

The Effect of Overconfidence Bias and Representativeness Bias on Investment Decision with Risk Tolerance as Mediating Variable

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Abstract

This research is intended to determine the effect of overconfidence bias and representativeness bias on investment decisions with risk tolerance as a mediating variable. The object of this research is investors who invest in the Indonesian Capital Market. The technique of collecting data is by using a questionnaire through online media and a literature study with the criteria of active investors with a sample of 200 investors. Data analysis in this study uses an alternative method of Structural Equation Modeling (SEM) version 3.0. The first stage in this research is to test the validity of each variable's questions along with their reliability. The second stage examines the relationship between overconfidence bias and representativeness bias on investment decisions with risk tolerance as a mediating variable. The results of this study indicate that the overconfidence bias variable and the representativeness bias have a significant positive effect on investment decisions either directly or through the mediating risk tolerance variable.

INTRODUCTION

Rational investors expect the maximum possible profit with minimum risks. Many factors influence investment decision making and one of the main factors is the psychological factor and personal character of investors. Psychological factors are factors that contribute to determining investor behavior, even though many parties state that investment psychology factors have the most role in investing and affect the results to be achieved. Psychological factors are even considered to be able to cause investors to do irrational and unpredictable things. However, most investors do not care about the extent to which these psychological factors affect their actions in making investment decisions. This statement is also the same as that conveyed by Barberis and Thaler (2003) which states that financial behavior has emerged by combining emotions and cognitive errors and their effects on investors and the decision-making process. Psychological factors are factors that contribute to determining investor behavior, even though many parties state that those investment psychology factors have the most role in investing and affect the results to be achieved.

Behavioral finance states that human nature is irrational based on traditions, beliefs and norms, and human differences from that prove to be imperfect in decision-making (Tversky & Kahneman, 1979). Kurniawan (2019) stated that sometimes emotions, traits, knowledge, preferences and various things inherent in humans underlie the emergence of decisions to act and this makes investors lose self-control where they become too confident or even become too pessimistic.

Overconfidence bias and representativeness bias are biases that can affect an investor's decision-making, if these biases are not taken seriously they can harm the investor himself.

Qadri & Shabbir (2013), Lim (2012), Qureshi et al. (2012) and Bashir et al. (2013) have found overconfidence has a significant positive impact on investors' decision-making. On the other hand, Atif (2014) and Kentharan (2014) found that overconfidence hurts decision-making.

In addition to overconfidence bias and representativeness bias, risk tolerance is also one of the factors that influence investment decisions. Nguyen et al (2015) state that financial risk tolerance is closely related to individual investment decision-making and is therefore measured based on routine questionnaires as part of the financial advisory process in many countries. Much research on investment decisions has been carried out, furthermore, researchers will conduct the research with the title "The Effect of Overconfidence Bias and Representativeness Bias on Investment Decisions with Risk Tolerance as Mediating Variable".

LITERATURE REVIEW

Behavioral Finance

Behavioral Finance is the study of how individuals actually behave in making financial decisions, in particular that studies how psychology influences investors' investment decisions (Risman et al., 2021). These psychological factors are even considered to be able to cause investors to do things that are irrational and unpredictable. Sometimes emotions, traits, knowledge, preferences, and various kinds of things inherent in humans underlie the emergence of decisions in action. Pompian (2012) suggests that behavioral finance is a study of psychological factors that influence investors in making investment decisions. After receiving information and facts, investors make decisions based on cognitive factors and emotional factors.

Investment Decision

Subash (2012) explains that investment decisions can be defined as the process of choosing an alternative from various alternatives. Making investment decisions is an important challenge faced by investors. An investment decision is said to be optimal if the timing of the investment can maximize the expected utility. To maximize utility, a person will only invest if the expected benefits from the investment are greater than if the money is spent now.

Overconfidence Bias

Risman et al. (2021) defines overconfidence bias as an investment decision made because investors have too much confidence in their predictions and information. This condition is a normal thing that is also a reflection of a person's level of confidence to achieve or get something. Shefrin (2001) suggests that overconfidence is "related to how well people understand their own abilities and the limits of their knowledge. "Individuals who are overly confident in their abilities tend to think that they are better than they really are". The same is true for knowledge and individuals who are overconfident about their level of knowledge tend to think they know more than they actually do.

Investors who are too confident to get more returns will use their superior skills and abilities (Chen et al. 2007). Vijaya (2014) shows that one of the behavioral factors Overconfidence has a significant and positive relationship with investment performance. This study is consistent with the results of the study by The results of this study are in line with the results of studies that show a significant correlation between overconfidence bias on investment decisions, including Waweru (2008), Qureshi et al. (2012), Bashir et al. (2013), Qadri & Shabbir (2013), Broihanne et al (2014), Bakar and Yi (2016), Khan et al. (2017) and Raut et al. (2018). Therefore, the hypothesis can be formulated as follows:

H1: Overconfidence bias has a positive and significant effect on investment decisions.

Representativeness Bias

According to Risman et al. (2021), Representativeness bias is Investors make investment decisions too quickly without deep analysis. In generally, investors only rely on past experience which is considered to be a reference for their current investment decisions.

Moosa and Ramiah (2017) say that we find people losing their temper and, in a number of cases, these people being blamed for the overreaction. But representativeness bias allows us to understand why people lose their temper because they have been exposed to a series of previous events plus a final trigger. This behavioral characteristic is also present in the stock market which allows representativeness bias. This research is in line with research conducted by Sohani Islam (2012), Waweru et al (2014), Badshah et al. (2016), Raut et al. (2018).

Based on this explanation, the second hypothesis is as follows:

H2: Representativeness bias has a positive and significant effect on investment decisions

Risk Tolerance

Baird & Thomas (1985) say that risk tolerance is defined as an individual's assessment of how risky a situation is in terms of a probabilistic estimate of the level of situational uncertainty, how controllable that uncertainty is, and confidence in the estimate are two important ways in which risk is interpreted and acted upon. Risk as a feeling refers to our spontaneous and impulsive reactions to danger and risk when analysis brings logic, reasoning and scientific considerations to support risk assessment and decision-making (Slovic et al. 2006).

Putri et al. (2017) examined the relationship between personality factors and risk tolerance for stock investment decisions on financial asset investors in the city of Surabaya and they used 2 test models. They found that personality relationships (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism) did not affect investors' risk tolerance because financial asset investors tend to be rational in their decision-making. This study is in line with the research conducted by Hariharan et al. (2000), Bailey and Kinerson (2005) and Yohnson (2005), Nguyen et al. (2016), Nurninda et al. (2020). Therefore we can propose a third hypothesis as follows:

H3: Risk tolerance has a positive and significant effect on investment decisions.

Risk tolerance is a consideration in making investment decisions based on overconfidence and bias, therefore risk tolerance can minimize and increase the effect of Overconfidence bias and Representativeness bias on investment decisions, thus the indirect effect hypothesis can be proposed as follows:

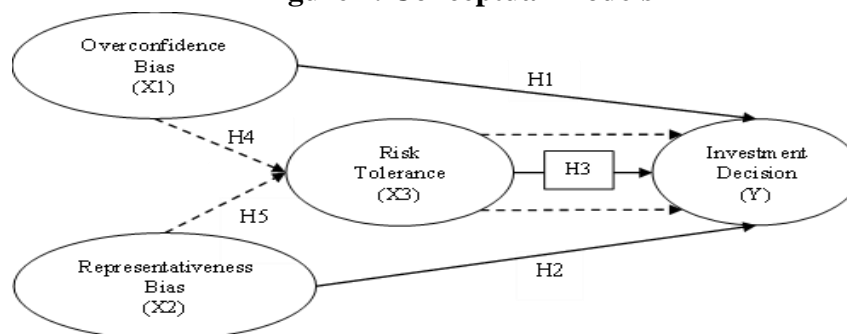
H4: Overconfidence bias indirectly affects investment decisions through risk tolerance.

H5: Representativeness bias indirectly affects investment decisions through risk tolerance.

METHODOLOGY

Conceptual Models

Figure 1. Conceptual Models



Data Collection

The research method used is a sample survey research method. The unit of analysis used in conducting the survey is individuals, namely investors in the Indonesian Capital Market who were taken randomly. The measurement scale used in this study is the Likert Scale. The population in this research is 200 individual investors who have transacted in the Indonesian Capital Market. In this research, the sampling method used simple random sampling. Data collection techniques in this study were questionnaires through online media and a literature study.

Data analysis method

The data analysis method used in this research is the Component or Variance Based Structural Equation Model where the data processing uses the Partial Least Square (SmartPLS) version 3.0 PLS program. PLS (Partial Least Square) is an alternative model of covariance-based SEM.

The testing steps to be carried out are the Evaluation of Measurement Model (Outer Model) Evaluation of the Structural Model and Hypothesis Testing (Inner Model). In outer model discuss about convergent validity, discriminant validity, and composite reliability. And in inner model discuss R-square result, goodness of fit model, and hypothesis testing results (path coefficients).

RESULTS AND DISCUSSION

Characteristics of Respondents

Table 1. Characteristics of Respondents

No.	Characteristic	Frequency	Percentage (%)
1	Gender		
	Male	101	51
	Female	99	50
	Total	200	100
2	Age		
	< 20 years	1	1
	20 - 30 years	154	77
	31 - 40 years	28	14
	41 - 50 years	12	6
	> 50 years	5	3
	Total	200	100
3	Last Education		
	High school	28	14%
	Diploma	76	38%
	Bachelor	83	42%
	Post graduated	11	6%
	Others	2	1%
	Total	200	100
4	Job Status		
	Working full time	165	83%

	Working part time	7	4%
	Work casually / temporarily not working	17	9%
	Retired and not working	0	0%
	Retired and working part time/casual	1	1%
	Others	10	5%
	Total	200	100
5	Monthly Income		
	< Rp 2.000.000,-	15	8%
	Rp 2.000.000,- s/d Rp 4.000.000,-	37	19%
	Rp 4.000.001,- s/d Rp 6.000.000,-	75	38%
	Rp 6.000.001,- s/d Rp 8.000.000,-	20	10%
	> Rp 8.000.000,-	53	27%
	Total	200	100

This result showed that total of 200 respondents there were 101 men and 99 women. The Characteristic of respondents based on age in table 1 was dominated by aged 20-30 years or 77% of the total respondents while the smallest number of respondents are aged under 20 years by 1% or 1 person from the total respondents.

The characteristics of the respondents are classified as follows:

1. Based on education level, more people invest in the Indonesian capital market is mostly done by people with a last educational background of bachelor's by 42%, and fewer people than people with a last educational background of others by 1%.
2. Based on job status, who invest the most in the capital market are people who do work full time 83% and those who don't invest at all are people who are retired and not working by 0%.
3. Based on their monthly income who get the highest income is in the age range 20-30 years or 77% of the total respondents while the smallest respondents is aged under 20 years by 1% or 1 person from the total respondents.

Evaluation of Measurement Model (Outer Model)

1. Convergent Validity

Convergent validity measures the magnitude of the correlation between the construct and the latent variable.

Table 2. Convergent Validity Test Results (Modification 2)

Variabel	Indicator	Outer Loading	Description
Overconfidence Bias	OB6	0.891	Valid
	OB8	0.909	Valid
	OB9	0.782	Valid
Representativeness Bias	RB4	0.872	Valid
	RB7	0.827	Valid
	RB8	0.779	Valid

Risk Tolerance	RT1	0.765	Valid
	RT2	0.784	Valid
	RT3	0.702	Valid
	RT4	0.708	Valid
	RT5	0.785	Valid
Investment Decision	KI2	0.770	Valid
	KI5	0.721	Valid
	KI8	0.762	Valid
	KI9	0.789	Valid
	KI10	0.737	Valid
	KI15	0.817	Valid
	KI18	0.771	Valid
KI19	0.798	Valid	

Source: Output PLS 2021

Based on the table above, the outer loading value $>0,7$ indicates that that the value has reached convergent validity because it has a loading factor value above 0.70.

2. Discriminant Validity

Table 3. Discriminant Validity Test Results (Cross Loadings)

	Overconfidence Bias	Representativeness Bias	Risk Tolerance	Investment Decision
OB6	0.891	0.400	0.505	0.572
OB8	0.909	0.354	0.557	0.504
OB9	0.782	0.415	0.306	0.566
RB4	0.341	0.872	0.595	0.710
RB7	0.424	0.827	0.608	0.527
RB8	0.358	0.779	0.370	0.555
RT1	0.205	0.561	0.765	0.543
RT2	0.227	0.600	0.784	0.552
RT3	0.652	0.389	0.702	0.577
RT4	0.438	0.387	0.708	0.595
RT5	0.468	0.485	0.785	0.495
KI2	0.598	0.485	0.581	0.770
KI5	0.470	0.583	0.456	0.721
KI8	0.446	0.670	0.568	0.762
KI9	0.707	0.447	0.485	0.789
KI10	0.405	0.541	0.712	0.737
KI15	0.492	0.465	0.483	0.817
KI18	0.372	0.551	0.544	0.771
KI19	0.412	0.711	0.685	0.798

Source: Output PLS, 2021

Based on table 3. it can be seen that the correlation of the Overconfidence Bias construct with its indicators (OB6 of 0.891, OB8 of 0.909, OB9 of 0.782) is higher than the correlation

of the Overconfidence Bias indicator with other constructs, then the correlation of the Representativeness Bias construct with its indicators (RB4 is 0.872, RB7 is 0.827, RB8 of 0.779) is higher than the correlation of the Representativeness Bias indicator with other constructs, then the correlation of the Risk Tolerance construct with its indicators (RT1 of 0.765, RT2 of 0.784, RT3 of 0.702, RT4 of 0.708, and RT5 of 0.785) is higher than the correlation of the Risk Tolerance indicator with other constructs, then the correlation of the investment decision construct with its indicators (KI2 of 0.770, KI5 of 0.721, KI8 of 0.762, KI9 of 0.789, KI10 of 0.737, KI15 of 0.817, KI18 of 0.771, KI19 of 0.798) is higher than the correlation of Investment Decision indicators with other constructs. This result concluded that the indicator is valid because it has the highest loading factor value for the target construct compared to the loading factor of other constructs.

Table 4. Discriminant Validity Test Results (Fornell Lacker Criterion)

	Overconfidence Bias	Representativeness Bias	Risk Tolerance	Investment Decision
Overconfidence Bias	0.863			
Representativeness Bias	0.449	0.827		
Risk Tolerance	0.537	0.646	0.750	
Investment Decision	0.631	0.729	0.739	0.771

Source: Output PLS, 2021

Based on Table 4 above, it can be concluded that the square root of the Average Variance Extracted (AVE) for each construct is greater than the correlation between one construct and another in the model. So it can be concluded that the construct in the estimated model meets the criteria for discriminant validity.

3. Composite Reliability

Table 5. Hasil Pengujian Composite Reliability & Cronbach's Alpha

Variable	Composite Reliability	Cronbach's Alpha's	Description
Overconfidence Bias	0.897	0.826	Reliable
Representativeness Bias	0.866	0.770	Reliable
Risk Tolerance	0.865	0.804	Reliable
Investment Decision	0.921	0.902	Reliable

Source: Output PLS, 2021

Based on table 5. the results of testing composite reliability and Cronbach's alpha show a satisfactory value because all latent variables have a composite reliability value and Cronbach's alpha ≥ 0.70 . This means that all latent variables are said to be reliable.

Evaluation of the Structural Model and Hypothesis Testing (Inner Model)

1. R-square result

Table 6. Endogen Variable R² Value

Variable Endogen	R-square (R ²)
Risk Tolerance	0.494
Keputusan Investasi	0.707

Source: Output PLS, 2021

From table 6, it can be seen that the effect of the independent latent variables (Overconfidence Bias and Representativeness Bias) on Risk Tolerance gives an R-square value of 0.494 which can be interpreted that the variability of the Risk Tolerance construct which can be explained by the variability of the Overconfidence Bias and Representativeness Bias constructs is 49.4%, while 50.6% is explained by other variables outside the studied.

Investment decisions have an R-square value of 0.707, so it can be interpreted that the constructed variable of investment decisions can be explained by the variability of the construct's Overconfidence Bias, Representativeness Bias, and Risk Tolerance is 70.7% while 29.3% is explained by other variables outside the researched.

2. Goodness of fit model

The predictive relevance value is obtained by the formula:

$$Q^2 = 1 - (1 - R^2) (1 - R_p)$$

$$Q^2 = 1 - (1 - 0.494) (1 - 0.707)$$

$$Q^2 = 0.852$$

The calculation results above show the predictive relevance value of 0.852 (>0). The model is said to be feasible to have relevant predictive value. Based on the above calculation, 0.852 (85.2%) relates the Investment Decision variable which is explained by the Overconfidence Bias, Representativeness Bias, and Risk Tolerance variables, while the remaining 14.8% is explained by variables outside the model.

3. Hypothesis testing results (path coefficients)

Table 7. Hypothesis Testing Results

Variable	Original Sample	Standard Deviation	T-statistics	P values	Description
Overconfidence Bias → Investment Decision	0.274	0.063	4.374	0.000	Positive - Significant
Representativeness Bias → Investment Decision	0.383	0.054	7.145	0.000	Positive - Significant
Risk Tolerance → Investment Decision	0.344	0.071	4.854	0.000	Positive - Significant
Overconfidence Bias → Risk Tolerance → Investment Decision	0.310	0.061	5.054	0.000	Positive - Significant
Representativeness Bias → Risk Tolerance → Investment Decision	0.507	0.058	8.757	0.000	Positive - Significant

Source: Output PLS, 2021

The path coefficient value shows the direction of the variable relationship whether positive or negative. If the original sample value <0 then the effect is negative but if the original sample value >0 then the effect is positive. The result above shows that all the original sample values are >0 indicating that all the directions of the variable are positive.

The path coefficient value shows the direction of the variable relationship whether significant or not if the statistical value is greater than the T-table value of 1.96. The result above shows that all the t-statistics values are >1,96 indicating that all the directions of the variable are significant.

CONCLUSION

Based on the results of the analysis that has been done, the conclusions that can be obtained from this research are follows:

1. There is a direct positive and significant effect on the relationship between Overconfidence Bias and Investors' Investment Decisions in the Indonesian Capital Market.
2. There is a direct positive and significant effect on the relationship between Representativeness Bias and Investors' Investment Decisions in the Indonesian Capital Market.
3. There is a direct positive and significant influence on the relationship between Risk Tolerance and Investors' Investment Decisions in the Indonesian Capital Market.
4. There is an indirect influence on the relationship between Overconfidence Bias and Investor Investment Decisions in the Indonesian Capital Market through Risk Tolerance.
5. There is an indirect influence on the relationship between Representativeness Bias and Investor Investment Decisions in the Indonesian Capital Market through Risk Tolerance.

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