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THE EFFECT OF HEARDING BIAS AND OVERCONVIDENCE ON CRYPTOCURRENCY INVESTMENT DECISIONS WITH FINANCIAL LITERACY AS A MODERATING VARIABLE (Study on Tokocrypto Official Group Community)

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Abstract

The development of cryptocurrency as an investment instrument is increasingly attracting the attention of investors, especially among the digital community. However, investment decisions in this asset are often influenced by psychological biases, such as herding bias and overconfidence, which can lead to irrational and high-risk decision-making. This study aims to analyze the effect of herding bias and overconfidence on cryptocurrency investment decisions, with financial literacy as a moderating variable. This study uses a quantitative approach with the Structural Equation Modeling (SEM) method based on Partial Least Squares (PLS) to test the relationship between variables. Primary data were collected through questionnaires distributed online to members of the Tokocrypto Official Group community with a sample of 100 respondents selected using the snowball sampling technique. The results of the study show that herding bias has no significant effect on cryptocurrency investment decisions, while overconfidence has a positive and significant effect on investment decisions. However, financial literacy is not proven to significantly moderate the relationship between herding bias and overconfidence on investment decisions. This finding indicates that even though investors have a good level of financial literacy, psychological factors still play a dominant role in making investment decisions in cryptocurrency. This study contributes to enriching the literature on behavioral finance by revealing the limited role of financial literacy in suppressing psychological bias in risky investment decisions. The practical implications of this study emphasize the need for investment education that focuses not only on financial literacy, but also on controlling psychological aspects in investment decision making.

Keywords: ***Herding Bias, Overconfidence, Investment Decisions, Cryptocurrency, Financial Literacy***

INTRODUCTION

Financial investment has mushroomed in the current era of globalization. Financial investment is usually done in stocks or bonds, along with the rapid development of globalization that has given birth to other financial derivative instruments such as options, futures, credit default swaps, debt obligations, warrants, etc. With this development, investors, and prospective investors around the world, including Indonesia, are created to generate higher investment returns even though it will produce higher commensurate risks.(Nurbarani & Soepriyanto, 2022). In 2019, an outbreak occurred in one of the big countries, namely China. Wuhan City, China was the first place where the Coronavirus virus was discovered at the end of 2019. This Coronavirus is the cause of an infectious disease called Covid-19 (WHO, 2021). At the time of Covid-19, one of the investments that was rising during the Covid-19 pandemic was cryptocurrency.

Crypto asset trading in Indonesia has experienced very rapid growth in recent years. This is indicated by the increasing number of companies officially registered with the Commodity Futures Trading Supervisory Agency (Bappebti) as crypto asset trading organizers. To date, there are 13 companies that have obtained official permits to operate in this sector, including several big names such as Indodax, Tokocrypto, and Pintu. In addition, the significant spike in crypto asset transactions also reflects the increasing public interest in this investment instrument. As of July 2021, total crypto asset transactions in Indonesia reached 471 trillion rupiah, experiencing a growth of 636% compared to the total transactions throughout the previous year. This figure even far exceeds the total stock transactions which only reached 117 trillion rupiah in the same period. The increase in the number of crypto asset

investors also reflects a growing trend among the public. As of October 2021, the number of crypto investors has reached 10 million people, experiencing a growth of 189% compared to the previous year. Interestingly, this number has even exceeded the number of investors in the stock market which is recorded at 6.8 million people. This phenomenon shows that crypto assets have become one of the investment options that are increasingly in demand by the Indonesian people. However, amidst this rapid growth, there are still various challenges that need to be considered, such as regulatory aspects, financial literacy levels, and investor psychological factors that can influence investment decision making (Investor.id, accessed in., 2022).

Based on data from July 2021 owned by Tokocrypto, Indonesia currently has around 7.5 million investors in crypto assets. If this number exceeds the number of investors in the capital market. Meanwhile, according to the Indonesian Central Securities Depository (KSEI), the number of Single Investor Identification (SID) in the capital market reached 6,758,335 by the end of October 2021, which is simplified to 6.76 million SID. This proves that there has been an increase in interest in Cryptocurrency investment among the people in Indonesia. Many people invest in Cryptocurrency, of course there are factors that are the basis for making investment decisions in Cryptocurrency. However, most investors often do not consider and pay attention to the risks of the investment. Many ordinary people only invest as much as they have to follow. So, there are investors who do not do in-depth investment analysis. Some investors have made their analysis before making investment decisions. Investors are not all rational. Some of the reasons are something to consider before making investment decisions. Some investors plan before investing, while others do not or at least have a plan. This is because investors want a big return that allows them to get rich quickly overnight (Khalid, 2018).

These investors want instant profits, often causing irrational thinking. Among them are herding bias and overconfidence. Herding is a behavior that tends to imitate the actions of others rather than following one's beliefs or the information they have (Hirshleifer and Teoh, 2003). Overconfidence is a tendency to be too confident in one's ability and predictions to succeed. This condition is normal and at the same time a reflection of a person's level of confidence to achieve or get something. It cannot be denied that humans have high self-confidence, including in investing (Gozalie and Anastasia, 2015). From this irrational thinking, investors will finally decide to make decisions to invest according to this irrational thinking. Based onThe background explained above shows that there is a gap phenomenonIrrational thinking is of course very dangerous, because it can harm the investor himself, where they want profit but instead cause losses. So investors need to have good financial literacy regarding the investment to be taken. With good financial literacy, the investor's thinking becomes more rational and there is more basis for making investment decisions. This is in line with research conducted by H Khalid, Javed, & Shahzad (2018) showing that financial literacy can reduce psychological bias in making risky investment decisions, which means that good financial literacy can reduce the level of irrational thinking / psychological bias in investors

This research is also to fill research gapin literaturethat influenceherding bias and overconfidence on investment decisions. Research conducted by(Theressa & Armansyah, 2022)stated that herding bias and overconfidence have an influence on investor investment decision making. Then the research conducted by,(Afriani & Halmawati, 2019)states that herding bias has a significant positive effect on investment decisions. In research conducted by(Qasim et al., 2019)states that herding bias and overconfidence have a positive and strong impact on investment decisions. However, this is different from the research conducted by (Lathifatunnisa & Nur Wahyuni, 2021) which states that the level of overconfidence has no influence when investors make decisions. This means that the lower the level of overconfidence of an investor, the higher the level of investment of a person. In a study conducted by (Mahadevi & Haryono, 2021) it was stated that the results of the hypothesis test of the herding behavior variable did not have a significant effect on investment decisions. Then, in a study conducted by(Nurbarani & Soepriyanto, 2022)stated that herd bias has no significant positive effect on the decision to invest in Cryptocurrency in the Jabodetabek area.

Previous research related to the influence of herding bias and overconfidence on investment decisions. However***novelty***from this research by referring to existing literature, this study has novelty in several key aspects. First, this study adds financial literacy as a moderating variable in the relationship between herding bias and overconfidence on cryptocurrency investment decisions. Previous studies generally only examine the direct relationship between psychological bias and investment decisions, without considering how financial literacy can strengthen or weaken its influence. With financial literacy, it is hoped that investors can be more rational in making decisions and be able to reduce the influence of excessive psychological bias. Second, this study focuses on the cryptocurrency investor community, specifically the Tokocrypto Official Group. Unlike previous studies that have focused more on investor behavior in the stock market or conventional financial instruments, this study specifically

analyzes investors in crypto assets, which have higher volatility and a stronger tendency for psychological bias. Thus, this study provides new insights into investor behavior in the still-developing digital investment ecosystem. Third, this study contributes to filling the research gap in the literature on the influence of herding bias and overconfidence on investment decisions. So far, there have been differences in research results related to the influence of the two biases, where some studies found a significant influence, while other studies showed the opposite results. By considering financial literacy as a moderating variable, this study seeks to provide a deeper understanding of the factors that cause the differences in findings. The study was conducted by analyzing the influence of Hearding Bias and Overconfidence on Cryptocurrency Investment Decisions with Financial Literacy as a Moderating Variable.

FORMULATION OF THE PROBLEM

In this problem formulation, the research questions are as follows:

1. Is there any influence between herding bias and investment decisions?
2. Can overconfidence influence investment decisions?
3. Can financial literacy have an impact or moderate the influence of herding bias and overconfidence on investment decisions?

LITERATURE REVIEW AND MODEL DEVELOPMENT

Influence Between Research Variables

The Influence of Herding Bias on Investment Decisions

Herding is the behavior of investors who have a tendency to follow the actions of others (Kengatharan & Kengatharan, 2014). This behavior describes a situation where people do something together with what many other people do (Asri, 2015). Herding occurs when an individual's private information is more influenced by public information about group or individual decisions (Areiqat et al, 2019). Investors assume that other investors have more ability when deciding on investments, so these investors will follow investors who have more ability. In a study conducted by (Addinpujoartanto & Darmawan, 2020) stated that there is a significant relationship between herding bias and investment decisions. (Theressa & Armansyah, 2022) stated that herding bias and overconfidence have an influence on investor investment decision making. Then a study conducted by (Afriani & Halmawati, 2019) stated that herding bias has a significant positive effect on investment decisions. In a study conducted by (Qasim et al., 2019) stated that herding bias and overconfidence have a positive and strong impact on investment decisions. Therefore, the researcher formulated a hypothesis.

H1: Herding Bias has a significant positive effect on Cryptocurrency investment decisions

The Influence of Overconfidence on Investment Decisions

Overconfidence is a person's assessment of the abilities they have and based on the knowledge they have according to Shiller (2007) in (Asri, 2015). An investor often makes predictions in the future with a sense of optimism and high self-confidence so that an investor will tend to ignore the risks that will be faced. Which means that the higher the level of overconfidence of an investor, the higher the level of confidence of an investor in making decisions and being braver in taking risks because according to him he has more abilities and expertise than other investors. In a study conducted by (Sutikno & Mery, 2021) it was stated that there is a positive and significant partial influence of the Overconfidence variable on investment decisions in the capital market. In (Budiman et al., 2021) it was stated that overconfidence has a positive and significant effect on investment decisions in capital market products at the IAIN Langsa Investment Gallery. (Theressa & Armansyah, 2022) stated that herding bias and overconfidence have an influence on investor investment decision making. In a study conducted by (Qasim et al., 2019) it was stated that herding bias and overconfidence have a positive and strong impact on investment decisions. Therefore, the researcher formulated a hypothesis

H2: Overconfidence has a significant positive effect on cryptocurrency investment decisions.

The Influence of Herding Bias and Overconfidence on Investment Decisions Moderated by Financial Literacy

Hayat & Anwar (2016) and Khalid et al. (2018) stated that investors with good financial literacy tend to use published financial information in making investment decisions, while those with low financial literacy tend to make decisions based on advice from family, friends, and stockbrokers. Referring to the concept of financial behavior, psychological biases in the form of herding and overconfidence tend to be experienced by investors. Meanwhile, from the explanation of financial literacy in the previous section, it is known that economic agents who have high financial literacy tend to be more able to make more rational decisions. Budiarto & Susanti (2017) found that

adequate financial literacy can make investors make more appropriate and expected investment decisions. This is reaffirmed by Pradhana (2018) who explains that the higher a person's level of knowledge, the wiser the decisions made. Therefore, the researcher formulates the hypothesis, namely

H3: Financial Literacy moderates the relationship between herding bias and investment decisions.

H4: Financial Literacy moderates the relationship between overconfidence and investment decisions.

Theoretical Framework

Based on several references from the literature review, the following is the research framework below.

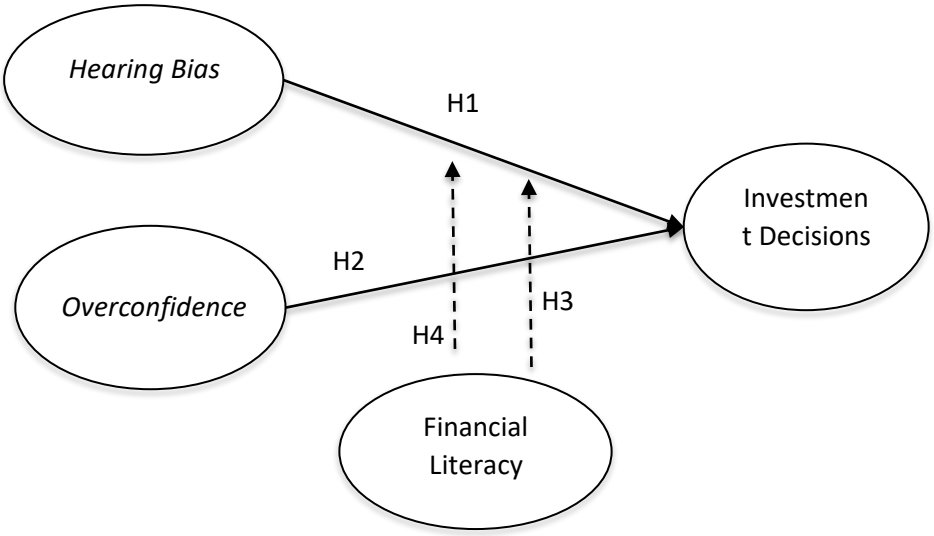

Figure 1. Framework of Thought

RESEARCH METHODOLOGY

Types and Sources of Research Data

Data Types

This study uses a quantitative approach with a causal design, to test pThe influence of Hearding Bias (X1) and Overconfidence (X2) on Investment Decisions (Y) with Financial Literacy as a moderation (Z) obtained in the form of quantitative data. This research method uses a quantitative method because the data to be processed is numerical data and the focus of this study is to determine the magnitude of the influence between the variables studied.

Data source

Secondary data

Secondary data in the form of scientific works from previous researchers, various financial management literature, behavioral finance and other relevant data.

Primary data

Primary data acquisition in this study used a questionnaire instrument which will be distributed online using Google Form.

Population and Sample

Population

The population in this study is the Tokocrypto Official Group Community. According to McMillan and Chavis (1986), a community is a collection of members who have a sense of belonging, are bound to each other and believe that the needs of the members will be met as long as the members are committed to continuing together. Currently, the number of members of the community is 117,890.

Sample

The sampling technique uses the Slovin formula, the population size is known, namely 117,890 members..

Information :
n = Sample size
N = Population size
e = 0.1 (sampling error is tolerated)

So, using the Slovin calculation formula, the number of respondents was 99.91, which was rounded up to 100 respondents..Researchers will use the snowball sampling technique. According to(Sugiyono, 2011)Snowball sampling is a sampling technique that is initially small in number, then enlarged. So, researchers will distribute questionnaires to millennials, then the community will distribute the questionnaires back to friends/other millennials.

Data Analysis Techniques

The analysis was conducted using Structural Equation Modeling (SEM) with the help of PLS 4.0 software to test the effect of hearing bias and overconfidence on cryptocurrency investment decisions with financial literacy as a moderating variable. Hypothesis testing was conducted with a t-value and significance level (α <0.05).

DATA ANALYSIS RESULTS AND DISCUSSION

Data Analysis Results

Instrument Validity Test

Validity testing using convergent validity.Calculations using PLS 4 yield the following results:

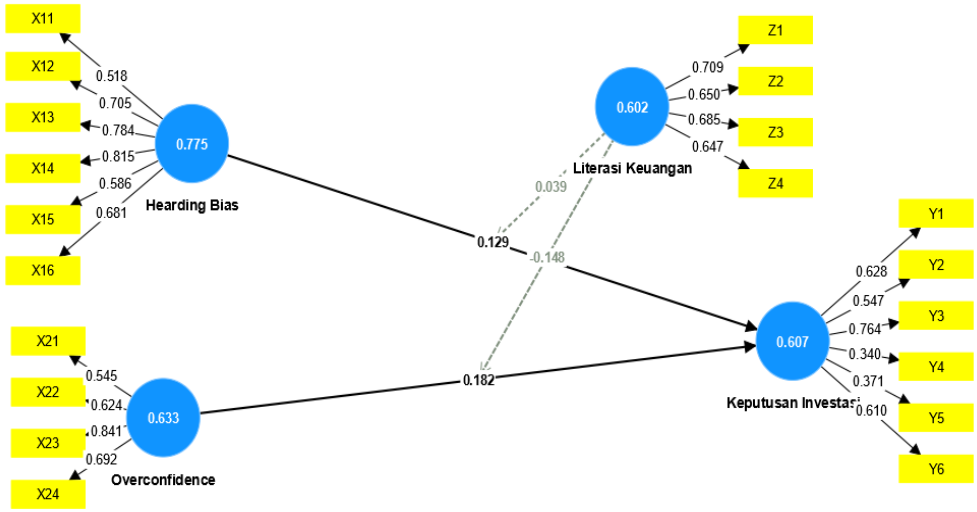

Figure 2. Outer Loading Results

The results in the form of images are supported by the results in the following table:

Table 1. Convergent Validity Test Results

Variables	Item Grain	Outer loading value
Herding Bias	X1.1	0.518
	X1.2	0.705
	X1.3	0.784
	X1.4	0.815
	X1.5	0.586
	X1.6	0.681
Overconfidence	X2.1	0.545
	X2.2	0.624
	X2.3	0.841
	X2.4	0.692
Investment Decisions	Z1	0.628
	Z2	0.547

	Z3	0.764
	Z4	0.340
Financial Literacy	Y1	0.371
	Y2	0.610
	Y3	0.709
	Y4	0.650
	Y5	0.685
	Y6	0.647

Source: processed data, 2024

Based on the table above, it shows that the indicators in each of the research variables have an average loading factor value of > 0.5, which can be explained that the indicators of the herding bias, overconfidence, investment decisions and financial literacy variables have a valid category. While the loading factor value <0.5 in the indicator is as follows.

Table 2. Elimination of Convergent Validity Test

Variables	Item Grain	Outer Loading Value
Investment Decisions	Y4	0.340
Investment Decisions	Y1	0.371

Reliability Test

Reliability testing is used to measure the indicators of this study based on the questions asked. Reliability testing uses the Cronbach Alpha statistical method with a significance of 0.6 where if the Cronbach Alpha value of a variable > 0.6 then the question items asked in the measurement of the instrument have adequate reliability. On the other hand, if the Cronbach Alpha value of a variable < 0.6 then the question item is not reliable (Ghozali, 2014). The results of the reliability test are as in the following table.

Table 3 Reliability Test Results

Variables	Alpha Value α> 0.6
Herding Bias	0.775
Overconfidence	0.607
Financial Literacy	0.602
Investment Decisions	0.633

Source: Primary data processed 2024

Based on the table above, it can be seen that herding bias, overconfidence, financial literacy and investment decisions get a Cronbach Alpha value of > 0.60. This result shows that the indicators in the question items in the study are reliable, in other words, the question item indicators used in this study have high consistency in measurement.

R2 Test

An R2 value of 0.67 is categorized as substantial, a value of 0.33 in R2 is included in the moderate category, a value of 0.19 in R2 is included in the weak category, a value of more than 0.7 in R2 is included in the strong category.

Table 4. R-Square Measurement Results

Variables	**R-square adjusted**
Investment Decisions	0.351

Source: Primary data processed 2023

Based on the table above, the adjusted R-Square test obtained a value of more than 0.33, so it can be stated that the endogenous latent variable is included in the moderate category.

F-Square Test

A value of 0.02 on f2 is included in the category of having a weak influence on the structural order, a value of 0.15 on f2 is included in the category of having a sufficient influence on the structural order, and a value of 0.35 on f2 is included in the category of having a fairly strong influence on the structural order.

Table 5. F-Square Measurement Results

	F-Square
Herding bias -> Investment Decision	0.018
Overconfidence -> Investment Decisions	0.258
Financial literacy -> Herding bias	0.037
Financial literacy -> Overconfidence	0.001

Source: Primary data processed 2024

Based on table 5, the results of F-Square measurements show the level of influence between variables. Herding bias has a weak influence on Investment Decisions (0.018). Overconfidence has a moderate influence on Investment Decisions (0.258). The financial literacy variable has a weak influence on both herding bias and overconfidence (0.037 and 0.001).

Hypothesis Testing

Hypothesis testing by looking at the results on the path coefficient. The calculation results are as follows:

Table 6. Results of the Influence Test

Hypothesis	Original sample	Sample mean	Standard deviation	T statistics	P values	Information
H1: Herding bias -> Investment Decision	0.129	0.146	0.09	1,432	0.152	Rejected
H2: Overconfidence -> Investment Decision	0.182	0.197	0.09	2,035	0.042	**Accepted**
H3: Financial Literacy x herding bias -> investment decisions	0.039	0.024	0.107	0.361	0.718	Rejected
H4: Financial Literacy x overconfidence -> investment decisions	-0.148	-0.126	0.102	1,448	0.148	Rejected

Source: Primary data processed 2024

Based on the influence test table which shows the results of the hypothesis test with the following explanatory description:

1. The first hypothesis test shows a T-statistic figure of 1.432 < t-table 1.96 with a p-value obtained of 0.152> 0.05 and an original sample value of 0.129. It can be interpreted that the first hypothesis is rejected. There is no significant influence of herding bias on cryptocurrency investment decisions
2. The second hypothesis test shows a T-statistic figure of 2.035 > t-table 1.96 with a p-value obtained of 0.042 < 0.05 and an original sample value of 0.182. It can be interpreted that the second hypothesis is accepted, namely that overconfidence has a significant positive effect on cryptocurrency investment decisions.
3. The third hypothesis test for herding bias shows a T-statistic of 0.361 < t-table 1.96 with a p-value of 0.718>

0.05. It can be interpreted that the third hypothesis is rejected. Financial literacy has not been proven to significantly reduce the relationship between herding bias and cryptocurrency investment decisions. Hypothesis testing for the role of financial literacy on overconfidence shows a T-statistic of1,448 <t-table 1.96 with a p-value obtained of 0.148 > 0.05. Therefore, it can be interpreted that financial literacy has not been proven to significantly reduce the relationship between overconfidence and cryptocurrency investment decisions.

DISCUSSION

The Influence of Herding Bias on Investment Decisions

Herding bias is the behavior of investors who have a tendency to follow the actions of others. The influence of other investors will affect investment decisions. This study found that the p-value obtained was 0.152> 0.05 and the T-statistic value was 1.432 so that with a p-value exceeding 0.05, herding bias was not proven to have a significant effect on cryptocurrency investment decisions. The higher the tendency to follow other investors, it does not significantly affect the decision to invest in cryptocurrency. This is possible when investors, even though they have herding bias, have other considerations in investment decisions. The results of this study are in line with the research of Mahadewi and Haryono (2021) and the research of Nurbarani and Soepriyanto (2022). On the other hand, these results do not support the research of Addinpujoartanto and Darmawan (2020) and the research of Pranyoto et.al (2020).

The Influence of Overconfidence on Investment Decisions

Based on the results of the Hypothesis test, the T-statistic data obtained was 2.035> t-table 1.96 with a p-value obtained of 0.042 <0.05, which means that the p-value has a value lower than 0.05, namely the hypothesis is accepted, so that overconfidence has a significant positive effect on investment decisions. The higher the level of overconfidence of an investor, the higher the level of confidence of an investor in making decisions and the more daring in taking risks. Investors who have high confidence in past success will be able to budget their money well. Likewise, investors who have the ability to control high investment decisions will be able to manage their finances well. The results of this study support the research of Budiman et al. (2021) and Sutikno and Mery (2021) who found that overconfidence has a significant positive effect on investment decisions. On the other hand, this study obtained results that were not in line with Lathifatunnisa and Nur Wahyuni (2021).

The Influence of Financial Literacy on the Relationship between Herding Bias and Overconfidence with Cryptocurrency Investment Decisions

The results of the hypothesis test show that financial literacy is not proven to significantly reduce the relationship between herding bias and overconfidence on investment decisions. Investors who have high knowledge about the level of security of the selected investment product do not reduce the influence of overconfidence on investment decisions. Likewise, investors who are able to know and assess their personal financial condition do not reduce the influence of overconfidence in making investment decisions. These results are not in line with the research of Budiarto and Susanti (2017) and Pradhana (2018).

The Influence of Financial Literacy on the Relationship between Overconfidence and Cryptocurrency Investment Decisions

The results of the direct influence hypothesis test show that the Innovation Orientation Behavior variable (X2) has a positive and significant effect on work attitudes (Z), this proves that the fourth hypothesis is accepted. The fourth hypothesis shows that good Innovation Orientation Behavior will have a positive effect on the work attitudes of Islamic Banking employees. This finding shows that good innovation orientation behavior will have a positive impact on the work attitudes of employees in the Islamic Banking environment. Employees who lack innovation orientation behavior tend to show unenthusiasm and lack of passion in working. Research by Subagio (2017) also supports this concept by stating that innovation orientation behavior directly affects work attitudes.

CONCLUSION

The hypotheses proposed in this study are four hypotheses. The conclusions of the four hypotheses are as follows:

1. The results of the first hypothesis test prove that Herding Bias does not have a significant positive effect on Cryptocurrency investment decisions.

2. The results of testing the second hypothesis prove that overconfidence has a significant positive effect on cryptocurrency investment decisions.
3. The results of testing the third hypothesis prove that financial literacy does not significantly reduce the relationship between herding bias and investment decisions.
4. The results of testing the third hypothesis prove that financial literacy does not significantly reduce the relationship between overconfidence and investment decisions.

MANAGERIAL IMPLICATIONS

Based on the conclusion, the following recommendations can be made to management:

RESEARCH LIMITATIONS

The results of this study and the limitations found in the study can be used as a source of ideas for developing this research in the future, as follows.

1. This study was only able to prove the influence of herding bias and overconfidence on investment decisions.
2. This study has not been able to prove the influence of herding bias on investment decisions and the role of financial literacy in moderating the relationship between herding bias and overconfidence on investment decisions.
3. This study found many respondents with little investment experience, so it was not optimal, namely investors who had been investing in cryptocurrency for more than 4 years.

SUGGESTIONS FOR FUTURE RESEARCH

Based on the conclusion, the following suggestions can be made for future research:

1. To obtain more representative results, it is recommended to limit the sample by investment experience.
2. Future research can re-examine the influence of herding bias on investment decisions and the moderating role of financial literacy by improving indicators.

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