Behavioral Biases on Investment Decision: A Case Study in Indonesia

by Kartini Kartini

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Abstract

A shift in perspective from standard finance to behavioral finance has taken place in the past two decades that explains how cognition and emotions are associated with financial decision making. This study aims to investigate the influence of various psychological factors on investment decision-making. The psychological factors that are investigated are differentiated into two aspects, cognitive and emotional aspects. From the cognitive aspect, we examine the influence of anchoring, representativeness, loss aversion, overconfidence, and optimism biases on investor decisions. Meanwhile, from the emotional aspect, the influence of herding behavior on investment decisions is analyzed. A quantitative approach is used based on a survey method and a snowball sampling that result in 165 questionnaires from individual investors in Yogyakarta. Further, we use the One-Sample t-test in testing all hypotheses. The research findings show that all of the variables, anchoring bias, representativeness bias, loss aversion bias, overconfidence bias, optimism bias, and herding behavior have a significant effect on investment decisions. This result emphasizes the influence of behavioral factors on investor's decisions. It contributes to the existing literature in understanding the dynamics of investor's behaviors and enhance the ability of investors in making more informed decision by reducing all potential biases.

Keywords: Behavioral Finance, Investment Decisions, Emotional Bias, Cognitive Bias

JEL Classification Code: G41, G11, D91, D81, F65

1. Introduction

Optimal portfolio investment as explained by Markowitz (1952) is focused on two things, (1) how to maximize investment returns at a given level of risk, or (2) minimizing risks at a certain level of return. In building a portfolio theory, Markowitz (1952) assumed that all investors are rational individuals in making a decision. Therefore, all the decisions made are expected to generate the highest utility possible through a variety of rational analysis processes.

Not only modern portfolio theory but also a range of other conventional finance theories, such as capital asset pricing model (CAPM) (Treynor, 1961; Sharpe, 1964; Lintner, 1965; Mossin, 1969) and efficient market hypothesis (EMH) (Fama, 1970) use the same assumptions, that investors are always rational.

Barberis and Thaler (2003) explained that rational behavior should cover two things. First, when investors receive new information, they will update their beliefs appropriately and accurately. Second, based on the new beliefs, the investors will make the right decisions consistent with the explanation of conventional finance theories. Hence, biases will not occur in an investment decision, as each individual is considered to have the capability of selecting the best alternatives among various options that are available, based on complete calculations, theories, concepts, and the right approaches.

A basic question put forward by a few theorists of behavioral finance, is "are investors always rational?" (Kahneman & Tversky, 1979; De Bondt & Thaler, 1985; Shefrin & Statman, 1985; Shiller, 1987). According to them, the assumption of investor rationality is not easily fulfilled,

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since investors make decisions when presented with alternatives that involve risk, probability, and uncertainty. People choose between different options (or prospects) and how they estimate (many times in a biased or incorrect way) the perceived likelihood of each of these options. They also state that financial decision-makers not only involve logical and rational considerations, but also psychological aspects that are at times irrational, involving intuition. Hence, it may deviate from the rationality assumption.

Behavioral Economics is the study of psychology as it relates to the economic decision-making processes of individuals and institutions. Behavioral economics reveals systematic deviations from rationality exposed by investors. Individuals are victims of their cognitive biases that lead to the existence of financial market inefficiencies and anomalies (Al-Mansour, 2020). Literally, decision making is a process of selecting the best alternative from a number of possible options available in complex situations (Hirschey & Nofsinger, 2008). The complexity of it then makes the investor simplify decision-making in drawing the right conclusions (Shefrin, 2007). Therefore, the information acquired and the level of investor ability to process the information is highly affected by the quality of the decisions made. Further, Shefrin (2007) stated that a range of behavioral bias practices or irrational behavior is mainly caused by investor's limited ability to analyze information and the emotional factor in decision making.

The concept of behavioral finance has arisen from the assumption that human beings as social as well as intellectual creatures involve mind and emotion in decision making. According to Hirschey and Nofsinger (2008), behavioral finance is defined as *"A study of cognitive errors and emotions in financial decisions"*. They explained that the concept of behavioral finance is a study of financial decision-making caused by emotional and cognitive factors. Pompian (2006) divided decision-making biases into two categories – cognitive and emotional biases. The former is a bias that is associated with the thought process, while the latter is associated with feelings and emotions. Asri (2013) classified cognitive bias into 3 groups as suggested by Shefrin (2000):

a. The bias of simplifying decision-making processes by using rules of thumb is known as heuristic bias. Heuristics are commonly defined as cognitive shortcuts or rules of thumb that simplify decisions, especially under conditions of uncertainty. This group comprises availability, hindsight, and representativeness biases.
b. The bias of reaction to information based on the information's frameworks is called a framing effect. The framing effect is a cognitive bias where people decide on options based on whether the options are presented with positive or negative connotations;

as a loss or as a gain. Framing bias occurs when people make a decision based on the way the information is presented, as opposed to just on the facts themselves. The same facts presented in two different ways can lead to people making different judgments or decisions. Framing is as important as a substance that was previously ignored by traditional finance. This group consists of overreaction, conservatism, anchoring, and confirmation biases.
c. The bias of understanding information and self-adjusting to the market price is known as prior bias. The prior bias, heuristic bias, and framing effect, will at last cause prices to deviate from their fundamental value, thus the market will be inefficient. This group includes optimism, overconfidence, and mental accounting biases.

Sha and Ismail (2020) explained that investors make decisions based on the available information, and the issue is related to how they build their perception of that information. In this context, the investors should be aware of the different types of cognitive biases that may lead them to a much better or worst position. They found that the investors are influenced by different cognitive biases and it depends on the gender of the investor.

Based on previous research findings and phenomena, this research makes a further investigation about the influence of biases, both cognitive and emotional, on investment decision making. Shefrin (2002) described that behavioral finance is not a science to defeat the market. The most important part of this concept is the recognition of the existing risk from an investor sentiment or the risk that arises due to psychological factors that are sometimes larger than the fundamental risk.

This study was corroborated by Kartini and Nuris (2015) who stated that the various biases that occur can be detrimental, as it can lead to a risk miscalculation that may occur. Besides, such biases are also difficult to control because they are invisible and directly linked to thought processes involving emotions or feelings. Despite the controlling difficulty, Olsen (1998) warned that the main purpose of behavioral finance is understanding the influence of psychological factors systematically in the financial market so that each individual will be more prudent in decision making.

This research attempts to investigate the influence of various psychological factors on investment decision-making. The psychological factors to be investigated are differentiated into two aspects as explained by Pompian (2006), cognitive and emotional aspects. Accordingly, this study examines the influence of anchoring, representativeness, loss aversion, overconfidence, and optimism biases on investor decisions. Meanwhile, the latter aspect to be examined is the influence of herding behavior on investment decisions.

2. Literature Review

2.1. Investment Decision

Investment decisions are the process of choosing investment from various alternatives that are commonly affected by the past investment's returns and the expected returns in the future (Subash, 2012). There are two kinds of investors in making investment decisions, rational investor and irrational investor. Rational investors are those who make a decision merely based on logical thinking and information about the investment prospect. While irrational investors decide based on their psychological aspect which creates biases in investment decisions.

2.2. Prospect Theory

Prospect theory is proposed by Kahneman and Tversky (1979). In general, it explains how investors make decisions under certain risks. According to them, individuals assess their loss and gain perspectives asymmetrically. Thus, contrary to the expected utility theory (which models the decision that perfectly rational agents would make), prospect theory aims to describe the actual behavior of people. They found that losses hurt about twice as much as gains make us feel good. That is people feel the pain of loss twice as strongly as they feel pleasure at an equal gain. The thought that the pain of losing is psychologically about twice as powerful as the pleasure of gaining is known as loss aversion. The other implication of prospect theory is people tend to take larger risks to avoid losses, rather than take risks to earn profits. To put it another way, investors will be inclined to be risk-averse, when coming across profits and switch to be risk-takers when perceiving losses. This finding contrasts with the expected utility theory from Markowitz (1952) who stated that a rational investor will exhibit consistent behavior, whether he/she is a risk-averse or a risk-taker under any circumstances.

2.3. Heuristic Theory

The term heuristic was introduced by Tversky and Kahneman (1974) who described that the decisions made amid complexities and conditions of uncertainty are mostly based on the beliefs concerning the likelihood of uncertain events. Uncertainty in events is uncertainty regarding either the occurrence of an event. These beliefs then form a heuristic way of thinking, by which people tend to use rules of thumb to simplify the decision-making processes. This view was strengthened by De Bondt et al. (2008) that individuals (investors) have a bias in their belief that will affect how they think and make decisions. Fromlet (2001) defined heuristics as "the use of experience and practical

efforts" that is an effort to interpret information quickly by relying on experiences accompanied by intuition. It explains how individuals or groups make decisions under conditions of uncertainty. Investors frequently make mistakes in decision making because they use rules of thumb as a basis in processing the information. On the one hand, a heuristic approach can facilitate faster decision making. This approach may result in biases or errors that occur systematically. Tversky and Kahneman (1974) classified heuristic bias into 3 types - representativeness, availability, and anchoring biases that will be investigated in this study.

2.4. Framing Theory

The subsequent discussion of cognitive bias after heuristics dealing is framing. According to Frensidy (2016), traditional finance assumes that framing is transparent. Meanwhile, behaviorists think of it differently, many frames are not so transparent that investors have difficulty seeing it clearly. Consequently, the decisions made will be highly dependent on how the information is framed or presented. Based on the previous experiment, Frensidy (2016) described someone (suppose called Budi), in a different way by using the same information on two separate groups, group A and B. In group A, Budi is said to be a smart, diligent, impulsive, critical, stubborn, and jealous person, whereas, in group B, Budi is described as a jealous, stubborn, critical, impulsive, diligent, and smart person. The same characteristics about Budi but presented in reverse order turn out to significantly influence the groups' assessment results. The experiment results reveal that the characteristics mentioned earlier have more influence than those mentioned later. Group A significantly asses Budi better than group B do. He argued that there are two reasons which explain such phenomena. First, one's concentration level may decrease with the increasing amount of information to be absorbed, so that the information placed behind gets less attention. Second, first impressions usually receive more weight than the information that comes after. These two things then lead to anchoring bias to occur.

3. Hypotheses Development

3.1. Anchoring Bias and Investment Decisions

According to Tversky and Kahneman (1974), anchoring bias occurs when people rely too much on pre-existing information or the first information they find when making decisions (anchor). Then, adjustment is made on such perception. Investors who are affected by this bias tend to underlie their investment decisions on one certain information, regardless of whether the information is first acquired, or it is the only information available which made

people highly rely on it. Ackert and Deaves (2009) defined overconfidence as the tendency of a person to overestimate knowledge, ability, and the accuracy of the information that an investor possesses, or the tendency to become too optimistic about the future and ability. Such an investor must be wary of anchoring bias. Despite the different information available, people tend to be inclined to the first-owned information in making a decision.

Many investors in the capital market experience anchoring bias that most of them continue to remember the buying price of shares in their portfolio. The selling decision is frequently based on the buying price as the reference point. Investors decide to sell their shares sooner when the price is above the reference point. Besides buying price, the highest price of shares that has ever been achieved during a certain period also frequently become reference price. Yet, many investors are not willing to cut loss cause they refer to such reference prices (Frensidy, 2016). Thus, a hypothesis is proposed as follows:

H1: Anchoring bias will affect investment decisions.

3.2. Representativeness Bias and Investment Decisions

Representativeness bias is someone's tendency to make decisions based on certain stereotypes or prior knowledge or experiences. Representativeness bias happens when people make decisions only by limited observations to acquire information from the surrounding environment and ignore other information (Baker & Nofsinger, 2002; Ritter, 2003; Shefrin, 2000). Representativeness bias tends to lead investors to overreact during processing information in making decisions (Kahneman & Riepe, 1998). It is supported by the findings of Franses (2007) and Marsden et al. (2008) who revealed that the representativeness bias can cause over-reaction behavior to occur as reflected in the stock prices. On the other hand, investors who are affected by this bias can also ignore or not pay close attention to important events that may happen in the future. Hence, they do not protect themselves from such unexpected events (Yoong, 2010).

Representativeness bias can lead someone to make a wrong conclusion. Higher-priced products are often decided with higher quality than lower-priced ones, although there is a likelihood that prices do not always reflect quality. Chen et al. (2007) explained that the common stereotypes in the capital market are investors tend to interpret the good characteristics of a company, such as product quality, reliable managers, and high growth as the characteristics of the company that has a worthwhile investment.

The other error of representativeness bias that often occurs in the financial market as described by Frensidy (2016) is the assumption that past performance is the best indicator to predict future performance. In other words, investors often believe that past rates of return represent future expected return. If a company announces successive profit increases, investors will assume that it will continue to rise and consider this company a good company, which means good investment. Therefore, investors expect higher returns for past winners' stocks and use this trend as a stereotype for future stock movements (Lakonishok et al., 1994; Ackert & Deaves, 2010). Thus, based on the explanations and reviews on earlier studies, a hypothesis is proposed as follows:

H2: Representativeness bias will affect investment decisions.

3.3. Loss Aversion and Investment Decisions

According to Pompian (2006), loss aversion is the tendency to prefer avoiding losses to acquiring equivalent gains. Loss aversion is a tendency where investors are so fearful of losses that they focus on trying to avoid a loss more so than on making gains. The more one experiences losses, the more likely they are to become prone to loss aversion. Research on loss aversion shows that investors feel the pain of a loss more than twice as strongly as they feel the enjoyment of making a profit. The concept of loss aversion has emerged as an implication of prospect theory that investors are not risk-averse, but loss averse. Such a thing occurs because the psychological impacts of losses are greater than those of profits. To put it another way, investors tend to feel more stressed by potential losses in comparison to potential gains with an equivalent value. Therefore, they will be more prudent in investment to reduce the risk of losses (Barberis & Thaler, 2003).

H3: Loss aversion bias will affect investment decisions.

3.4. Overconfidence Bias and Investment Decisions

Another behavioral bias that is also often found among investors is overconfidence. Overconfidence bias means that the individual is outrightly confident of his decisions and he overestimates or exaggerates his ability to perform a task. Decision-makers incline to overestimate the knowledge and information that they possessed, also ignore the public information available. The investors with overconfidence bias override models and data because they convince themselves that they know better. They may not always know better, and by ignoring the early signs of potential damage, they cause themselves more harm than good. (Lichtenstein & Fischhoff, 1977). Baker and Nofsinger (2002) defined overconfidence as a form of excessive self-confidence that

the information owned can be utilized properly because of having good analytical skills. In fact, this is only an illusion of belief, due to lack of experience and having a shortcoming in interpreting available information.

In short, overconfidence is a condition in which investors believe and consider their abilities are above the average of other investors and have an unrealistic level of self-evaluation (Odean, 1999; Pompian, 2006). Frischhoff et al. (1977) asserted that in an uncertain world of investment, investors are inclined to make overconfident decisions. Those who are overconfident usually think that they know more than they do, so they tend to believe that they are better or smarter than others (Shiller, 2000). When the number of market participants who are overconfident is large, then the aggregate reactions that occur in the market will be far from being ration8al.

According to Frensidy (2016), an individual's inclination to be overconfident may be caused by two things. First, except for those who are depressed, everyone positively judges themselves. Second, psychologically, people want to control the situation and their surroundings and believe that they can do that. Further, he revealed that there are four financial implications of this bias. First, investors can take the wrong position in buying and selling shares because they fail to realize that they do not have the advantage of information or analysis. Second, investors are inclined to trade more frequently which results in higher transaction costs. Third, overconfident investors are inclined to set prediction intervals that are too narrow. Finally, overconfident investors will be surprised more often than expected.

A handful of studies have been conducted to investigate the influence of overconfidence bias on the financial market. Overconfidence behavior unconsciously influences investors to do excessive trading (Benos, 1998; Daniel et al., 1998; Graham et al., 2005; Odean, 1999; Pompian, 2006; Toma, 2015; Ullah et al., 2017). Besides affecting the frequency of transactions, overconfidence bias also affects trading volume. The higher the overconfident level, the greater the volume traded (Statman et al., 2003). These results indicate a positive influence of overconfidence bias towards investment decision making. Besides, Bakar and Yi (2016) also revealed that the level of overconfidence that occurs also depends on individual gender.

Those research findings are in line with Pompian (2006) who found that the belief of overconfidence in skills can cause mistakes in decision making that make investors trade excessively. The overconfident investor also tends to overestimate investment returns and underestimate risks. If the actual return is lower than the expected return, they will associate it with an unfortunate condition (Miller, 1975). Overall, these various factors will have a positive impact on investment decisions.

H4: Overconfidence bias will affect investment decisions.

3.5. Optimism Bias and Investment Decisions

Optimism bias often relates to overconfidence bias. Nofsinger (2005) explained that both overconfidence and optimism biases are caused by the same psychological factors – an illusion of knowledge and illusion of control. The former is a condition in which an individual feel highly confident with the information they possessed. It affects his/her belief in the chance level of success that may be achieved. Such belief then leads to perceived control over the results to be gained (the illusion of control). The illusion of control is the tendency for people to overestimate their ability to control events; for example, it occurs when someone feels a sense of control over outcomes that they demonstrably do not influence. Thus, control illusions are defined as a situation in which people frequently believe that they have influenced the results obtained from an uncontrolled event. When an illusion of knowledge and illusion of control evolve further, there will appear as excessive optimism (Shefrin, 2007).

Shefrin (2007) defined optimism bias as one who inclines to overestimate success (the likelihood of obtaining results as desired) and underestimating the risk of failure. Further, optimism bias is an investor's expectation or belief that their portfolio performance will always generate a positive return (Hoffmann et al., 2013). The important thing from this bias is that there is a likelihood that investors make investment decisions excessively. The higher level of optimism bias that occurred, the higher investor's expectation of their portfolio performance. This positive expectation then spurs them to increase the frequency and volume of trading, even though there is a high probability that the actual may deviate from the expectations (Pompian, 2006). Khan et al., (2017) and Ullah et al. (2017) found a relationship between past portfolio yields and the level of investor optimism that had an impact on investment decisions.

H5: Optimism bias will affect investment decisions.

3.6. Herding Behavior and Investment Decisions

Banerjee (1992) and Hirshleifer and Teoh (2003) explained herding behavior as a people behavior that tends to follow the actions of other people rather than following their owned-beliefs or owned-information in the making decision. This behavior is considered irrational behavior as investors decide based on other's decisions in the market (Altman, 2012). Herding behavior is often found among investors in emerging markets and mostly occurred during market stress situations (Rahayu et al., 2020). According to Humra (2014), herding behavior occurs when a group of investors make investment decisions based on collective information from a group of investors and ignore other information. As a result, when the group majority makes a wrong decision, it will turn to significant market price deviations.

The finding of Chang et al. (2000) showed that herding practices are more prevalent in developing countries, which then is supported by Chiang and Zheng (2010) and Zheng et al. (2017) concerning the herding practices in Asian stock exchanges (China, South Korea, Singapore, Malaysia, and Indonesia). Herd mentality bias refers to investors' tendency to follow and copy what other investors are doing. They are largely influenced by emotion and instinct, rather than by their own independent analysis. In Indonesia, the research findings related to herding behavior are still contradictive, even though they are tested by the same methods. Sari (2012), and Purba and Faradynawati (2012) revealed there had been herding practices in Indonesia, whereas Narasanto (2012) did not find herding practices. Furthermore, Bowe and Domuta (2004), using the Lakonishok et al. (1992) method, found that herding behavior in the Indonesian Stock Exchange was mostly dominated by foreign investors.

H6: Herding behavior will affect investment decisions.

4. Methodology

The population of this study is investors over the age of 17 years and based in Yogyakarta and based on random sampling that results in 165 respondents. To determine the sample size, we use the Slovin formula. It provides the sample size (n) using the known population size (N) and the acceptable error value (e). Slovin's formula gives the researcher an idea of how large the sample size needs to be to ensure a reasonable accuracy of results.

$$n = \frac{Z^2}{4(\text{Moe})^2}$$

Z = Level of confidence, this study uses a 95% confidence level
Moe = The maximum tolerable error rate is 8%
n = sample size

We collect the data using questionnaires based on the 5-Likert scale, with 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; and 5 = Strongly Agree. We define only score 4 and 5 that considered investor decisions are influenced by behavioral bias, otherwise, it does not (Altamimi, 2006). The total number of questions from all variables are 42 questions − 5 questions for anchoring bias, 8 questions for representativeness bias, 5 questions for loss aversion, 7 questions for overconfidence bias, 7 questions for optimism bias, and 4 questions for herding behavior. Six independent variables are used in the model -anchoring bias, representativeness bias, loss aversion, overconfidence bias, optimism bias, and herding behavior, while the dependent variable is investment decisions. The data is first

analyzed based on validity and reliability test to validate the questionnaires using Bivariate Pearson correlation (Pearson Product Moment).

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[\{N\sum X^2 - (\sum X)^2\}\{N\sum Y^2 - (\sum Y)^2\}]}}$$

r_{xy} = Pearson Correlation Coefficient
X = Scores for each question or statement item
Y = Scores for total question items or statements
$\sum X$ = total scores in X distribution
$\sum Y$ = total scores in Y distribution
$\sum X^2$ = total squares of each X score
$\sum Y^2$ = total squares of each Y score
N = total subjects

The reliability of items that test the degree of stability, consistency, predictive power, and accuracy are measured based on the Cronbach alpha formula:

$$\alpha = \left(\frac{K}{K-1}\right)\left(\frac{S_r^2 - \sum S_1^2}{S_x^2}\right)$$

α = Cronbach' alpha reliability coefficient
K   = total question items tested
$\sum s_1^2$ = total item score variants
S X^2 = Variance of test scores (all items)

Then, One sample t-test is used to test the effect of anchoring bias, representativeness bias, loss aversion, overconfidence bias, optimism bias, and herding behavior on investor decisions. The formula for one-sample t-test is used as follows:

$$Z = \frac{\overline{X} - \mu_x}{S/\sqrt{n}}$$

5. Results and Discussion

Table 1 displays the information about the characteristics of the respondents. The results of the Pearson Bivariate correlation test on the total questionnaire items indicate that all of them are valid based on the r-value of each item which is greater than the value of the r-table. The Cronbach's alpha score also shows similar results where the value for each item is greater than 0.6. The score for each variable - anchoring bias, representativeness bias, loss aversion, over-evidence bias, optimism bias, and herding behavior are 0.61, 0.77, 0.67, 0.86, 0.78, and 0.75 respectively. The Kolmogorov-Smirnov test is used to check the normality and it shows that

Table 1: Sample Descriptive

Demographic Factors		Number of Respondents	Percentage
Gender	Male	94	57%
	Female	71	43%
Level of Education	Postgraduate	5	3%
	Bachelor's degree	82	49.7%
	Associate degree	5	3%
	Senior high school	73	44.2%
Investment selected	Stocks	141	85.5%
	Bonds	4	2.4%
	Mutual funds	15	9.1%
	Others	5	3%

Table 2: The Result of One-Sample *T*-Test

Variables	Mean	Significance	Result
Anchoring bias	3.84	0.000	H0 rejected
Representativeness bias	3.78	0.000	H0 rejected
Loss aversion	4.09	0.000	H0 rejected
Overconfidence bias	3.27	0.000	H0 rejected
Optimism bias	3.95	0.000	H0 rejected
Herding behavior	3.30	0.000	H0 rejected

the data is distributed normally. The results of one sample *t*-test indicate that the average value of each variable is greater than 3.00 and all of the hypotheses are significant at 1% alpha. It indicates that most of the investors in Yogyakarta tend to be affected by anchoring bias, representativeness bias, loss aversion, overconfidence bias, optimism bias, and herding behavior in making investment decisions.

5.1. Anchoring Bias and Investment Decisions

The result of the first hypothesis suggests that there is an inclination of the investors to sell the stocks based on buying price as the reference price. The investors make quick decisions to sell their shares when the selling price exceeds the buying price. Besides buying price, the highest price that was achieved during a certain period also becomes the reference price. Besides, investors decide to buy stocks based on the past stocks' performance which means the investors overestimate their own opinions and expertise. This finding is in line with that of Frensidy (2016), Vijaya (2014), Rekik and Boujelbene (2013), Luong and Doan (2011), and Masomi and Ghayekhloo (2010).

5.2. Representativeness Bias and Investment Decisions

The result of the second hypothesis testing indicates that representativeness bias has a significant influence on investment decisions. Investors tend to make decisions simply based on limited information from the surroundings and ignore other information or the important events that may happen in the future. Hence, they are less prepared for unexpected events or information. They also consider that past performance as the best indicator to predict future performance. The representativeness bias further supports the notion that people fail to properly calculate and utilize probability in their decisions. The research finding is consistent with Toma (2015), Vijaya (2016), and Virigineni and Bhaskara (2017).

5.3. Loss Aversion and Investment Decisions

The third hypothesis result shows that investors are prudent in deciding to buy or sell the shares to avoid the loss. They focus more on avoiding the losses instead of gaining higher profits. Very often, stocks are bought without much research. So, once the stock price goes up, investors fear that it may go down as fast as it went up. Such thinking makes them sell the stocks too soon. Then come instances where the stock price has gone down after an investor has bought it. This tends to happen when the primary reason for buying the stock was a recent upsurge. Hence, when the value of their portfolio investment decreases, they prefer to retain it as they hope that it would increase to the previous price in the future. On the other hand, they tend to sell their stock so early when the investment value increases. These findings support the concept of disposition effect and are in line with that of Luong and Doan (2011), Ngoc (2014), Khan (2017), Kimeu et al. (2016), and Rekik and Boujelbene (2013).

5.4. Overconfidence Bias and Investment Decisions

We also find in this study that overconfidence bias has a significant influence on investment decisions. Considering that the major respondents are college students, there is a high level of probability that they tend to have a higher level of enthusiasm and motivation to get into the investment world. However, enthusiasm and motivation themselves are not enough to be a good investor. They need to develop more investment skills and broaden the knowledge of investment which they do not have enough. Stock investment is a long-term investment that has the highest risk compared with other types of investments, such as mutual funds or bonds. This is worth noting for young investors who are very vulnerable to overconfidence bias. This empirical finding is consistent with Toma (2015), Bakar and Yi (2016), and Ullah et al. (2017).

5.5. Optimism Bias and Investment Decisions

The result of the fifth hypothesis also describes that optimism bias affects investment decisions significantly. The optimism bias is an expectation or belief that the future performance will always better than the past return (Hoffmann et al., 2013). As the respondents are dominated by the young investors, who are highly susceptible to be overconfident, it will be followed by a high level of optimism. Overconfidence and optimism biases are caused by the illusion of knowledge and illusion of control. The illusion of knowledge is a condition where a person feels very confident about the information he/she has so that it has an impact on his/her belief in their chance of success. It supports by the empirical finding of Khan et al. (2017), Fatima and Waqas (2016), and Ullah et al. (2017).

5.6. Herding Behavior and Investment Decisions

This study also found that herding behavior has a significant influence on investment decisions. It indicates that investors tend to rely on collective information from other investors rather than personal information. In this respect, the investors react impulsively to the changes found in others' decisions as they prefer others' investment choices to their own choices. They put little attention on the company's prospects and believe more about what others decide in the market. This finding is in line with the studies of Vijaya (2014), Ngoc (2014), Ranjbar et al. (2014), and Kumar and Goyal (2015).

6. Conclusion

Our research findings suggest that anchoring bias, representativeness bias, loss aversion, overconfidence bias, optimism bias, and herding behavior affect significantly the investor's decisions. There are a few opportunities for much more comprehensive research on investors' behavioral biases.

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