

Original Article

Regret Aversion Bias, Mental Accounting, Overconfidence, and Risk Perception in Investment Decision Making on Generation Y Workers in Yogyakarta

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Abstract - In traditional finance theory, the investors are expected to be rational decision-makers going along with the expected utility theory. Behavioral finance, contrary to this, heavily criticizes this rational perspective and they argue that investors tend to deviate from rationality whenever making investment decisions. Nowadays investors often make investment decisions irrationally. The decision is often based on their judgment that is far away from rational assumption. When investors face a risky situation, there are some objectivities, emotions, and other psychological factors that usually affect their decision-making. The purpose of this paper is to study and describe several biases in investment decision-making through the review of research articles in the area of behavioral finance. The study includes behavioral finance patterns of the Y generation that will be independent variables are regret aversion bias, mental accounting, overconfidence, and risk perception to the Y generation on how they will make an investment decision. This study used purposive, convenience, and snowball sampling methods. There are 100 respondents taken from the questionnaire by survey method. To test hypotheses, this study employs descriptive analysis and multiple regression analysis. Moreover, by performing multiple regression analysis, this study found that only overconfidence and risk perception have a significant effect on investment decision making, but experienced regret, and mental accounting do not.

Keywords - Investment Decision Making, Regret Aversion bias, Mental Accounting, Overconfidence, Risk Perception.

I. INTRODUCTION

Generation Y is an individual born in 1980-2000 [1]. This generation was born in the era of the development of information technology and the education world so it has different characteristics than the previous generation. Everyone, especially the Y generation wants to have a decent life, fulfill their needs and desires, and have added value to

the income that has been generated. One way to fulfill that desire is to invest. Choosing the right investment can be profitable so that investors can maximize their returns. Adequate knowledge of investment can help an investor to choose the right type of investment.

However, many people do not pay attention to the risks of the selected investment. Most people do investment activities only limited to follow-up, it is called herding behavior. So there are some investors who do not conduct analysis of investment types in depth. But, there are some investors who conduct investment analysis first before making investment decisions. Each individual has a different approach to making investment decisions.

Reference [2] reveals that psychology affects investor behavior and can change at any time. When investors are faced with a situation that forces them to choose what type of investment to choose, there may be elements of subjectivity, emotions, and other psychological factors that are more dominant in influencing it. The psychological factor of an investor is very influential on the investment decision. Reference [3] states, that behavioral finance is the science of how the phenomenon of psychology affects financial behavior.

Reference [4] divides the bias into two categories. Firstly, cognitive bias, e.g. overconfidence bias. Secondly, emotional bias, e.g. loss aversion bias, regression aversion bias, and status quo bias. In this study, researchers only discussed aversion bias regret. An aversion bias regression is a regret that results from loss to make a decision to avoid the same error.

On the other hand, when an investor has succeeded and has been comfortable with the investments already made, the confidence level will increase to make another investment in the future. The level of confidence that continues to increase causes someone overconfidence. Overconfidence will make investors overestimate the knowledge owned by the investors themselves, and underestimate the predictions made as investors overestimate the capabilities they possess [5]. Many studies have suggested that investors are overconfident with



investment capabilities that cause investors to be too confident in their judgment.

Investors who consider the cost and benefit of the decision making are investors who have mental accounting in decision making when transacting because they feel safe and comfortable [5]. Investors feel more secure in making transactions. So, they minimize the risks due to the consideration of cost and benefits to be gained by decisions making, such as the risk of loss in large numbers. The indicator used, namely "in investing investors always calculate the profits to be gained; in investing, investors always calculate the cost to be incurred."

Somebody's perceptions of risk will also influence investment decision-making. Perception is an individual process of regulating and interpreting the sensory impression to give meaning to the environment [6]. Risk perception is socially constructed; Reference [7] defines risk perception as the result of many factors underlying differences in decision-making against potential losses. Investor behavior in making decisions is influenced by subjective attitudes possessed to risk and investment income itself.

II. LITERATURE REVIEW

Kahneman and Tversky [8] describe the prospect theory that relates to the idea that humans do not always behave rationally. The involvement of emotions, joys, traits, and various inherent things in humans often leads to humans not always behaving rationally in taking a decision. This theory is also mentioned as a rational choice theory which is better known as an approach with political science and often represents an alternative dominant model to explain behavior.

A. Regret Aversion Bias

Regret aversion bias is a decision to act to avoid the same misperception of fear in the face of the same loss in a person [4]. The researchers identified the regret aversion bias in two components, namely experienced regret and anticipated regret. Experienced regret is a regret that arises from past mistakes [9]. Respondents are faced with an investment plan whose investment options are no better than the outcome of other investment plans. Regret that will make an investor avoid the consequences that arise after taking the wrong investment decision. The action to avoid such consequences is called anticipated regret.

In a study conducted by [9], the regret aversion bias variable was divided into two, namely experienced regret and anticipated regret. Experienced regret is based on the research of [10]. While anticipated regret is based on Bell's research [11]. In a previous study, the results of a study conducted by [9] and [10] were experienced regrets having a significant effect on investment decisions. In addition, research results on anticipated regrets

performed by [9] have no significant effect on investment decisions. This result is contrary to research conducted by [11] and [12] that anticipated regret has a significant effect on investment decisions. Overall, the aversion regression bias affects investment decisions. However, each component of the aversion regression (experienced regret/ anticipated regret) has a different influence on investment decisions.

B. Overconfidence

Overconfidence will make investors going to overestimate the knowledge owned by the investors themselves and underestimate the predictions made as investors overestimate the capabilities they possess [5]. Overconfidence will also affect investors' risk-taking behavior. Rational investors seek to maximize profits while minimizing the amount of risk taken [5]. Overconfidence also could cause investors to bear greater risks in making decisions to invest.

Overconfidence is related to how much prejudice or feelings about how well a person understands their abilities and limits their own knowledge. This is supported by the statement of [3] cited as follows, "Overconfidence is a bias that pertains to how well people understand their own abilities and the limits of their knowledge".

The cause of overconfidence is excessive confidence that the information obtained can be utilized properly because it has accurate and precise analytical skills, but this is actually an illusion of knowledge and ability due to several reasons such as insufficient experience and limited expertise to interpret information [13].

Reference [3] divides this overconfidence into two groups, there are (1) overconfidence of ability or overconfidence about ability and (2) confidence about knowledge or overconfidence about knowledge. People who are too confident about their abilities usually think that someone feels better than the truth. While people who are too confident about their own level of knowledge usually think that the person knows more than is actually known. This attitude does not necessarily mean that investors are unconcerned or incompetent; the problem lies in the idea that the person is smarter and better.

Investors with overconfidence will override the information they get because they are overconfident in their own beliefs. Investors become too confident and confident in the views and knowledge of the individual so that other information obtained is not too ignored. Excessive confidence causes investors to overestimate their knowledge, overestimate the risks and exaggerate the ability to control what happens.

C. Mental Accounting

Investors who have mental accounting in making decisions when transacting are investors who consider the cost and benefits of the decisions taken [5]. With such investors feel safe. In the sense that

investors are safer in making transactions so as to minimize the risks due to the consideration of cost and benefits to be gained with decisions taken e.g. the risk of loss in large amounts. The indicator used is "In investing investors always calculate the profit to be gained; in investing investors always calculate the costs to be incurred."

The process of purchasing goods in mental accounting is viewed in terms of profit and loss. The goods obtained are considered as profits, while the money paid is considered as a loss. However, the results of research conducted by [14] and [15] rejected the idea. According to them, a person acquires two kinds of utilities from the purchase process, namely utility acquisition and utility transactions. The acquisition utility measures the value of the goods obtained compared to the price of the item. The acquisition utility is a value that buyers are willing to pay. The valuation of the item is considered as a gift earned less than the price to be paid, while the transaction utility is measuring the agreed value. This agreed value is a regular price that is willing to be paid for a good. The price is a difference from the amount paid by the buyer to the price that the buyer is actually expecting for the item. This transaction utility concept does not apply in the standard economic model because individual consumption is always the same under any circumstances.

D. Risk Perception

Risk perception is the process when one interprets information about the risks. Risk perception is socially constructed; Reference [7] defines risk perception as the result of many factors that form the basis of differences in decision-making against potential losses.

Reference [2] argues that risk perception can increase the number of information retrievals if the assets invested are low. Likewise [16] suggests that investment risk and experience tend to show positive relationships and past experiences that successfully increase investor risk tolerance. Reference [17] argues that information has a positive relationship to risk perception, so the more information received, the risk perception of investors will increasingly affect the expected rate of return. Reference [17] shows that investors who obtain information from market reports are optimistic to have a lower risk perception.

E. Hypotheses Developments

Effect of Aversion Bias Regression on Investment Decision

Experienced regret is a regret caused by a mistake in the past that will affect the decision in the future [22]. An investor who experienced a loss in the past will lead to a conservative attitude that will affect future investment decisions. In taking an investment decision, investors often behave irrationally. There

are also investors who are not affected by experienced regret in making investment decisions. The greater the losses experienced, the greater the level of courage in taking greater risks [23].

Anticipated regret arises if the planned investment is not in accordance with the expected. Respondents are faced with an investment plan whose investment options are no better than the outcome of other investment plans. This raises remorse that will make an investor avoid the consequences that arise after making the wrong investment decision. The action to avoid such consequences is called anticipated regret. Uncertainty about future investments forces investors to do an analysis for the investment to be chosen more carefully in order to avoid future losses.

Previous research on experienced regrets conducted by [9] and [10] that the result is experienced regret significantly influence the investment decision. In addition, previous studies on anticipated regrets by [11] and [12] suggest that anticipated regrets have a significant effect on investment decisions.

Thus, it is suspected that the investment decisions that will be taken by the respondents from both experienced regret and anticipated regret groups will differ significantly if they affect the investment decision.

H1: Regret aversion bias influences investment decisions.

The Effect of Overconfidence on Investment Decisions

Overconfidence is a feeling of over-confidence. Overconfidence will make investors overestimate the knowledge owned by the investors themselves, and underestimate the predictions made as investors overestimate the capabilities they possess [5]. Overconfidence will also affect investors' risk-taking behavior. Rational investors seek to maximize profits while minimizing the amount of risk taken [5], [24]. Overconfidence can also cause investors to bear greater risks in making decisions to invest. In other words, people who are overconfident more perceive risk as low and vice versa, people who do not overconfidence more view a high risk.

H2: Overconfidence influences investment decisions.

The Influence of Mental Accounting on Investment Decisions

Mental accounting focuses on how one should respond to and evaluate a situation when there are two or more possible outcomes, in particular how to combine the possible outcomes. According to [15], there are three components in the mental accounting process, there are:

- a. Perceptions of outcomes and making and evaluating decisions
- b. Setting events for specific records.

c. Determine the restriction of time period against other related mental accounting.

Mental accounting covers a wide range of human behaviors, not just about relationships with financial or financial issues. By understanding mental accounting, people are expected to better understand the psychological processes underlying a person in making choices or making economic and other decisions, including investment decisions and investment performance [4], [5].

H3: Mental accounting influences investment decisions.

Effect of Risk Perception on Investment Decision

When there is a thing that will happen and what has happened, then everyone can interpret it equally or differently. It forms perception. Perception is an individual process of organizing and interpreting their sensory impressions to give meaning to their environment [6]. Risk perception is the process when one interprets information about the risks. Risk perception is socially constructed; Reference [7] defines risk perception as the result of many factors that form the basis of differences in decision-making against potential losses.

Problems of perception and trends then affect the readiness of individuals to take risks. Such readiness may depend either on uncertain outcomes due to imperfect knowledge or on the scale of potential loss or gain. Risk perception plays an important role in human behavior especially related to decision making in uncertain circumstances [17]. A person tends to define a risky situation in case of a loss due to a bad decision, especially if the loss affects the financial situation. Because risk perception is a person's judgment on risky situations, the judgment is highly dependent on the psychological characteristics and circumstances of the person [21].

H4: Risk perception influences investment decisions.

F. Research Model

Based on our literature review and the hypotheses development above, we constructed the research model into a graph to figure out the influence of regret aversion bias, overconfidence, mental accounting, and risk perception on investment decisions.

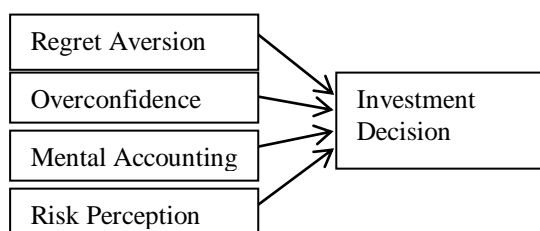


Fig. 1 Research Model

III. METHODS

A. Sample and Procedure

The sample criteria proposed for data retrieval are as follows:

- a) Respondents are Y-generation workers/entrepreneurs aged 20-40 years.
- b) Respondents have worked for at least 1 year.
- c) Respondents have domiciled in Yogyakarta
- d) Respondents have one or more investments. Investment can be a real investment and financial investment.

Table 1. Demographic Data

characteristics of respondents	Highest Percentage	Information
Gender	63%	Male
Age	64%	20-30 years
Marital status	58%	Married
Level of education	42%	Bachelor degree
Work	61%	Private employees
Position in Work	51%	Non-Managerial Employee
Years of service	48%	1-2 years
Income	42%	Rp4,000,000- Rp10,000,000

Source: a survey of Y generation workers/entrepreneurs aged 20-40 years in Yogyakarta, Indonesia

Table 1 summarizes the characteristics of respondents to the collected questionnaires. Questionnaires that can be processed in this study are as many as 100 questionnaires. The results of the study found that of 100 respondents scattered, as much as 63 percent male sex. This explains that the Y generation studied is dominated by men. An age that dominates is the age between 20 to 30 years with a percentage of 64%. This shows that at that age the respondent has had a permanent job and has an investment. Most respondents married status is already married. This shows that most of the respondents have married so that the proceeds of income are also able to support the family.

Unmarried respondents also occupy the second position, this can be attributed also to the number of respondents aged 20 to 30 years, who are still at the age of looking for and choosing a spouse. Based on work, 61% of respondents work as private employees. This shows that private employees dominate this research. Non-managerial employee respondents dominate the job position, which is 51%. The most working period is between 1 to 2 years with a percentage of 48%. Based on the total income of respondents per month as much as 42% percent of respondents have income in the range of Rp4,000,000 - Rp10,000,000. All the respondents who fill the questionnaire have knowledge of the investment because this study only aimed at respondents who have knowledge about investment and have at least one investment.

B. Measures

From the respondents, the Y generation in Yogyakarta found 100 respondents in accordance with the criteria and willing to be respondents. Exogenous variables consist of:

- 1) Aversion bias regrets, is an experience experienced by someone who causes the person regrets. Indicators of this variable are the experience of losses in investing, feelings of regret when investing, the impact of experience loss for subsequent investments. Likert scale is used to measure the variables whose interval range scales from strongly disagree (score 1) to strongly agree (score 5).
- 2) Overconfidence is a state when a person has very high confidence that makes an overestimate of its ability and underestimates the risk. The indicators that make up the overconfidence variable are the assessment of the accuracy of the selection of investment, the level of confidence in the ability and knowledge possessed the confidence in the selection of investment. Likert scale is used to measure the variables whose interval range scales from strongly disagree (score 1) to strongly agree (score 5).
- 3) Mental accounting is a set of cognitive operations used by individuals and households in coding, creating categories, and evaluating their financial activities. Mental accounting focuses on a person's behavior responding to and evaluating a situation when there are two or more possible outcomes, in particular how to combine the possible outcomes.
- 4) Risk perception, is an investor's view of the risks that will be obtained when making investment decisions. Indicators that make up the Risk perception variable include, without consideration and unsecured investment, and the use of revenues for risky investments. Like Likert scale is used to measure the variables

which interval range scales from less risky (score 1) to very risky (score 5).

Endogenous variables consist of:

Investment decision-making is the type of investment decision a person takes. Indicators that can shape investment decision variables are the use of revenues for risky investments, investment without consideration, unsecured investment, intuition/feeling-based investment. Measurements of variables used were using interval range scales never (score 1) up to very often (score 5).

C. Statistical Analysis

The data collected were sourced from the primary data collected by using the survey method, i.e. distributing questionnaires filled by selected respondents. Analytical techniques used were the heteroscedasticity test, normality test, multicollinearity test, and multiple regression analysis (MRA).

IV. RESULT AND DISCUSSION

Based on the survey, respondents choose to invest in the land the most, which are 87 respondents. Surprisingly, investing in stock is the second choice, follows by time deposits, currencies, gold, mutual funds, education, mix, index, bond, money market, and derivatives. The type of investment selected by the respondents is also an indicator of this research. When a respondent chooses different types of investments will also affect the results of research from the financial behavior of respondents.

Before proceeding to the research result, the validity and the reliability test are applied. A validity test is used to measure the validity of a questionnaire. The questionnaires are valid if able to reveal something that the questionnaire will measure. Based on Table 2, all the questionnaires are valid.

The reliability test is shown in Table 3. If the Cronbach's Alpha is greater than 0.7 so the variable is reliable.

Table 2. Validity Test Results

		<i>Scale Mean if Item Deleted</i>	<i>Scale Variance if Item Deleted</i>	<i>Corrected Item-Total Correlation</i>	<i>Cronbach's Alpha if Item Deleted</i>	<i>Result</i>
RAB.1	When investing, I tend to lose	9.99	5.970	0.599	0.723	Valid
RAB.2	I will stick with my investments rather than making new investments with higher returns but with big risks too	9.93	5.965	0.587	0.730	Valid
RAB.3	When I suffer losses, I tend to avoid the same investment.	9.89	6.079	0.671	0.688	Valid
RAB.4	I feel scared and unsure to make an investment that once made me lose.	9.85	6.735	0.502	0.770	Valid
OC.1	I feel very confident with my investment options, even without being supported by the right information.	9.97	8.656	0.688	0.825	Valid

OC.2	In making investment decisions, I tend to base myself on the initial information I get	9.97	8.332	0.698	0.820	Valid
OC.3	I believe that when I make a profit in investing, the achievement is due to my own ability	10.10	7.687	0.808	0.772	Valid
OC.4	I became hesitant when I got new information from other parties about the investment I would take	10.16	8.843	0.619	0.852	Valid
MC.1	I tend to make investment decisions based on information available in the market without my analysis anymore.	11.35	5.664	0.517	0.733	Valid
MC.2	I have started financial planning for the future	10.92	6.317	0.583	0.686	Valid
MC.3	I record my personal expenses	10.93	6.268	0.603	0.676	Valid
MC.4	I set aside money slowly as planned to make an investment	10.93	6.530	0.538	0.709	Valid
RP.1	I feel too much uncertainty if I make other investments	9.71	8.370	0.764	0.815	Valid
RP.2	I feel that my decision to make the investment I choose is risky	9.83	9.395	0.713	0.837	Valid
RP.3	I am willing to make big risky decisions to generate huge revenues	9.62	9.066	0.733	0.829	Valid
RP.4	I am willing to accept the risk of losing money, provided my investment generates higher income than inflation in the future	9.57	8.894	0.682	0.849	Valid

Table 3. Reliability Test

Variabel	Cronbach's Alpha	N of Items
MC	0.757	4
OC	0.858	4
RAB	0.782	4
RP	0.869	4

Reliability test results show all variables have a coefficient Cronbach's Alpha is large enough that is above 0.70 so it can be said all the measuring concepts of each variable of the questionnaire is reliable so that for the next items on each of the concept of the variable is feasible to be used as a measuring tool.

Table 4. Normality Test by Using Kolmogorov-Smirnov

		Mental Accounting	Overconfidence	Regret Aversion Bias	Risk Perception	Investment Decision Making
N		100	100	100	100	100
Normal Parameters ^{a,b}	Mean	3.6775	3.3500	3.3050	3.2275	3.8300
	Std. Deviation	0.79796	0.94281	0.80055	0.97513	1.49108
Most Extreme Differences	Absolute	0.096	0.124	0.121	0.118	0.135
	Positive	0.068	0.056	0.086	0.066	0.121
	Negative	-0.096	-0.124	-0.121	-0.118	-0.135
Kolmogorov-Smirnov Z		0.961	1.243	1.208	1.178	1.354
Asymp. Sig. (2-tailed)		0.315	0.091	0.108	0.125	0.051

a. Test distribution is Normal.

b. E3 Calculated from data.

Based on Table 4, the probability value of one-sample Kolmogorov-Smirnov test results is 0.315 for mental accounting, 0.091 for overconfidence, 0.108 regret aversion bias, 0.125 for risk perception, and

investment decision 0.051. Because all the results are more than 0.05, they are considered normal. If the distribution is considered normal, then the data is parametric data, so it could be tested by using parametric statistics, namely regression analysis.

Table 5. Multicollinearity Test Results

Model		Collinearity Statistics	
		Tolerance	VIF
1	Mental Accounting Overconfidence	0.894	1.119
	Regret Aversion Bias	0.939	1.065
	Risk Perception	0.962	1.040
		0.958	1.044

a. *Dependent Variable:* Investment decision making

Symptoms of multicollinearity can be seen from the values of tolerance and value of the Variance Inflation Factor (VIF). If the VIF value is less than 10 and the tolerance value is above 0.1 or 10% it can be concluded that the regression model does not occur multicollinearity.

The four independent variables: mental accounting, overconfidence, regression aversion bias, and risk perception have a Variance Inflation Factor (VIF) value within a predetermined tolerance range, so there is no multicollinearity of the independent variables of the study, thus it can be concluded that the regression is valid for use.

Table 6. Heteroscedasticity Test Results

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.795	0.610		1.303	0.196
	Mental Accounting	0.052	0.103	0.053	0.503	0.616
	Overconfidence	0.073	0.085	0.089	0.862	0.391
	Regret Aversion Bias	0.078	0.099	0.080	0.789	0.432
	Risk perception	-0.120	0.081	-0.150	-1.469	-0.145
	Obs *R-square	0.0803				

a. *Dependent Variable:* Abs. Res. Y

From the calculation, Obs *R-square 0.0803 > 0.05. This shows that the model does not experience heteroscedasticity because the Obs *R-square criterion is greater than alpha [18].

Table 7. Results of Multiple Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.432	1.092		3.145	0.002
	Mental Accounting	0.113	0.184	0.060	0.612	0.542
	Overconfidence	0.500	0.152	0.316	3.287	0.001
	Regret Aversion Bias	-0.217	0.177	-0.116	-1.225	0.223
	Risk Perception	-0.302	0.146	-0.198	-2.075	0.041

$$Y = 3.432 + 0.113 MC + 0.500 OC - 0.217 RAB - 0.302RP$$

Where:

- Y = Investment decision making
- MC = Mental accounting
- OC = Overconfidence
- RAB = Regret Aversion Bias
- RP = Risk Perception

This shows that there is an influence between mental accounting, overconfidence, regret aversion bias, risk perception in investment decision making.

Table 8. Research Results

Hypotheses	Hypothesis Statement	Sig n.	Information
H1	Regress aversion bias affects investment decision making	0.223	Not significant
H2	Overconfidence affects investment decision making	0.041	Significant

H3	Mental accounting affects investment decision making	0.5 42	Not significant
H4	Risk perception affects investment decision making	0.0 41	Significant

When viewed theoretically, aversion regret bias causes the decision to avoid the same mistakes because of the fear of facing losses in the future. The result of this research shows that the regret aversion bias significance is 0.223. This result means that regret aversion bias has no significant effect on investment decision-making. This result is in accordance with the research of [19] which in their research suggests that experienced regret does not significantly influence investment decision making. Different from the results of [10], this is possible because of the different types of investment choices made. Respondents in research conducted by [10] are investors who have investments in stocks that have high-risk characteristics so that the impact of regret experienced will also be high. Respondents in this study are respondents who have good investments with high or low risks. Most invested in the highest real asset is a land investment that has a relatively low level of risk. Therefore, the level of regression experienced by investors also tends to be low, so regret does not affect investment decision-makers.

It is known that the significance of overconfidence is 0.001 which means that overconfidence influences investment decisions significantly. The results of this study support the opinion of [5] who said that overconfidence causes a person to misinterpret the accuracy of the information and become too confident in the ability to analyze the information. The results of this study are different from previous studies, according to [19] that the overconfidence has a significant level of 0.373, meaning that overconfidence has no significant effect on investment decision making. This difference of opinion can be due to different respondents. Respondents in this study are workers/entrepreneurs who already have income. Workers who become respondents, despite having a fundamental knowledge of knowledge, but not all have a high level of financial knowledge. This is what makes respondents tend to rely on intuition and confidence to invest in the selected.

Mental accounting shows the significance level of 0.542 results is greater than 0.05, which means that the hypotheses in this study mental accounting have no significant effect on investment decisions. According to [5] explains that investors who have mental accounting in decision making when transacting are investors who consider the cost and benefits of the decisions taken. The cause of mental

accounting becomes insignificant can occur because most respondents who researched prefer real investment, so when spending cost, then the results obtained will tend to be in accordance with expectations. In addition, in Indonesia people lack of education and habituation to manage and sort out their finances.

Risk perception has a significant level of 0.041, meaning that risk perception has a significant effect on investment decision-making. The results of this study support research conducted by [20] which states that risk perception has a significant effect on investment decision making. When viewed from the relationship between perceptions of risk to investment decision making, research conducted by [20] has a negative correlation. That is, the higher the perception of risk, the lower the investment intentions of an investor. The results of the correlation prove that in making a decision a person is not necessarily in accordance with what he perceived. If someone has a high-risk perception of an activity should be likely to have a cautious attitude. A person tends to define a risky situation in case of a loss due to a bad decision, especially if the loss affects the financial situation.

Table 9. F Test Result

	<i>Model</i>	<i>Sum of Squares</i>	<i>Df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
1	<i>Regression</i>	38,504	4	9.626	5.035	0.001 ^a
	<i>Residual</i>	181,606	95	1.912		
	<i>Total</i>	220,110	99			

a. Predictors: (Constant), Risk Perception, Regret Aversion Bias, Overconfidence, Mental Accounting

b. Dependent Variable: Investment Decision Making

Based on Table 9 above, F test results statistics show a value of 5.035 with a significance of 0.001. The significant value of F is less than 0.05, thus Ho is not supported and Ha is supported. This means that simultaneous testing shows that aversion bias regression, overconfidence, mental accounting, and risk perception together have a significant determinant of investment decision making.

V. CONCLUSION, LIMITATION, AND RECOMMENDATION

According to the results of the analysis conducted by researchers, the conclusions that can be obtained by researchers are as follows:

Aversion bias does not significantly affect investment decision-making. This result is in accordance with the research of [19] which in his research suggests that experienced regret does not significantly influence investment decision making.

Overconfidence significantly affects investment decision-making. The results of this study support the opinion of [5] who said that overconfidence causes a person to misinterpret the accuracy of the

information and become too confident in the ability to analyze the information. The results of this study are different from previous research from the reference journal, according to [20] that the overconfidence has a significant level of 0.373, meaning that overconfidence has no significant effect on investment decision making.

Mental accounting does not significantly affect investment decision-making. This study contradicts [5], who explains that investors who have mental accounting in decision making when transacting are investors who consider the cost and benefit of the decisions taken.

Risk perception significantly affects investment decision-making. The results of this study support research conducted by [20] which states that risk perception has a significant effect on investment decision making.

Regression aversion bias, overconfidence, mental accounting, and risk perception together have a significant determination to investment decision making. These variables have the determinant coefficient (R²) obtained at 0.140. This means 14% variation of investment decision variables can be explained by aversion bias regression variable, overconfidence, mental accounting, and risk perception while the rest equal to 86% explained by other variables not proposed in the research.

The limitations of this study are limited research variables on aversion bias regression, mental accounting, overconfidence, and risk perception, so it is advisable for further research to add other research variables such as herding and gambler's fallacy which is a psychological factor that influences investment decision making [21]. The number of respondents who are still very limited and the responses of respondents on the research questionnaire have not been consistent also become obstacles in this research. It is advisable to classify the risk between real assets and financial assets because the risk characteristics of each asset are fundamentally different, so it will get more precise results.

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