias, availability bias, and internal locus of control. This means that other remaining 31.2% can be explained by other variables out of the scope of this research.

Table 2 The Results of Hypothesis Testing

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P-Values
FL-IID	-0.142	-0.122	0.106	1.338	0.182
RB-IID	0.248	0.240	0.095	2.602	0.010
AB-IID	0.381	0.377	0.087	4.400	0.000
RB*ILoC-IID	-0.029	-0.029	0.089	0.323	0.747
AB*ILoC-IID	-0.025	-0.009	0,085	0.298	0.766

Note: FL-IID is referring to the prediction of financial literacy on Irrational investment decisions, RB-IID is refer to the prediction of representative bias on irrational investment decisions, AB-IID is refer to the prediction of availability bias on irrational investment decisions, RB*ILoC-IID is refer to the moderation of internal locus of control in the prediction of representative bias on irrational investment decision, AB*ILoC-IID is referring to the moderation of internal locus of control in the prediction of availability bias on irrational investment decision

In this hypothesis testing is using a confidence level of 95%. The p-value is significant at H_2 and H_3 , which is the prediction of representative bias to irrational investment decisions with the value of 0.010 and the prediction of availability bias to irrational investment decisions with the value of 0.000. The other variables of H_1 , H_4 , and H_5 are getting an insignificant p-value. The result indicates that availability bias can significantly influence investors of the Indonesia Stock Exchange in making an irrational investment decision. However, the other variables can't predict irrational investment decisions of investors of the Indonesian Stock Exchange significantly.

2.7. Discussion

The discussion of this study is by comparing the results of hypothesis testing in this study with the relevant theories and previous research.

2.7.1. The prediction of financial literacy on irrational investment decision

Based on the result, financial literacy has an insignificant role in predicting irrational investment decisions, or H_1 is statistically rejected. This is proved with the p-value from the hypothesis testing which includes financial literacy with a score of 0.182. the p-value is lower than 0.05 as the confidence level of this study is 95%. The insignificant result does not support the relevant financial literacy theory which states that with a high level of financial literacy, investors can make a rational investment decision to increase welfare. However, the insignificant result is in line with some of the previous research that states no significant

2.6. Hypothesis Testing

In hypothesis testing, t-statistics is used to determine the effect of the independent variable and/or moderation variable on the dependent variable. This study used a two-tailed test, which means that the significant level is above 1.96 at a confidence level of 95%. Table 2 shows the results of each variable.

effect [9]. Thus, this study finds that with a high level of financial literacy, investors can still make an irrational investment decision. It means that this study is in line with Tversky and Kahneman's [6] statement that experienced investors can still be influenced by the heuristics and end up with an irrational investment decision.

2.7.2. The prediction of representative bias on irrational investment decision

With a confidence level of 95%, representative bias can significantly predict irrational investment decisions. The results show that H_2 is accepted statistically with a p-value of 0.010 which is lower than 0.05. This result is in line with behavioral finance [4] and heuristics decision-making theory [13] that state investment decision is affected by factors like heuristics and investors tend to rely on heuristics. Thus, investors are making irrational investment decisions when relying on heuristics, which is representative bias.

2.7.3. The prediction of availability bias on irrational investment decision

The results in the hypothesis testing show that availability bias has the most significant effect in predicting irrational investment decisions. With the p-value result of 0.000, H_3 is statistically accepted. It means that the result is supporting behavioral finance [4] and heuristics decision-making theory [13]. Apart from supporting theories, the result of the hypothesis testing also supports representative and availability bias as the most used heuristics which is stated by Tversky and Kahneman [6]. Thus, the availability bias

has the most significant prediction on irrational investment decisions.

2.7.4. *The prediction of representative bias on irrational investment decision with an internal locus of control as moderating variable*

Based on the hypothesis testing result, with a confidence level of 95%, H_4 is statistically rejected with a p-value of 0.747 far above 0.05. This shows that the internal locus of control is insignificant in moderating representative bias prediction on irrational investment decisions. The result is in line with previous researches such as Rasheed et al [3]. The result of this study support Rasheed et al [3] explanation with heuristic decision-making theory [13] that the insignificant result is because heuristics are made based on experience and knowledge. Thus, an internal locus of control does not play a role in moderating the prediction of representative bias on irrational investment decisions.

2.7.5. *The prediction of availability bias on irrational investment decision with an internal locus of control as moderating variable*

The hypothesis testing result shows that H_5 is statistically rejected due to the p-value result being above 0.05, which is 0.766. The p-value result of H_5 is in line with the rejected H_4 , which has the same explanation from the heuristics decision-making theory. It means that Rasheed et al [3] explanation which connects the result with the heuristics decision-making theory is proven by this study. As heuristics, availability bias also has an effect based on the experience and knowledge of investors [13]. Thus, the internal locus of control has no role in influencing the prediction of availability bias on irrational investment decisions.

3. CONCLUSIONS AND SUGGESTIONS

This study reveals that representative bias and availability bias have a significant prediction on irrational investment decisions. It is in line with the behavioral finance that investment decision is affected by factors like heuristics. However, this study also finds out that financial literacy has no significant prediction on irrational investment decisions. Financial literacy comes out insignificant and it could be interpreted Tversky and Kahneman [6] are right, even experienced investors, in this case, investors with a high financial literacy level can also be affected by biases. Then, this study also reveals that internal locus of control has no moderating role in the prediction of representative bias and availability bias on irrational investment decisions. Driven by the fact that heuristics arise because of experience and knowledge.

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