

**HERDING BEHAVIOR, LOSS AVERSION BIAS, FINANCIAL LITERACY, AND INVESTMENT DECISIONS (A STUDY ON MILLENNIAL GENERATION IN INDONESIA IN THE DIGITAL ERA)**

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**Abstract:** In the last few years in Indonesia, many investment applications have emerged where these applications make it easy for investors to be able to invest. The emergence of investment applications also raises many problems such as fraud under the guise of investment and people in Indonesia, especially young people who are easily tempted by investment offers that provide high returns so that they often carry out investment activities but are irrational and tend not to look at financial conditions in making investments. The purpose of this study is to see how the internal and external factors of an investor, especially the millennial generation, in making investment decisions, namely the factors of Herding Behavior, Loss Aversion Bias and Financial Literacy. This research method uses descriptive and verification methods with a sample size of 400 respondents and data analysis techniques using Multiple Logistic Regression Analysis. The results showed that the the Herding Behaviour variable has a positive effect on Investment Decisions of the Millennial Generation in Indonesia in the Digital Age, Loss Aversion Bias has a negative effect on Investment Decisions of the Millennial Generation in Indonesia in the Digital Age, while the Financial Literacy variable has no effect on Investment Decisions of the Millennial Generation in Indonesia in the Digital Age.

**Keywords:** Herding Behavior, Loss Aversion Bias, Financial Literacy, Investment Decisions

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## INTRODUCTION

The rapid advancement of technology in this digital age has given the financial sector a boost. With technological advancements and a connected virtual world, the financial sector now faces challenges, including how people invest their money. Knowledge related to financial management is very important to keep up with technological advances, especially investment platforms (Utami & Sitanggang, 2021). The emergence of investment applications makes it easier for investors to make transactions, especially the millennial generation. This millennial generation is digital natives who were born in the digital era and technology has greatly influenced all aspects of their lives. Based on research conducted by Michelmors, 76% of millennials use online platforms in investing (Michelmores, 2019). This condition has also led to an increase in capital market investors to 7.15 million investors in November 2021. Of this total, 59.81% of them are millennials aged 30 and under (Annur, 2021). However, this phenomenon is widely utilized by irresponsible actors. Investments that were supposed to be beneficial in the future have instead made many victims. This condition is caused by the emergence of illegal investment applications. Katadata.co.id reported that Rp117.4 trillion was the

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loss experienced by the community in approximately ten years (Dihni, 2022). This condition is not only caused by actors who build applications, websites, and various kinds of attractive offers through social media but also people in Indonesia who are easily tempted by investment offers that provide high returns (Dihni, 2022). This is because millennials do not have a strategy and are mistaken in making investment decisions (Syafina, 2019).

Investment decision making is a complex phenomenon because it includes how a person makes various investment choices that exist by covering various aspects and dimensions. In making investment decisions, a fund owner faces various conditions that occur such as multiple meanings, risks, and various investment options (Awais et al., 2016). Yoong & Ferreira (2013) in Adil et al., (2022) revealed that investors tend to make investment decisions that worsen their investment portfolio due to emotional behavior and psychological factors that result in irrational decisions. Investment studies are inseparable from the behavioral bias factor, especially in the millennial generation which is interesting to explore, behavioral bias has at least 3 classifications including cognitive bias, emotional bias, social bias, some biases tend to be owned by the millennial generation. Among the many behavioral biases in investors, herding behavior and loss aversion bias are one of the biased behaviors that are closer to millennial investors emotionally and socially. Herding has been put in the category of behavioural biases in the literature. The behavioural biases are the cognitive factors that influence the investment decisions of the investors in financial markets. The behavioural biases locate the causes of irrational and illogical behaviour of the investors and expound how investors logically make faults and mistakes while making judgements. (Dewan and Dharni, 2019). Millennial investors in taking action based on herding behavior by considering the decisions of other investors in buying and selling shares, the number of certain (Adielyani and Mawardi, 2020). Loss aversion is a bias that allows individuals to avoid losses as much as possible and continue to reap profits in accordance with the characteristics of the millennial generation who are always achievement-oriented. This is due to the level of satisfaction when getting a profit is smaller than the level of sadness when experiencing a loss. Investors prefer to minimize losses that have an excessive impact when investing rather than the profit itself (Pompian M., 2012).

To be able to make investment decisions and overcome behavioral bias both herding behavior and loss aversion bias, there are other factors that influence investment decisions. Another factor is education, where education or financial knowledge or financial literacy is an important thing that can affect investment decisions (Pompian, 2006). An investor who has good financial literacy can ignore their biases and is able to make sound financial decisions (Son & Park, 2019) where this is supported by Khalid et al., (2018) which explains that investment decisions and the level of financial literacy have a correlation where when high financial literacy investors will consider and practice various options when making decisions compared to investors with low financial literacy. Financial literacy for individuals is an important point for each, where financial literacy in this life cannot be separated from doing financial management and financial literacy is one of the points in avoiding mistakes (Bernheim et al., 2001). (Chen & Volpe, 1998) explain that a low level of literacy will make investors tend to make mistakes in making financial decisions.

In making investment decisions, there are two attitudes among investors, namely rational behavior and irrational behavior. Rational behavior is the behavior of investors who make investment decisions based on common sense by considering information rational behavior is the behavior of investors who make investment decisions based on common sense by considering the information available in the market and can be proven by available data and evidence, while irrational behavior is the behavior of investors who do not make investment decisions based on common sense, but are influenced by other factors (Sabila viera Berliana, 2021).

Herding behavior is considered to be one of the most common behavioral biases that affect financial markets and investors (S.N.Geetha, 2019). Activities This herding behavior even ignores the ability and confidence of individual investors and aims to socialize and gain more trust. and aims to socialize and gain acceptance and recognition from the group. acceptance and recognition from the group. Based on this, herding behavior shows that there is a significant positive effect because when herding behavior increases, an investor will show the determination of what investment will be determined (Boda and Sunitha, 2018).

Loss aversion significantly affects investment decisions, especially in determining whether investors have a tendency to seek risk or avoid risk (Hala et al., 2020). Manuel and Mathew (2017) and Subramaniam & Velnampy (2017) show that loss aversion has a significant negative impact on investment decisions: the higher the investor's loss aversion, the greater the risk they accept to make a profit, and vice versa, if the investor's loss aversion is higher, the greater the risk they accept to make a profit. risk they accept to make a profit, and vice versa, if the investor's loss aversion is low, the more risk they accept to make a profit. loss aversion is low, the more risks and rewards they face and accept in investment decisions. face and accept in investment decisions.

Financial literacy, as a measure of financial behavior, relates to an individual's ability to spend and manage money. More specifically, a degree of financial literacy refers to their ability to deliberately think about financial choices and to recognize and apply relevant financial concepts (Anasta, 2019). Lack of literacy leads people to smaller levels of capital market participation. People with a lack of financial knowledge are also thought to be less likely to own shares (Aisa, 2021)

The research conducted by the author is different from several studies research conducted previously such as in the research of Metawa et al., (2019) and Adil et al., (2022) in determining behavioral bias does not include variable loss aversion bias in the study. In addition, in Indonesia related to behavioral factor, research conducted by Ady (2018) did not include the variable herding behavior as a bias factor that affects investment decisions. investment decisions. Research that includes herding behavior variables and loss aversion bias, namely research by Noah and Lingga, (2021) and did not include financial literacy variables in the study. financial literacy variables in the study. In addition, research (Yustitia Fitria, 2019) on Millennial Generation research did not include the bias factor variable."

## METHODS

This research method uses descriptive and verification methods using a quantitative approach. According to Creswell (2012: 13), quantitative research requires researchers to explain how variables affect other variables. By using the research method, it will be known the influence or significant relationship between the variables studied so as to produce conclusions that will clarify the description of the object under study. Meanwhile, descriptive research according to Sekaran (2016: 43) is research designed to explain the characteristics of the group under study in a situation and verification research according to Hasan (2009: 11) is research that tests the truth of something (knowledge) in an existing field and is used to test hypotheses using statistical calculations. According to Sekaran (2016: 73), the dependent variable or dependent variable is the variable that is the main concern of the researcher. In this study, the Dependent Variable used is the Investment Decision. Independent variables or independent variables according to Sekaran (2016: 74) are variables that affect the dependent variable either positively or negatively. In this study, the independent variables used are Herding Behavior, Loss Aversion Bias, and Financial Literacy.

**Table 1. Operational Variables**

Number	Variabel	Variabel Definiton	Indicator	Scale
1	Herding Behaviour	The tendency to do something in common especially when uncertain conditions where investors feel confident that the majority of choices are not can't be wrong (Afriani & Halmawati, 2019)	Make a choice main investment choice following someone else's investment choice Do not dare to choose investment decisions that different from the majority investments chosen by other investors Make investment decisions investment decisions based on market changes Respond quickly to changes in decisions decisions of other investors Other investors' decisions regarding the choice of type of investment will influence his investment decision	Ordinal
2	Loss-Aversion Bias	The tendency a person to avoid loss, so they are more cautious in making decisions (Yiwen, 2021).	Avoiding losses Holding on to loss-making investments for too long Unwilling to try other investments Knowing with certainty the	Ordinal

3	Financial Literacy	Financial literacy can be defined as knowledge financial knowledge, with the goal of achieving prosperity (Lusardi and Mitchell, 2007)..	<p>performance of the investment to be invested in</p> <p>Be aware of investment changes sudden changes in investment that may cause loss</p> <p>Understand the Factors That Affect Net Compensation</p> <p>Know your of your income</p> <p>Describe how acquire wealth and achieve your financial</p> <p>Understand your budget your savings</p> <p>Understand insurance</p> <p>Analyze risk, return, and liquidity</p> <p>Evaluation of investment options</p> <p>Analyze the impact of tax and inflation on investment returns</p> <p>Analyze the Pros and Cons Debt</p> <p>Explain the purpose of credit report and recognize the rights of debtors</p> <p>Explain how to avoid or fix debt problems</p> <p>Are you aware of the Basic Law Consumer Protection Law about loans and debt?</p> <p>Keep a financial record</p> <p>Understand Balance Sheet, Income Statement and Cash Flow Statement</p>	Nominal
4	Decision Investment	An activity in determine choice from various options in finance (Subash, 2012).	<p>Not doing Investment will be denoted by number zero (0)</p> <p>Investment will be denoted by number one (1)</p>	Nominal

This research uses a finite population, as for the largest investor population based on the total capital market investors under the age of 40, namely 81.31% of the total 9,112,677 people, among others, it is estimated that there are 7,409,518 Young Generation Investors where the majority are on Java Island, namely 69.59%, Sumatra 16.62%, Kalimantan 5.42%, Sulawesi 4.07%, Bali NTT NTB 3.33%, and Maluku and Papua 0.98% (KSEI, September 2022). The sampling technique uses the formula from Slovin (Sugiyono, 2017) where the number of respondents from the millennial generation in Indonesia based on the sampling category from Roscoe and the Slovin formula, shows



a minimum number of 400 people. Sampling technique in this research is stratified random sampling technique. The criteria for sampling this research are Millennial Generation Investors who have at least 1 year of experience as an investor where it is also necessary to make strata according to the research island area in Indonesia, this grouping is carried out first into proportional strata so that the sense of representation of population members is more guaranteed and the general conclusions of the research can be accounted for (Supardi, 1993). Based on this, the percentage distribution of the number of investors in Indonesia, which can be generated, is on the island of Java, namely 279 people, Sumatra 66 people, Borneo 22 people, Celebes 16 people, Bali-NTT-NTB 13 people, and Maluku and Papua 4 people.

Data collection techniques for research using questionnaires, literature research and the internet. The data analysis method used is validity, reliability, logistic regression analysis which according to Ghozali (2018) is similar to discriminant, namely we want to test whether the occurrence of the dependent variable can be predicted by the independent variable is a mixture of continuous (metric) and categorical (non-metric) variables. "Based on the information in this study, the dependent variable uses numeric variables or binary variables or surrogate variables. In this case, respondents who "Make investment decisions" will be given the value "1" and respondents with the status "Do not make investment decisions" will be given the value "0". Meanwhile, the independent variables in this study are Herding Behavior, Loss Aversion Bias, and Financial Literacy, so the logistic regression equation used is: logistic regression equation used is:"

$$L = \ln \left( \frac{Pt}{1-Pt} \right) = b_0 + b_1X_1 + b_2X_2 + b_3X_3$$

Description:

$\ln (Pt/1-Pt)$  = Log of respondents who make investment decisions and do not make investment decisions.

$b_0$  = Constant

$b_1$  = Herding Behavior Coefficient

$b_2$  = Loss Aversion Bias Coefficient

$b_3$  = Financial Literacy Coefficient

$e$  = Coefficient of Financial Literacy

Hypothesis testing to test how far all the independent variables included in the model have an influence on the Investment Decision which includes partial hypothesis testing and simultaneous hypothesis testing and the coefficient of determination test to see how much influence the independent variable and the dependent variable partially use the coefficient of determination. The coefficient of determination is the square of the correlation coefficient as a measure to determine the ability of each variable used.

## RESULTS AND DISCUSSION

Analysis of the description of respondents, namely Millennial Generation Investors based on age, gender, education, income, residence and length of time investing with the following description:

**Table 2. Characteristics of Research Respondents**

Criteria of Respondents		Total Respondents	Percentage (%)
Age	25 – 30 years old	133	33%
	31 – 35 years old	133	33%
	36 – 40 years old	134	34%
Type of Gender	Male	214	53,5%
	Female	186	46,5%
Education	Diploma	25	6.25%
	Bachelor/Undergraduate	328	82.00%
	Postgraduate	47	11.75%
Income	≤ 3.999.999 Million IDR	74	18.50%
	4 - 5.999.999 Million IDR	133	33.25%
	6 - 7.999.999 Million IDR	104	26.00%
	8 - 9.999.999 Million IDR	15	3.75%
	> 10.000.000 Million IDR	74	18.50%
Length of Investment	1 s/d 5 years	353	88.25%
	6 s/d 10 years	37	9.25%
	>10 years	10	2.50%
Residence	Java	279	69.75%
	Sumatra	66	16.50%
	Bali, NTT, NTB	13	3.25%
	Celebes	16	4.00%
	Borneo	22	5.50%
	Maluku dan Papua	4	1.00%

Source: Questionnaire Data (2023)

Assessing the feasibility of the regression model can be done by looking at the significant value in the Hosmer and Lemeshow Goodness of Fit table. The model is said to be able to predict the observation value and match the observation data if the Chi-square value is  $> 0.05$  (Ghozali, 2018). The following are the results of the regression model feasibility test in this study using SPSS version 22.0:

**Table 3. The Goodness of Fit Test**

Chi-Square	Df	Sig.
11.541	8	0.173

Source: Results of Data Processing by SPSS (2023)

It can be seen from table 3 above that the significant value of the model feasibility test results is 0.173 with a Chi Square value of 11.541, a significant value  $> 0.05$  indicates that the regression model formed is able to predict the observation value well and fits the observation data, so the regression model used in this study is suitable for further analysis, this is because there is no significant difference between the predicted classification and the observed classification.

Hypothesis testing was conducted using multiple logistic regression analysis. To facilitate data analysis, all data were processed with SPSS (Social Science Statistical Package) for Windows version 23.0 and Ms. Office Excel 2013. The regression results of the processed primary data are shown in table 3 as follows

**Table 4. Results of Logistic Regression Analysis**

Variables	B	Std. Error	Wald	df	Sig.
Investment Intercep	2.764	1.051	6.911	1	.009
X1	.104	.043	5.822	1	.016
X2	-.206	.049	17.288	1	.000
X3	.045	.056	.647	1	.421

Source: Results of Data Processing by SPSS (2023)

Based on the table above, the regression equation model can be obtained as follows:

$$L = \ln\left(\frac{Pt}{1-Pt}\right) = 2,764 + 0,104 - 0,206X_2 + 0,045X_3 + e$$

The model assessment test aims to determine how much the dependent variable can be explained by the independent variable by looking at the Cox and Snell's R Square value where the results are:

**Table 5. Analysis of the Relationship between the Independent Variable (X) and the Dependent Variable (Y)**

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
438.609 <sup>a</sup>	.152	.212

Source: Results of Data Processing by SPSS (2023)

It can be seen from table 5. that the Cox & Snell R Square value is 0.152, this shows that the amount of effective contribution given by the Herding Behaviour, Loss-Aversion Bias and Financial Literacy variables to investment decisions is 15.2%. Furthermore, the Nagelkerke R Square value in the regression model is 0.212, which means that the variance of investment decision variables that can be explained by the Herding Behaviour, Loss-Aversion Bias and Financial Literacy variables is 21.2%, while the remaining 78.8% is influenced by other factors outside the Herding Behaviour, Loss-Aversion Bias and Financial Literacy variables.

To see whether the hypothesis proposed can be accepted or not, we need to look at the results of hypothesis testing both partial and simultaneous hypothesis tests as follows:

**Table 6. The Wald test**

	B	S.E	Wald	df	Sig.
X1	.104	.043	5.822	1	.016
X2	-.206	.049	17.288	1	.000
X3	.045	.056	.647	1	.421
Constant	2.764	1.051	6.911	1	.009

Source: Results of Data Processing by SPSS (2023)

The results of partial hypothesis testing show that the Herding Behavior variable has a positive effect on Investment Decisions of the Millennial Generation in Indonesia in the Digital Age, Loss Aversion Bias has a negative effect on Investment Decisions of the Millennial Generation in Indonesia in the Digital Age, while the Financial Literacy variable



has no effect on Investment Decisions of the Millennial Generation in Indonesia in the Digital Age.

Simultaneous testing is multivariate testing in binary logistics which is carried out together to obtain the results of the simultaneous influence of the independent variables on the dependent variable. And the results of this test can be seen from the omnibus test.

**Table 7. The Omnibus Test**

	<b>Chi-square</b>	<b>Df</b>	<b>Sig.</b>
Step	32.330	3	.000
Block	32.330	3	.000
Model	32.330	3	.000

Source: Results of Data Processing by SPSS (2023)

The omnibus test results in Table 6. show that the chi square value is 32.330 with a probability of 0.000. Because the probability level is smaller than 0.05, it can be concluded that the Herding Behavior, Loss Aversion Bias, and Financial Literacy variables simultaneously affect investment decisions.

The results of the description analysis show that even though the respondent's Herding Behavior level is in the low category, millennial investors still make herding or follow-along attitudes a consideration in determining investment decisions, especially in the highest response, namely the value of quick reactions to changes in other investors' decisions where investors do not care about the company they invest in, they only follow the decisions of the majority of other investors who they feel can bring returns or profits to them. Based on this, herding behavior shows that there is a significant positive effect because when herding behavior increases, an investor will show investment determination behavior, an investor will show what investment determination will be made.

The results of respondents' assessment of Loss-Aversion Bias belong to the high category where usually Millennial investors have a high level of risk aversion when investing. The higher the loss aversion bias, the investor's decision to invest will decrease because he feels the lower the return obtained from the investment, and vice versa, if the loss aversion bias of an investor is low, the greater the investor's decision to make an investment decision because of the high return, even though the level of risk to be faced will also be high. Based on the results of logistic regression analysis show a significance value of 0.000 < 0.05, this indicates that there is a negative and significant influence on the investment decision because of the high return despite the high level of risk that will be faced. this shows that there is a negative and significant effect of Loss Aversion Bias on investment decisions. Bias on investment decisions. Based on this, Loss Aversion Bias shows that there is a significant negative effect because when the increase in Loss Aversion Bias, an investor will not make an investment, and vice versa, the lower the Loss Aversion Bias, the lower the investment, and vice versa, the lower the Loss Aversion Bias, the more millennial investors will invest. millennial investors will invest.

The results of respondents' assessment of Financial Literacy belong to the moderate category of millennial investors having sufficient knowledge, skills and abilities to utilize their resources to achieve goals. However, this knowledge, skills and abilities are used to understand relevant information to make basic financial decisions, the

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importance of financial literacy only helps to make financial decisions using relevant information, but does not guarantee the right decision (Mason and Wilson, 2000) (Koto and Pulungan, 2017). Based on the results of logistic regression analysis, the significance value is  $0.421 > 0.05$ , this shows that there is no influence on investment decisions. This means that increasing financial literacy does not affect increase in investment decisions. Financial literacy has no influence on investment decisions, meaning that respondents' high understanding of personal finance will not necessarily have an impact on their desire to invest.

### CONCLUSION

The results of the descriptive analysis of Herding Behavior where the results of the respondents' answers show a value that is included in the "Low" criteria. The results of the description analysis of Loss Aversion Bias where the results of the respondents' answers show a value that is included in the "Moderate" criteria. The results of the descriptive analysis of Financial Literacy where the results of the respondents' answers show a value that is included in the "Medium" criteria. The results of the analysis of the description of the respondent's investment decision where the results of the respondent's answer show a value of 66.2% of the total of all respondents who will invest.

Statistical analysis for hypothesis testing shows the variables Herding Behavior, Loss Aversion Bias, Financial Literacy have a positive impact on the millennial generation's investment decisions in Indonesia in the digital era. As for the partial effect of the Herd behavior variable, it positively affects positive on the investment decisions of millennials in Indonesia in the digital era. digital era, loss-aversion bias has a negative impact on investment decisions millennial generation in Indonesia in the digital era, while the financial literacy variable has no effect on the investment decisions of the millennial generation in Indonesia in the digital era. literacy variable has no effect on millennial generation investment decisions in Indonesia's digital era.

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