

THE INFLUENCE OF FINANCIAL LITERACY AS A MEDIATION OF THE RELATIONSHIP BETWEEN BEHAVIORAL BIAS AND DECISIONS IN INVESTING EMPLOYEES IN JABODETABEK

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ABSTRACT

This study aims to determine how Behavior Biases influences people in making investment decisions. The Independent Variable used in this study is Behavior Biases consist of Overconfidence, Herding, Risk-aversion and Disposition. Dependent Variable used in this study is Investment Decision. The moderating variable used in this study is Financial Literacy. This study taking samples from workers lives in Jabodetabek (Jakarta, Bogor, Depok and Bekasi), Indonesia. By using data collection method via Google Forms spreaded to public of Jabodetabek 2022-2023 thus obtaining 353 respondents who became the research sample. The data analysis used to test the hypothesis is the analysis of the regression equation using SEM PLS (Structural Equation Model Partial Least Square) program. The result of this study indicates that Bias Behavior (Overconfidence, Herding, Risk Aversion, Disposition) has an influence on Investment Decisions, while Financial Literacy has no effect and Financial Literacy doesn't moderate Bias Behavior towards Investment Decisions. This finding has implications for potential investors to consider learning Financial Literacy more in their investment decisions.

Keywords: *Behavior Bias, Financial Literacy, Investment Decision*

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INTRODUCTION

In recent years, experts have tried to conduct research on the relationship between Financial Literacy and investment decisions (Ateş et al., 2016). Nowadays people have begun to get used to financial literacy (Financial Literate) where people have begun to understand how important financial literacy is in today's industrial era and the understanding of Financial Literarcy is not only centered on adults who are qualified to invest but along with the development of technology and science, young people tend to be literate in financial literacy. Several studies have also revealed that investors tend to make deficient investment decisions related to investors' investments which result in less profitable investment performance (Adil et al., 2022a). Financial behavior indicates where an investor has psychological and emotional behavior that deviates from rational behavior (Yoong & Ferreira, 2013). that's why this bias can be the cause of loss-making investments. By deeply understanding financial behavior, it can increase preferences for investors and can provide strategies in making investment decisions (Saivasan, 2022).

Previous studies have revealed that Financial Literacy is one of the important components in the economy and financial stability (Adil et al., (2022b); Takeda et al., (2013). Financial channels such as leasing, mortgages, business loans, credit cards are easily accessible to the public. In investing, lack of information on financial aspects can confuse the investment decision-making process and can increase abiguity (Cox et al., 2015). The importance of financial literacy to learn because it can help in managing financial resources effectively. An investor who has low financial literacy tends to make irrational or unprofitable investment

decisions (Son & Park, 2019). Previous research has shown that investors who have low financial literacy tend to hold undiversified portfolios and avoid stock investments (Fedorova et al., 2015), hence the need for an investor to understand financial literacy. A financially literate investor is more likely to put aside their biases and be able to make good investment decisions (Son & Park, 2019). This behavioral bias often affects the decisions of investors in investing (Itzkowitz and Itzkowitz, 2017), because that is how it is necessary for an investor to regulate their bias and put aside bias in order to be able to think well and make the right decisions in investing. According to experts, everyone has psychological biases that can prevent them from making rational decisions and have unpleasant consequences in investing decisions (Ahmad, 2020). Intuitive reasoning, judgment and choice also influence the quality of financial decisions (De Bondt et al., 2013).

This study took samples from the Indonesian state of the Greater Jakarta region (Jakarta, Bogor, Depok, Tangerang, Bekasi) of individual investors who have invested or who will invest in the region by collecting a structured questionnaire of 200 people in the Greater Jakarta area, Indonesia. In analyzing the validity and reliability of this study using the Pearson correlation and the Cronbach test. In conducting hypothesis tests, hierarchical regression analysis was used for this study.

METHOD

This study takes samples from the population of Jabodetabek (Jakarta, Bogor, Depok, Tangerang and Bekasi), Indonesia to people who have experience in investment and will decide to invest in stocks/bonds, mutual funds, crypto and so on. The study sample used the cross-sectional method through questionnaires. The data collection method uses primary data obtained directly from respondents. The respondents involved amounted to 353 adult and young adult employees who had investment experience and would decide to invest by distributing questionnaires in online form, This study used a minimum sample of $29 \times 5 = 145$ and from the data collected through the google form obtained a sample of 353 samples with details of 164 were male respondents and 189 were female respondents.

Validity Test

Validity testing is used to test whether the measurement indicator of a variable is proven to measure what it is willing to measure (valid). There are 2 types of validity tests used, namely:

- a. Convergent Validity is done by proving that the statement on each unobserved variable can be understood by respondents in accordance with what is intended by the study. This test uses outer loading with the criteria of an indicator said to be valid if it has an outer loading of 0.5 to 0.6 (Ghozali, 2014).
- b. Discriminant Validity is determined by determining the correlation between constructs and other constructs in the research model. The test was carried out using Average Variance Extracted (AVE) criteria where the indicator is said to be valid if it has an AVE value of > 0.5 (Hair et al, 2014).

Reliability Test

Reliability testing is carried out to test the consistency of answers from responden, namely whether the research instrument item if done several times will provide relatively consistent measurement results. The reliability test used in this study is Composite Reliability with variable criteria considered reliable if it has a Cronbach alpha value of ≥ 0.7 .

Testing the Validity and Reliability of Overconfidence Variables

The results of processing for testing the validity and reliability of the Overconfidence variable are shown in table 1 From the table, it can be seen that all 5 measurement indicators have proven valid (measuring what they want to measure) because they produce an outer loading value of > 0.5 and the discriminant validity passes as shown by the AVE value of $0.570 > 0.5$ which means that there is a proven relationship between one indicator and another indicator in forming the Overconfidence variable. The results of reliability testing show that all 5 indicators are proven reliable as shown by Composite Reliability values of $0.866 > 0.7$. Thus, it can be concluded that 5 measurement indicators of the Overconfidence variable are proven to be valid and reliable so that all indicators will be used in testing research hypotheses.

Table 1

Validity and Reliability of Overconfidence Variables

Variable	Outer Loading			AVE	Composite Reliability
	Items	Loading	Conclusion		
<i>Overconfidence</i>	OVER1	0.638	Valid	0,570	0,866
	OVER2	0.850	Valid		
	OVER3	0.802	Valid		
	OVER4	0.589	Valid		
	OVER5	0.855	Valid		
<i>Herding</i>	HER1	0.638	Valid	0,690	0,917
	HER2	0.850	Valid		
	HER3	0.802	Valid		
	HER4	0.589	Valid		
	HER5	0.855	Valid		
<i>Risk Aversion</i>	RISA1	0.914	Valid	0,717	0,927
	RISA2	0.777	Valid		
	RISA3	0.832	Valid		
	RISA4	0.810	Valid		
	RISA5	0.892	Valid		
<i>Disposition</i>	DIS1	0.633	Valid	0,593	0,877
	DIS2	0.850	Valid		
	DIS3	0.692	Valid		
	DIS4	0.901	Valid		

	DIS5	0.741	Valid		
<i>Financial Literacy</i>	FINL1	0.860	Valid	0,645	0,842
	FINL3	0.888	Valid		
	FINL4	0.638	Valid		
<i>Investment Decisions</i>	INVD1	0.726	Valid	0,524	0,815
	INVD2	0.698	Valid		
	INVD3	0.742	Valid		

Source : processed data

Herding Variable Validity and Reliability Testing

The results of processing for testing the validity and reliability of the Herding variable are shown in table 1 From the table, it can be seen that all 5 measurement indicators have proven valid (measuring what they want to measure) because they produce an outer loading value of > 0.5 and the discriminant validity passes as shown by the AVE value of $0.690 > 0.5$ which means that there is a proven relationship between one indicator and another indicator in forming a Herding variable. The results of reliability testing show that all 5 indicators have proven reliable as shown by Composite Reliability values of $0.917 > 0.7$. Thus, it can be concluded that 5 measurement indicators from the Herding variable are proven to be valid and reliable so that all indicators will be used in testing research hypotheses.

Risk Aversion Variable Validity and Reliability Testing

The results of processing for testing the validity and reliability of the Risk Aversion variable are shown in table 1 From the table, it can be seen that all 5 measurement indicators have proven valid (measuring what they want to measure) because they produce an outer loading value of > 0.5 and discriminant validity passes as shown by the AVE value of $0.717 > 0.5$ which means that there is a proven relationship between one indicator and another indicator in forming the Risk Aversion variable. The results of reliability testing show that all 5 indicators are proven reliable as shown by Composite Reliability values of $0.927 > 0.7$. Thus, it can be concluded that 5 measurement indicators of the Risk Aversion variable are proven to be valid and reliable so that all indicators will be used in testing research hypotheses.

Disposition Variable Validity and Reliability Testing

The results of processing for testing the validity and reliability of the Disposition variable are shown in table 1 From the table, it can be seen that all 5 measurement indicators have proven valid (measuring what they want to measure) because they produce an outer loading value of > 0.5 and the discriminant validity passes as shown by the AVE value of $0.593 > 0.5$ which means that there is a proven relationship between one indicator and another indicator in forming the Disposition variable. The results of reliability testing show that all 5 indicators have proven reliable as shown by Composite Reliability values of $0.877 > 0.7$. Thus, it can be

concluded that 5 measurement indicators of the Disposition variable are proven to be valid and reliable so all indicators will be used in testing the research hypothesis.

Testing the Validity and Reliability of Financial Literacy Variables

The results of processing for testing the validity and reliability of Financial Literacy variables are shown in table 1 From the table can be seen all 4 measurement indicators, only 4 indicators are proven valid (measuring what they want to measure) because they produce an outer loading value of > 0.5 while 1 indicator, namely FINL2, is invalid because it produces an outer loading of $0.434 < 0.5$. Discriminant validity testing for 4 valid indicators resulted in an AVE value of $0.645 > 0.5$ which means that there is a proven relationship between one indicator and another indicator in forming a Financial Lieterary variable. The results of reliability testing show that all 3 measurement indicators of the Financial Literacy variable have proven reliable as shown by a Composite Reliability value of $0.842 > 0.7$. Thus, it can be concluded that of the 4 measurement indicators of the Financial Literacy variable that have proven to be valid and reliable, only 3 indicators and there is 1 indicator that must be omitted in the research hypothesis assessment.

Testing the Validity and Reliability of Investment Decision Variables

The processing results for testing the validity and reliability of Investment Decision variables are shown in table 1 From the table it can be seen that all 5 measurement indicators have proven valid (measuring what they want to measure) because they produce an outer loading value of > 0.5 . Discriminant validity testing produces AVE values of $0.475 < 0.5$ which means that it is not proven that Investment Decision indicators are interconnected in forming Investment Decision variables. Improvements were made by eliminating indicator 4 which has the lowest outer loading and the test results showed that all indicators were proven to measure what they wanted to measure with an outer loading value of > 0.5 and interconnected between indicators with an AVE value of $0.534 > 0.5$ and consistent or reliable because it produced a Composite Reliability value of $0.815 > 0.7$.

Data analysis methods

The statistical method used in this study is the Structural Equation Model Partial Least Square (SEM-PLS) where processing is carried out using SMARTPLS 3. The stages of SEM-PLS analysis are carried out as follows.

Create an SEM-PLS model

The creation of the SEM-PLS model is carried out by referring to previous theories and empirical studies. In this study, the SEM model used is PLS SEM after an improvement in validity and reliability testing as shown in the following figure:

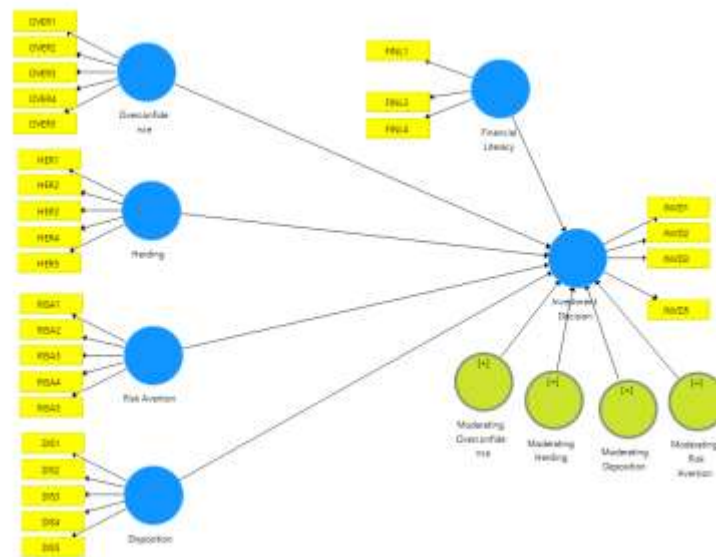


Figure 2. Model PLS

Convert a model into a regression equation

In this study, there is 1 regression equation, namely:

$$INVD = \beta 1 OVER + \beta 2 HER + \beta 3 RISA + \beta 4 DIS + \beta 5 FINL + \beta 7 OVER*FINL + \beta 8 HER*FINL + \beta 9 RISA*FINL + \beta 10 DIS*FINL + \varepsilon$$

Where INVD is Investment Decision, OVER is Overconfidence, HER is Herding, RISA is Risk Aversion, DIS is Disposition, FINL is Financial Literacy, $\beta 1, \beta 2, \dots, \beta 10$ is Coefficient of influence.

Structural Model Evaluation

Tests on structural models consist of:

a. Collinearity

Colinearity is used to test for the absence of relationships between independent variables in a model. With the hypothesis proposed:

Ho: There is no multicollinearity between independent variables

Ha: No multicollinearity Decision making

If $VIF < 10$ then Ho is rejected

If $VIF > 10$ then Ho is accepted

The results of multicollinearity testing for the Investment Decision model for both male models and female models resulted in a VIF value of < 10 for all independent variables used, which means that it is evident that the independent variables in the Investment Decision model are not interrelated (the assumption of the absence of multicollinearity is met). For more details can be seen in table 3.8.

Table 7

Multicollinearity Testing

Independent Variables	VIF	
	Male Model	Female Models
<i>Overconfidence</i>	6.186	5.985
<i>Herding</i>	3.309	3.546
<i>Financial Literacy</i>	2.793	5.967
<i>Risk Aversion</i>	5.424	4.482
<i>Disposition</i>	4.767	3.391

Source: processed data

b. Coefficient of Determination (R²) Testing

The coefficient of determination is used to explain how much variation the independent variable can be explained by its dependent variable (Gozali 2008). The closer to 1, the more fit the model and the closer to 0, the less fit the model. The results of processing the coefficient of determination for the three structural equations can be seen in table 3.8. Based on the information from the table:

- 1) For the male Investment Decision model, an adjusted R square value of 0.748 is obtained, which means that variations of independent variables, namely Overconfidence, Herding, Risk Aversion, Disposition, and Financial Literacy moderation with Overconfidence, Herding, Risk Aversion, Disposition are able to explain variations of the dependent variable, namely Investment Decisions of 74.8% while the remaining 25.2% are variations of other independent variables that affect Investment Decisions but it is not included in the model. These results show that the resulting fit model is good.
- 2) For the Women's Investment Decision model, an adjusted R square value of 0.669 was obtained, which means that variations of independent variables, namely Overconfidence, Herding, Risk Aversion, Disposition, and Financial Literacy moderation with Overconfidence, Herding, Risk Aversion, Disposition are able to explain variations of the dependent variable, namely Investment Decisions by 66.9% while the remaining 33.1% are variations from other independent variables that affect Investment Decisions but it is not included in the model. These results show that the resulting fit model is good.

Table 8

Coefficient of Determination

Type Investment Decisions	R Square	R Square Adjusted
Male Model	0.762	0.748
Female Models	0.685	0.669

Source: processed data

c. Hypothesis Testing Theory

Hypothesis testing is used to test the effect of each independent variable on its dependent variable. The hypothesis is carried out with stages

Ho : $b_1 = 0$ The independent variable does not affect the dependent variable

Ho : $b_1 \neq 0$ The independent variable affects the dependent variable

Decision:

If the p-value of $t < 0.05$ then Ho is rejected

If the p-value of $t > 0.05$ then Ho is accepted

RESULTS AND DISCUSSION

Descriptive Statistics of Overconfidence Variables

The results of descriptive statistical processing for the variable Perceived CSR Authenticity can be seen in table 9 Overall respondents gave good responses to the Overconfidence variable as shown by an average value of 5.181 The standard deviation value of 0.782 indicates the variation of respondents' answers is in the range of answer choices between 4 to 5. Responses to Overconfidence based on gender showed that the response of Men's responses to Overconfidence was higher than that of Female respondents where the average answer for Male respondents was 5,185 while for Women had an average value of 5,178..clearer information about descriptive statistics for the Overconfidence variable 9.

Table 9

Descriptive Statistics of Overconfidence Variables

		N	Mean	Std.Deviation	Minimum	Maximum
Overconfidence	Man	164	5.185	0.718	2.00	5.60
	Woman	189	5.178	0.835	1.00	5.80
	Total	353	5.181	0.782	1.00	5.80
Herding	Man	164	5.1256	0.878	1.00	5.60
	Woman	189	5.1608	0.775	1.00	5.80
	Total	353	5.1608	0.823	1.00	5.80
Risk Aversion	Man	164	5.284	-0.819	1.00	5.80
	Woman	189	5.232	-0.767	1.00	5.80

	Total	353	55.256	0.791	1.00	5.80
Disposition	Man	164	5.159	0.787	1.00	5.80
	Woman	189	5.201	0.704	1.00	5.80
	Total	353	5.181	0.743	1.00	5.80
Financial Literacy	Man	164	5.382	0.661	2.33	6.00
	Woman	189	5.299	0.650	1.00	6.00
	Total	353	5.338	0.655	1.00	6.00
Investment Decisions	Man	164	4.966	0.714	1.00	5.75
	Woman	189	4.956	0.642	1.00	5.75
	Total	353	4.961	0.675	1.00	5.75

Source: processed data

Descriptive Statistics of Herding Variables

Descriptive statistical processing for Herding variables can be seen in table 10. Overall, respondents gave good responses to the Herding variable as shown by an average value of 5.144, a standard deviation value of 0.782 indicating the variation of respondents' answers was in the range of answer choices between 4 to 6. Responses to Herding based on gender showed that the response of male respondents to Herding was lower than that of female respondents where the average answer for male respondents was 5,125 while for women had an average value of 5,160..clearer information about descriptive statistics for the variable Overconfidence 10.

Descriptive Statistics Variabel Risk Aversion

The results of descriptive statistical processing for Risk Aversion variables can be seen in table 11. Overall, respondents gave good responses to the Risk Aversion variable as shown by an average value of 5.256, a standard deviation value of 0.791 indicating the variation of respondents' answers in the range of answer choices between 4 to 5. Responses to Risk Aversion based on gender show that the response of male respondents is higher than that of female respondents where the average answer for male respondents is 5,284 while for women has an average value of 5,232.

Descriptive Statistics of Disposition Variables

Descriptive statistical processing for disposition variables can be seen in table 12. Overall, respondents gave good responses to the disposition variable as shown by an average value of 5.181, a standard deviation value of 0.743 indicating the variation of respondents' answers was in the range of answer choices between 4 to 6. Responses to disposition based on gender showed that the response of male respondents to disposition was low compared to female respondents where the average answer for male respondents was 5,150 while for women had an average value of 5,201.

Descriptive Statistics of Financial Literacy Variables

Descriptive statistical processing for Financial literacy variables can be seen in table 13. Overall, respondents gave good responses to the Financial Literacy variable as shown by an

average value of 5.338, a standard deviation value of 0.655 indicates the variation of respondents' answers is in the range of answer choices between 4 to 6. Responses to Financial Literacy based on gender show that the response of male respondents to Financial Literacy is higher than women's responses as can be seen from the average answers of male respondents is low compared to female respondents where the average answer for male respondents is 5,382 while for women has an average value of 5,299

Descriptive Statistics of Investment Decision Variables

Descriptive statistical processing for Investment Decision variables can be seen in table 14. Overall, respondents gave good responses to the Investment Decision variable as shown by an average value of 4,961. A standard deviation value of 0.675 indicates that the answer variation of 5 respondents is in the range of answer choices between 4 to 6. Responses to Investment Decisions based on gender show that responses from male respondents are higher than female responses as can be seen from the average answers of 4,966 for male respondents and 4,956 for women.

Analysis Results

The results of the analysis related to the study hypothesis can be seen in Table 4.6. The results of testing each hypothesis proposed in the study are explained as follows.

Table 15
Research Hypothesis Testing

Hipotesis	Model Pria			Model Wanita		
	Estimate	T Statistics (O/STDEV)	P Values	Estimate	T Statistics (O/STDEV)	P Values
H1 Overconfidence berpengaruh terhadap investment Decision	0.454	3.571	0.000**	0.220	1.196	0.232
H2 Herding berpengaruh terhadap investment Decision	0.245	2.202	0.028**	0.278	1.879	0.061*
H3 Disposition berpengaruh terhadap Investment Decision	0.328	2.629	0.009	0.258	1.980	0.048
H4 Risk Aversion berpengaruh terhadap Investment Decision	-0.311	1.973	0.049	-0.041	0.274	0.785
H5 Financial Literacy berpengaruh terhadap Investment Decision	0.080	0.988	0.324	0.155	1.361	0.174
H6 Financial Literacy memoderasi pengaruh dari Overconfidence terhadap Investment Decision	0.163	1.620	0.106	0.147	1.229	0.220
H7 Financial Literacy memoderasi pengaruh dari Herding terhadap Investment Decision	0.075	0.681	0.496	-0.413	1.787	0.075
H8 Financial Literacy memoderasi pengaruh dari Disposition terhadap Investment Decision	-0.263	1.420	0.538	0.004	0.032	0.974
H9 Financial Literacy memoderasi pengaruh dari Risk Aversion terhadap Investment Decision	-0.084	0.616	0.156	0.103	0.888	0.375

*= α 10% **= α 5%

Source: processed data

CONCLUSION

Based on the findings of the study that has been described in the previous section, here are some conclusions from the results of this study, namely Overconfidence has a significant positive effect on male models while on female models has not been proven to have an effect. Herding proved to have a significant positive effect on both male and female models. Disposition proved to have a significant positive effect on both male and female models. Risk Aversion was shown to have a significant negative effect on both male models but was not proven in female models. Financial literacy has not been shown to have a significant effect on either male models or on female models. Financial literacy was not shown to moderate the effect of overconfidence on investment decisions in male models whereas in female models. Financial literacy was not shown to moderate the positive influence of Herding on Investment Decisions in male models whereas in female models it was proven. Financial Literacy has not been shown to moderate the influence of Dispositions on Investment Decisions in both male and female models. Financial literacy has not been shown to moderate the effect of Risk Aversion on investment decisions in both male and female models.

These findings show that financial literacy is almost unproven to moderate the influence of the independent variables Overconfidence, Herding, Disposition and Risk Aversion on Investment Decisions. The results of this finding have implications for potential investors to consider Financial Literacy more in their investment decisions. This is because Financial Literacy includes information related to information about economic stability, both the goods market with inflation indicators, the money market with interest rate indicators and the foreign exchange market with exchange rate indicators as important information in investment decisions to get optimal results, namely maximizing returns and minimizing risk.

This study is limited to the variables of Overconfidence, Herding, Disposition and Risk Aversion as well as Financial Literacy on Investment Decisions. For further research with the aim of optimizing the right Investment Decisions, it is recommended to include other influencing variables such as macro variables, especially those concerning risk, namely disaster risk (Soetanto et al., 2020)

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