The influence of risk perception, risk tolerance, overconfidence, and loss aversion towards investment decision making

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A B S T R A C T

This study aims to examine the effect of risk perception, risk tolerance, overconfidence, and loss aversion on investment decision making. The sample in this study were workers in Surabaya and Jombang, East Java. There were 400 respondents taken using a questionnaire through the survey method. This study used PLS-SEM (Partial Least Square-Structural Equation Model) as a data analysis technique. The results showed that risk perception has a significant and negative effect on investment decision making, risk tolerance and overconfidence have a significant and positive effect on investment decision making, while loss aversion has no effect on investment decision making. This research is expected to provide an overview of how to deal with risk in investment and how to avoid behavioral biases in investment decisions making.

A B S T R A K


1. INTRODUCTION

The rapid development of technology currently affects the economy and has an impact on the industrial sector. There are so many products offered online that a buyer can get easily and quickly without having to go to the store supplying the products. This results in increasing human unlimited needs and desires. The increased desire, due to technological advances, may cause a person's income to be no longer able to cover the expenses. In order to be able to overcome this problem, it is important for people to manage their finance well. One of the efforts that can be done is by meeting their needs and desires, other than their fixed income that is by investment. Investment decision is a process of fund allocation for having a low risk assets such as savings and deposits, and high risk assets such as real estate and gold (Ariani et al., 2016) or stocks (Barber & Odean, 2001; Keller & Siegrist, 2006).

In reality, one’s investment decision is not always based on rational considerations, but can also be irrational aspects that are related to his psychology or often known as financial behavior. Financial behavior is divided into two main groups, namely cognitive psychology and limit of atbirth (Ritter, 2003). Cognitive psychology deals with how one thinks. There is a variety of evidence that shows that cognitive bias causes inappropriate decisions (Busenitz & Barney, 1997; Hilbert, 2012). Cognitive

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bias may lead to a person to overestimate risk (Simon, Houghton, & Aquino, 2000).

When making an investment decision, every investor is faced with a trade-off between expected return and risk. Therefore, an investor’s perspective on risk can influence his investment decisions (Nofsinger, 2017; Pompian, 2012). One bias that affects investment decisions is the perception of risk. Someone with a high risk perception may consider a low risk investment alternative to have a higher risk, while someone with a low risk perception may deem a high risk asset to have a lower risk. For that reason, an investor with a high risk perception tends to choose fund allocation in low risk assets, while someone with a low risk perception tends to be more willing to allocate funds to high-risk assets (Broihanne, Merli, & Roger, 2014; Weber & Milliman, 1997).

An investor’s investment decisions can also be influenced by the level of tolerance to risk. Risk tolerance is an attitude shown by investors when assessing a risk. Risks in this case relate to uncertainty over the investment returns. Investors who are willing to accept or tolerate risk tend to be brave in allocating funds to high-risk assets, and vice versa (Corter & Chen, 2006). Overconfidence is another behavioral bias factor that can influence decision making. Overconfidence is a belief in judgment, cognitive ability, rational reasoning and intellectuality in which a person exaggerates his ability to predict and accuracy of information owned (Pompian, 2012).

An overconfidence investor tends to underestimate risk and this may lead to sub-optimal asset allocation (Dittrich, Güth, & Maciejovsky, 2005). Therefore, this investor will tend to allocate funds to high-risk assets such as property and stocks, while a less overconfidence investor will allocate more of his funds in low-risk assets. The last behavioral bias factor that can influence investment decision making is loss aversion. Loss aversion is a feeling of being more confident to be able to avoid a loss than to get some gains. Loss aversion affects the level of risk of one’s risk (Thaler, Tversky, Kahneman, & Schwartz, 1997). Someone tends to reject the excessive loss so that he also tends to focus on avoiding the loss but getting the profit (Pompian, 2012). Someone tends to overreact losses, so in terms of investing he is more focused on avoiding losses than looking for profits.

This research was conducted in two regions in East Java, Indonesia, namely Surabaya and Jombang. The city of Surabaya is known as a representation of the Metropolitan City with a modern society, while Jombang Regency is a representation of a suburban city, known as the City that still largely adheres to traditional culture. Looking at these two cities, and based on the phenomena that occur in the community, the researchers decided to examine the effect of risk perception, risk tolerance, overconfidence and loss aversion on investment decision making.

2. THEORETICAL FRAMEWORK AND HYPOTHESIS

Investment Decision

Investment is a commitment to placing funds or other resources for a certain period of time in the hope of obtaining benefits in the future. Investments are related to investing funds in various alternative of assets, both real assets and financial assets (Bodie, Kane, & Marcus, 2018). The form of real assets that can be used as the purpose of placement of funds are land, buildings, machinery, and even commodities such as gold. The form of investment in financial assets are bank accounts (savings and deposits), bonds, mutual funds, and shares. In the case of Indonesia, the most preferred financial asset investment is the placement of funds in the bank account, which is 63.6 percent in 2016 (Financial Service Authority). This figure is far higher than investment in the capital market in the form of shares, mutual funds, and bonds, which are 1.2 percent, 0.2 percent and 0.1 percent respectively, and gold which is 0.5 percent for the same year.

Most all types of investments have uncertainty or risk. There is a positive relationship between the level of expected return and risk. When someone expects a high level of return, he must be willing to bear a high level of return uncertainty. Bank placements in the form of savings and deposits are relatively safe investments because it is unlikely that the bank cannot provide interest or profit sharing as promised as well as principal repayment, and if the bank goes bankrupt the Deposit Insurance Corporation will bear the refund for deposits up to Rp.2 billion. Investment in stocks is a form of investment that has the highest risk but also provides the highest level of expected return (Keller & Siegrist, 2006). Investments in bonds and real estate have medium risk based on the standard deviation of return on investment (Eichholtz, 1996).

Knowing that the risks and profit levels of investments vary, it is important for investors to see the factors in investment, related to asset allocation. Asset allocation is related to the decision process on how to allocate funds to various asset classes. An asset class has the same characteristics, attributes,
and relationships between risk and return level (Reilly & Brown, 2011). The asset allocation strategy depends on investment objectives, investment constraints, and the investor's attitude to risk. Therefore, making investment decisions effectively can be done by choosing an investment instrument that is suitable for the objectives associated with the level of expected benefits, time period, and risks that exist.

**Risk Perception and Investment Decision**

Perception is an aspect of the mind process through the senses such as seeing, hearing, and feeling, influenced by information, and then these senses influence judgment. Someone who receives information can use it to develop a picture of the results of that information (Rogers, 2017). Risk perception is a way for someone to interpret risks that are different from estimates or thoughts and reality. Risk perception is a part of cognitive bias. The higher the bias in a person's behavior, the lower the person's perception of risk (Simon et al., 2000). Perception of risk plays an important role in human behavior, especially related to decision making in uncertain circumstances (Forlani & Mullins, 2000). Someone tends to define a situation to be risky if he experiences a loss due to a bad decision made, especially if the loss has an impact on its financial condition. Therefore, risk perception is a person's judgment on a risky condition that is highly dependent on the psychological characteristics and condition of the person (Wulandari & Iramani, 2014).

Perception of risk influences investment decisions (Antonides & Van Der Sar, 1990; Hoffmann, Post, & Pennings, 2015; Nguyen, Gallery, & Newton, 2016; Weber, Siebenmorgen, & Weber, 2005). The higher a person's perception of risk, the more the person avoid allocating funds to high-risk assets and prefer low risk assets (Hariharan, Chapman, & Domian, 2000). Investors with a lower risk perception tend to choose to invest in high-risk stocks, compared to deposits with low risk (Aren & Zengin, 2016; Keller & Siegrist, 2006).

**Hypothesis 1:** The higher the risk perception, the smaller the proportion of funds invested in high-risk assets.

**Risk Tolerance and Investment Decision**

Risk tolerance is the level of one's willingness to accept risks from investments. It also means the way a person responds to and takes action regarding risks in an investment. It is possible for investors to like risk, avoid risk, or do not even care about the risk (Wulandari & Iramani, 2014). According to risk tolerance level, a person can be grouped into risk-seeker, neutral to risk, and risk averter.

Risk tolerance can help a person to understand the level of risk from investment and help someone to be able to tolerate and harmonize existing risks to suit the investment objectives so that the risk that someone has been willing to accept will be in accordance with the rate of return that will be received in the future. Risk tolerance influences investors' decisions in choosing investment alternatives (Pak & Mahmood, 2015; Snelbecker, Roszkowski, & Cutler, 1990). Someone with high risk tolerance tends to be brave to invest in high-risk assets, while someone with low risk tolerance has a tendency to avoid high-risk assets (Corter & Chen, 2006; Nguyen et al., 2016; Pompian, 2012). However, a person with high risk tolerance approaching retirement does not reduce investment in low-risk assets, such as bonds, to be transferred to high-risk assets such as stocks (Hariharan et al., 2000).

**Hypothesis 2:** The higher the risk tolerance, the greater the proportion of funds invested in high-risk assets.

**Overconfidence and Investment Decision**

One aspect of behavioral bias that has received the most attention from researchers in the financial sector is overconfidence (Barber & Odean, 2001; Dittrich et al., 2005; Gervais, Heaton, & Odean, 2011; Glaser & Weber, 2007; Malmendier & Tate, 2005). Overconfidence is an unreasonable belief based on heart prompting, self-assessment, and excessive cognitive ability. Overconfidence makes someone feel smarter and has better information so that when the person predicts an event that he thinks is certain, often the reality is less than expected (Pompian, 2012).

Overconfidence is also considered an overestimation of one's abilities, performance and chances of success. Overconfidence as a belief of better judgment than others (overplacement), as well as excessive certainty regarding the accuracy of one's beliefs (overprecision) (Moore and Healy, 2008). Someone who is overconfident will tend to over-ride the information obtained because he is too confident in his own beliefs, too confident, and trusting in his views and knowledge so that other information that is actually related is important to be ignored. The negative impact of overconfidence is to make someone make a more extreme decision than they should do (Pikulina, Renneboog, & Tobler, 2017; Zacharakis & Shepherd, 2001). Over-
confidence investors believe that they will get a high level of profit and low risk when investing, even though this cannot be guaranteed and does not necessarily happen.

Empirical evidence shows that investors who overconfidence make too many stock transactions (Chu, Im, & Jang, 2012; Glaser & Weber, 2007; Palomino & Sadrieh, 2011; Statman, Thorley, & Vorkink, 2006) and this has a negative impact on the level of returns obtained (Barber & Odean, 2000, 2001). Overconfidence encourages someone to prefer risk (McCannon, Asaad, & Wilson, 2016). Someone with a high degree of overconfidence tends to be more courageous in making investment decisions and allocating funds to high risk assets because of the very supportive level of confidence (Breuer, Riesener, & Salzmann, 2014; Dittrich et al., 2005), although the end the results of the investment is less than expected. Overconfidence investors tend to realize profits too quickly and to retain stocks that suffer losses because acknowledging losses is a shame (Chen, Kim, Nofsinger, & Rui, 2007; Chu et al., 2012). Overconfidence has a positive effect on participation in stock investments that have high risk characteristics (Xia, Wang, & Li, 2014). Someone who overconfidence invests more in Real Estate Investment Trusts (Eichholtz & Yönder, 2015).

Hypothesis 3: The higher the overconfidence, the greater the proportion of funds invested in high-risk assets.

Figure 1
Research Framework

3. RESEARCH METHODOLOGY
Sample and Sampling Technique
The research sample was the residents of Surabaya and Jombang. The sampling technique in this study was convenience sampling and purposive sampling. Convenience sampling is a sampling method where research objects are easily accessible. Purposive sampling is a sampling method based on criteria that are related to the research objectives. The criteria for the sample used are residents who live in Surabaya and Jombang, East Java, Indonesia, for a minimum of 3 years and have worked in there. There were 400 respondents of this study, devided proportionally between the two regions. This study used primary data, taken using questionnaires obtained directly through field surveys. This study aims to explain the relationship of cause and effect of the variables studied and shows the direction of the relationship between independent variables and dependent variables.

Research Variables and Measurement
The variables used in this study are investment decision making as the dependent variable and risk perception, risk tolerance, overconfidence, and loss aversion as the independent variables.

1. Investment Decision Making. Investment decision making is a process of determining one's choice through setting goals, finding and evaluating information related to several alternative investment instruments. Investment decision making is measured using the proportion of fund allocation in low risk assets and high risk assets. Low risk assets is a type of investment instrument that has a low risk with a low rate of return, while high risk assets is a type of investment instrument that has a high risk with a high rate of return. The indicators used in measuring investment
od to control investment returns, and confidence in past successes (Chitra & Jayashree, 2014; Pan & Statman, 2012). The variable overconfidence is measured using a Likert scale from the statement that shows overconfidence with five response categories that start on a scale of 1 to 5, namely (1) Strongly Disagree (SD), (2) Disagree (D), (3) Neutral (N), (4) Agree (A), and (5) Strongly Agree (SA).

5. **Loss Aversion.** Loss aversion is a condition where a person is very risk-averse because he is reluctant to accept losses. Loss aversion is also a deviant behavior that is based on fear of loss which encourages excessive rejection of risks that can cause harm. The indicators used in measuring loss aversion variables are investment with definite losses, caution against losses, and investments with good performance history (Khan, 2017). The loss aversion variable is measured by a Likert scale from a statement that shows loss aversion with five response categories that start on a scale of 1 to 5, namely (1) Strongly Disagree (SD), (2) Disagree (D), (3) Neutral (N), (4) Agree (A), and (5) Strongly Agree (SA).

**Data Analysis Technique**

The statistical analysis used in this study was Partial Least Square (PLS) analysis using the Structural Equation Model (SEM) method and the WarpPLS 6.0 program. The PLS statistical test was done using the Structural Equation Model (SEM) method that is used to test the relationship between latent constructs in linear and nonlinear relationships with various forms of indicators.

**4. RESULTS AND DISCUSSION**

**Descriptive Analysis**

Table 1 presents an overview of the research response. Based on Table 1 in the domicile section, it can be explained that the number of the respondents domiciled in Surabaya is 200 people while the number of those living in Jombang is 200 people. This proportion shows a balanced number that is 50% between respondents domiciled in Surabaya and Jombang. Table 1 also shows that the number of male respondents are 208, while those of female are 192 people. This shows that male respondents are more than women, namely male are 52 percent and female are 48 percent.

Based on the age, the respondents aged ≤ 25 years are 52 people with a percentage of 13 percent, respondents aged > 25-40 years are 76 people with a percentage of 19 percent, while respondents aged > 40-55 years are 180 people with a percentage of 45 percent and respondents aged > 55-64 years are 92 people with a percentage of 23 percent. This pro-
portion shows that the highest respondents of 45% are in the aged >55-64 years. Based on their occupation, the respondents who are professionals (lawyers, doctors, company executives, entrepreneurs) are 32 people with a percentage of 8 percent. Respondents who are civil servants (government employees, policeman, and army) are 50 people with a percentage of 12 percent. Respondents who are private employees are 100 people with a percentage of 25 percent, while respondents who are state owned enterprise employees are 6 people with a percentage of 2 percent and respondents who are farmers or traders are 212 people with a percentage of 53 percent. This result is not surprising because most of Jombang residents are farmers and many Surabaya residents are traders.

Table 1
Respondent Characteristics

<table>
<thead>
<tr>
<th>No.</th>
<th>Domicile</th>
<th>No. of Respondent</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Surabaya</td>
<td>200</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>Jombang</td>
<td>200</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Gender</th>
<th>No. of Respondent</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>208</td>
<td>48</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>192</td>
<td>52</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Age</th>
<th>No. of Respondent</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>≤25 year</td>
<td>52</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>&gt;25–40 year</td>
<td>76</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>&gt;40–55 year</td>
<td>180</td>
<td>45</td>
</tr>
<tr>
<td>4</td>
<td>&gt;55–64 year</td>
<td>92</td>
<td>23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Occupation</th>
<th>No. of Respondent</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Professionals (Lawyer, Doctor, Executive, Entrepreneurs)</td>
<td>32</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Civil Servant</td>
<td>50</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>Private Company Employee</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>Satate Owned Company Employee</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Other (Farmer, Trader)</td>
<td>212</td>
<td>53</td>
</tr>
</tbody>
</table>

Table 2 shows the categories of investment decisions of respondents. The data in this table shows that as many as 292 respondents chose to invest in high risk assets and 108 respondents chose to invest in low risk assets. Therefore, most of the respondents chose to invest in high risk assets such as property, land, and gold, with a percentage of 73 percent.

Table 3 shows that the respondent’s response to the risk tolerance statement on average is neutral on the statements. This means that most respondents have moderate level of perception, namely having a perception of risks that are considered not so risky. They believe that assets they are selected to have good returns and performance. They believe that the value of assets will increases in the future. Table 3 shows that most respondents agree that investments that have a good history of past performance will get good results in the future. Respondents also agree that the assets they choose will experience price increases and have promising returns both in the medium and long term.

Table 2
Respondents Response towards Investment Decisions

<table>
<thead>
<tr>
<th></th>
<th>No. of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Risk Asset</td>
<td>292</td>
<td>73</td>
</tr>
<tr>
<td>Low Risk Asset</td>
<td>108</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table 3
Respondents Response towards Risk Perception

<table>
<thead>
<tr>
<th>Item</th>
<th>Statement</th>
<th>Respondent Response (%)</th>
<th>Mean</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP1</td>
<td>The investment that I choose is definitely right and will perform well</td>
<td>6.5 27.5 41.5 24.5 0.0</td>
<td>2.84</td>
<td>Moderate Risk Perception</td>
</tr>
<tr>
<td>RP2</td>
<td>The investment I choose has good performance and convincing results</td>
<td>11.0 24.0 42.5 22.5 0.0</td>
<td>2.77</td>
<td>Moderate Risk Perception</td>
</tr>
<tr>
<td>RP3</td>
<td>The investment that I choose will have a significant value increase in the future</td>
<td>15.0 25.5 41.0 18.5 0.0</td>
<td>2.63</td>
<td>Moderate Risk Perception</td>
</tr>
<tr>
<td>RP4</td>
<td>The investment I choose will perform well in line with my goals</td>
<td>13.0 32.5 39.5 15.0 0.0</td>
<td>2.57</td>
<td>Low Risk Tolerance</td>
</tr>
<tr>
<td>RP5</td>
<td>The investment that I choose will have a very good rate of return in the medium and long term</td>
<td>12.0 25.0 47.0 16.0 0.0</td>
<td>2.67</td>
<td>Moderate Risk Perception</td>
</tr>
<tr>
<td>Average Score of Risk Perception</td>
<td>2.69</td>
<td>Moderate Risk Perception</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4 presents the responses of respondents to risk tolerance. This table shows that there are 218 respondents who have very low risk tolerance, then there are 130 respondents who have low risk tolerance, there are 50 respondents who have high risk tolerance and 2 respondents who have very high risk tolerance. Table 4 also shows that most respondents have low risk tolerance. This means that respondents are more afraid of risk so that they tend to choose low risk assets. Respondents' responses were dominated by those who have very low risk tolerance, namely 54.5 percent.

Table 5 shows that the respondent's response to the statement of overconfidence is neutral. This means that the majority of respondents believe that their abilities and skills are similar to those of others. Respondents in general also feel that success in the allocation of funds in the past was not entirely due to special skills that they have are better than others. Respondents also feel that they are not fully able to control the decisions they have made. However, the majority of respondents believe in their allocation decisions and still have confidence of the investment performance in the future.

Table 6 shows that the respondent's response to the loss aversion statement. Most respondents feel very reluctant to accept losses, so they were very careful when allocating funds and avoiding assets that could potentially cause losses. Table 6 also shows that the more to the right, the greater the total percentage of respondents' answers, which means the higher the level of reluctance of respondents to losses. Respondents were increasingly afraid of losses. Most respondents were very careful about changes in market prices of an asset because they feel they really don't want to suffer losses.

Table 7 presents the results of structural model evaluations. This table explains that the R-Squared effect of risk perception, risk tolerance, overconfidence and loss aversion on investment decision making is equal to 0.76. This means that 76 percent of the variations that occur in investment decision making are influenced simultaneously by risk perception, risk tolerance, overconfidence and loss aversion, and the remaining 24 percent can be influenced by variables outside the model estimated by the researchers. Based on the results of R-Squared (R2) that is equal to 76 percent, it shows a good model because it has the value of R-Squared (R2) above 0.7.

Table 8 is the result of hypothesis testing using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the WarpPLS 6.0 program. This table shows the relationship of each variable which includes investment decisions, risk perception, risk tolerance, overconfidence, and loss aversion.

Influence of Risk Perception towards Investment Decision
The estimation results of the model on risk perception show that the first hypothesis is accepted. This
can be proven by the $\beta$ coefficient value indicated by the risk perception variable, which is negative with a significance level smaller than 0.01. This means that risk perception has a significant negative effect on investment decision making. This implies that if the higher the level of risk perception, the proportion of investment in high-risk assets will be lower.

**Table 4**

<table>
<thead>
<tr>
<th>Total Score</th>
<th>Total Respondent</th>
<th>Percent of Respondent</th>
<th>Risk Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 – 8</td>
<td>218</td>
<td>54.50</td>
<td>Risk Tolerance Sangat Rendah</td>
</tr>
<tr>
<td>9 – 12</td>
<td>130</td>
<td>32.50</td>
<td>Risk Tolerance Rendah</td>
</tr>
<tr>
<td>13 – 16</td>
<td>50</td>
<td>12.50</td>
<td>Risk Tolerance Tinggi</td>
</tr>
<tr>
<td>17 – 20</td>
<td>2</td>
<td>0.50</td>
<td>Risk Tolerance Sangat Tinggi</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>100.00</td>
<td></td>
</tr>
</tbody>
</table>

**Table 5**

<table>
<thead>
<tr>
<th>Item</th>
<th>Statement</th>
<th>Respondent Response (%)</th>
<th>Mean</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>OC1</td>
<td>I am sure that my ability is better than that of others to choose investment assets</td>
<td>0  24.5  40.5  31.5  3.5  3.14</td>
<td></td>
<td>Moderate Overconfidence</td>
</tr>
<tr>
<td>OC2</td>
<td>I am able to fully control the results of my investment decisions</td>
<td>0  14.0  46.5  33.5  6.0  3.32</td>
<td></td>
<td>Moderate Overconfidence</td>
</tr>
<tr>
<td>OC3</td>
<td>The success of my investment in the past was due to the unique expertise I have</td>
<td>0  11.5  50.0  31.0  7.5  3.35</td>
<td></td>
<td>Moderate Overconfidence</td>
</tr>
<tr>
<td>OC4</td>
<td>I am sure of the investment performance I make</td>
<td>0  1.0   25.0  43.0  31.0 4.04</td>
<td></td>
<td>High Overconfidence</td>
</tr>
<tr>
<td></td>
<td>Average Score of Overconfidence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.46</td>
<td></td>
</tr>
</tbody>
</table>

**Table 6**

<table>
<thead>
<tr>
<th>Item</th>
<th>Statement</th>
<th>Respondent Response (%)</th>
<th>Mean</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA1</td>
<td>I am careful about losses caused by changes in market prices</td>
<td>0.0  0.0  8.0  51.5  40.5 4.33</td>
<td></td>
<td>Very High Loss Aversion</td>
</tr>
<tr>
<td>LA2*</td>
<td>I am willing invest in an asset that shows a definite loss</td>
<td>15.5 38.0 18.0 24.5  4.0  2.64</td>
<td></td>
<td>Neutral Loss Aversion</td>
</tr>
<tr>
<td>LA3</td>
<td>I often invest in assets that have performed well in the past</td>
<td>0.0  0.0  8.0  50.5  41.5 4.34</td>
<td></td>
<td>Very High Loss Aversion</td>
</tr>
<tr>
<td>LA4*</td>
<td>I hope to benefit from an investment that has shown a loss</td>
<td>7.0  20.0 22.0 39.0  12.0 3.29</td>
<td></td>
<td>Neutral Loss Aversion</td>
</tr>
<tr>
<td></td>
<td>Average Score of Loss Aversion</td>
<td></td>
<td>3.65</td>
<td></td>
</tr>
</tbody>
</table>

* The scores are inverted due to negative statements

**Table 7**

<table>
<thead>
<tr>
<th>Model Evaluation</th>
<th>R-Squared ($R^2$)</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.76</td>
<td>Good Model</td>
</tr>
</tbody>
</table>

**Table 8**
Risk perception is a way for someone to interpret the risks that differ between estimates or thoughts and the reality that occurs. Perception has an important role on the risks that exist in each investment instrument related to human behavior when making decisions because perception is the first stage related to the reaction to risk. When knowing about the existence of a risk to an asset, of course what someone does is perceive or think about the level of risk. Based on the results of testing one hypothesis, it shows that risk perception has a significant negative effect on investment decision making. This means that if someone has a perception and thinks that the risk to an investment asset is dangerous or has a high risk, the person tends to avoid allocating funds to the asset and prefer to invest in low risk assets, such as savings and deposits. Conversely, if someone has a perception and thinks that the risk of an asset that is actually at high risk has a lower risk then that person will prefer to allocate funds to higher risk assets, such as investments in property and gold. The results of the study are in line with the research conducted by Nguyen et al. (2016), Aren and Zengin (2016), and Keller and Siegrist (2006) which shows that risk perception has a significant negative effect on the allocation of risk assets and (Hariharan et al., 2000) which provides evidence that positively influences the placement of funds in low risk assets.

### Influence of Risk Tolerance towards Investment Decision

The results of the model estimation in Table 8 for risk tolerance indicate that the second hypothesis is accepted. This can be proven by the β coefficient value shown by the risk tolerance variable, which is positive with a significance level smaller than 0.01. This means that risk tolerance has a significant positive effect on investment decision making. The higher the level of risk tolerance, the higher the level of investment decision making in high-risk assets.

Risk tolerance is the level of willingness to accept or tolerate risks. Risk tolerance is the second stage when dealing with risk, which is related to the way a person responds or acts to risk. This can be done by understanding the size of the risk in an asset to be selected, then someone will be able to decide on the risk opportunities that have been accepted so that they will be in accordance with the level of expected return in the future. Based on the results of testing the second hypothesis shows that risk tolerance has a significant positive effect on investment decision making. This means that the higher a person's level of tolerance for risk, the higher the possibility of allocating funds to assets at a higher risk.

Investors who have high risk tolerance are more willing to bear the risk of loss from an investment as long as the investment provides an opportunity to provide a higher level of profit. If an investor is afraid of risk, the investor might try as much as possible to minimize risk so that he would prefer to allocate funds to assets that are low in risk. Investors will align the form of investment chosen based on the investor's tolerance for risk. The results of this study are in accordance with the research conducted by Corter and Chen (2006) and Nguyen et al. (2016) which shows that risk tolerance has a significant positive effect on the allocation of risk assets.

### Influence of Overconfidence towards Investment Decision

The model estimation results for overconfidence indicate that the third hypothesis is accepted. This can be proven by the value of the β coefficient shown by the overconfidence variable which is positive with a significance level smaller than 0.01. This means that overconfidence has a significant positive influence on investment decision making. The higher the level of overconfidence, the higher the level of investment decision making on high-risk assets.

Overconfidence is a feeling where someone is too confident, optimistic and confident about the knowledge or information possessed.

Overconfidence causes a person to potentially receive a greater risk in making investment decisions because they tend to view the risk as low and
the excessive belief in his choice without further consideration. Based on the results of testing the third hypothesis shows that overconfidence has a significant positive effect on investment decision making. This means that the higher the level of confidence and confidence in a person, the higher the opportunity for the allocation of funds to high-risk assets, and vice versa.

An investor with a degree of self-confidence and excessive confidence may ignore information about an asset from another person and feel that whatever he has decided or done must be true based on his own abilities. The results of this study are in line with the previous research which shows that overconfidence encourages someone to participate in stock investment (Xia et al., 2014) and investment in real estate (Eichholtz & Yönder, 2015), where both types of assets have a greater risk than the placement of funds on a bank account.

Influence of Loss Aversion towards Investment Decision
The results of model estimation for loss aversion indicate that the fourth hypothesis is rejected. This can be seen from the \( \beta \) coefficient value indicated by the loss aversion variable, which is negative with a significance level of 0.11. This means that loss aversion has a non-significant negative influence on investment decision making. This means that a person's high and low loss aversion cannot influence someone regarding investment decisions to allocate funds to high-risk assets and low-risk assets.

The results of this study are not in accordance with previous research which shows that loss aversion has a significant negative effect in making investment decisions on high-risk assets (Arano et al., 2010; Berkelaar et al., 2004) and encourage investment in lower risk assets (Dimmock & Kouwenberg, 2010). This not significant effect of loss aversion can be caused by this study not analyzing by gender. Previous research shows that women have a higher level of loss aversion than men (Charness & Gneezy, 2012; Schmidt & Traub, 2002) and things cause women to invest less in high-risk assets (Charness & Gneezy, 2012; Olsen & Cox, 2001). In this study, the proportion of male and female respondents was relatively balanced, namely 48 percent and 52 percent, respectively. The inclusion of gender influences in the research model might explain insignificant results on the effect of risk aversion on investment decisions.

5. CONCLUSION, IMPLICATION, SUGGESTIONS, AND LIMITATIONS
Based on the results of the research, it can be concluded that risk perception has a significant and negative effect on investment decision making. This means that the higher the level of perception of a person's risk, the lower the opportunity for the person to allocate funds to high risk assets. This study shows that risk tolerance has a significant and positive effect on investment decision making. The higher a person's risk tolerance level, the higher the person's opportunity to allocate funds to high risk assets. This study also shows that overconfidence has a significant and positive effect on investment decision making. This means that the higher the level of confidence in a person, the higher the opportunity for the person to allocate funds to high risk assets. However, this study did not obtain sufficient evidence that loss aversion has an effect on investment decision making.

There are several limitations in this study. First, it did not include alternative investment options such as stocks, bonds and mutual funds. Second, this study did not separate the research model for each district, namely the Surabaya and Jombang, so that to in order to be able to analyze it, the researchers need also to analyze the specific characteristics of each district. Third, this study did not examines the effect of gender on investment decisions.

The community should pay attention to the possibility of behavioral bias to avoid and minimize irrational decision making. Therefore, it needs to be reconsidered when choosing investment assets. For investment advisors, it is expected that they can help to find out the characteristics of customers, especially related to risk, to know the possibility of behavioral bias that can be experienced by their customers, so that they can direct the customers properly when allocating their own funds. For future studies, the researchers should separate the research model based on region from gender because of the possibility of each group having different characteristics and adding alternative investment options other than savings, deposits, housing, land and gold.

REFERENCES


