JMK, VOL. 24, NO. 2, SEPTEMBER 2022, 105–117
ISSN 1411-1438 print / ISSN 2338-8234 online
DOI: 10.9744/jmk.24.2.105–117

HERD INSTINCT BIAS, EMOTIONAL BIASES, AND INFORMATION PROCESSING BIASES IN INVESTMENT DECISIONS

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Submitted: June 15, 2022; Reviewed: June 21, 2022; Accepted: Aug 7, 2022; Published: Sept 30, 2022

Abstract

The evolution of information during the COVID-19 pandemic has altered how investors invest. Investments can be made easily on a variety of digital platforms that provide easy access to information in investment decisions. Information media is expanding to promote investment decision-making, boosting the rise and development of investor financial behavior bias. The purpose of this research was to gather evidence of irregularities in financial behavior such as herd instinct bias, emotional bias, and information processing bias in investment decision-making as information technology and communication media evolve, as well as new policies in the Indonesian capital market. PLS-SEM (Partial Least Square-Structural Equation Modeling) was used to evaluate the data of 205 individual Indonesian capital market investors who were members of securities companies. The data confirmed that overconfidence, herding bias, confirmation bias, and recency bias influence investor investment decisions, whereas endowment bias had no effect on investment decisions. This study contributed to the existing behavioral finance literature on financial management, particularly in investment decisions, and put psychological factors in the financial management analysis. Individual investors can use this study to better understand the adverse impact of behavioral biases and the usefulness of information acquisition in handling irrational behavior.

Keywords: Herding bias, overconfidence, endowment bias, recency bias, confirmation bias, investment decision.

Introduction

The necessity for investment is significant since investment is a component of financial planning. Everyone requires investment in order to protect and expand their money. Furthermore, investment can provide future social security. Some people make investments to have a better life in the future, reduce inflationary pressures, and save on taxes. Investment is an action in which an investor is willing to give up his current or current assets in the hope of making a larger profit in the future. Investors also consider the risks that will be faced as a result of the actions taken at this time. Everyone has a different reason for investing. 39.70 percent of people invest in real estate, vehicles, and education expenses. Around 35.30 percent of people use their investments as an emergency fund, and another 25 percent use them as a pension fund (Novianggie & Asandimitra, 2019). Global investment optimism is rising, with the expected average annual return over the next five years estimated at 11.3 percent in 2021, up from 10.9 percent last year. Meanwhile, in Indonesia, while the expected average annual return on investment over the next five years has decreased slightly, it is still expected to be quite high this year, at 14.6 percent, compared to global averages (Faruq, 2021), After the pandemic, 43 percent of people plan to invest in real estate, followed by 35 percent in luxury goods, 34 percent in charitable giving, 33 percent in debt repayment, and 32 percent in education.

As can be seen in the SID (Single Investor Identification) chart in Indonesia until May 2022 (Figure 1), the number of single investors in Indonesia has increased by 92.99 percent compared to last year to 7,489,337 SID from 3,880,753 SID in 2020 and increased by 18.29 percent as per May 2022. This demonstrates that the activities of investors in the Indonesian capital market change dramatically year after year.

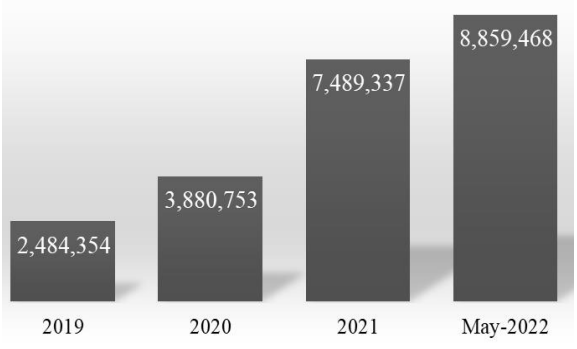

Figure 1. Growth of Indonesian capital market investors
Source: KSEI Data, 2022

The ease of access to information and the development of social media have encouraged a wave of stock retail investors, which are dominated by millennials. This wave is one of the impacts of the development of the capital market in the midst of a pandemic. Based on data from Indonesia Central Securities Depository (KSEI), 59.91 percent of capital market investors are less than 30 years old and 60.93 percent have a high school education. This demographic shows that most of the current capital market investors are millennial investors with a high school education. This development has become a gap used by influencers who are strengthened by social media to promote stocks so that their prices rise quickly or what is currently often referred to as the stock pom-pomer phenomenon. This phenomenon started with influencers who provided stock info via social media. Influencers who can be artists, celebgrams, YouTubers, or public figures usually admit to buying certain shares and invite others to also buy the same shares and then provide stock info or stock signals that they bought, through communication media such as Telegram, Instagram, Facebook, and other social media, which are pom-poms without clear fundamentals and analysis, with the aim of leading public opinion to without thinking carefully, buy shares that are already owned by these pom-pomers. This action will certainly lead novice investors to follow the advice obtained from the media, even more so with the Indonesia Stock Exchange policy in removing stock broker codes and investor types since last December 2021 where this research was conducted after the policy was implemented, with the phenomenon of pom-pom stock can lead to the emergence of severe herding behavior in the capital market.

Rational investors are those who always respond to information and can make choices that are normatively acceptable (Subash, 2012). Assumptions about a person's decision-making behavior are not entirely rational; there are many influencing factors, one of which is the emotional factor. Emotional factors in investors that influence their capital market investment decisions. This could have a negative impact on the capital market, causing unusual market movements. Investors seem unable to properly interpret information due to cognitive and emotional factors that affect them, making them irrational or irrational. The investor's irrationality is expressed in behavioral bias. Shefrin (2007) explains the tendency of prediction errors as a result of behavioral biases, namely cognitive and emotional factors from within each individual that can influence them in making investment decisions. Pompian (2012) explained that bias is divided into two categories, namely cognitive bias and emotional bias. Cognitive bias is a deviation from an investor in understanding, processing, and finally making a decision on an information or fact, and information processing bias falls into this category, whereas emotional bias is a deviation caused by feelings and spontaneity rather than facts. The emotional factors and information processing of investors in investment decisions are the focus of this study. Several studies have also revealed that investors' psychology can influence investment decision making or, more precisely, behavioral biases. This is interesting because this behavioral bias can lead to a crisis in a country (Armansyah, 2018) or even when the Covid-19 pandemic conditions affect the capital market (Allam *et al.*, 2020). Several studies have found that overconfidence, endowment bias, confirmation bias, and recency bias all have a significant impact on investment decisions (Tjandrasa & Tjandraningtyas, 2018; Peñón & Ortega, 2018; Qasim *et al.*, 2019; Rudiawarni *et al.*, 2020; Rabbani *et al.*, 2021;Armansyah, 2021; Gavrilakis & Floros, 2022). The purpose of this research is to gather evidence of irregularities in financial behavior such as herd instinct bias, emotional bias, and information processing bias in investment decision making as information technology and communication media evolve, as well as new policies in the Indonesian capital market. This study contributes to the existing behavioral finance literature of financial management, particularly in the investment decision, and putting psychological factors in the analysis of financial management. Individual investors can use this study to better understand the adverse impact of behavioral biases as well as the usefulness of information acquisition in handling the irrationality behavior. The sections that follow this paper examine relevant theory and findings from previous studies on behavioral biases. This study's research continues with a description of the data collection process and research methods employed. The results of the various analyses, as well as a discussion, are presented in the following section. Finally, conclusions and research recommendations are presented.

Overconfidence is an example of an emotional bias related to financial investments. Overconfidence refers to an investor's excessive belief in something. Overconfidence leads to overestimation of knowledge and underestimation of predictions made due to their superior abilities (Nofsinger, 2016). Overconfidence is the behavior of someone who is overconfident in his abilities and predictive skills and believes he will always succeed. This is a normal condition. Overconfidence is the behavior of someone who is

overconfident in his abilities and predictive skills and believes he will always succeed. This is a normal condition that can be used to gauge a person's level of confidence in obtaining something. Humans are undeniably confident, including when it comes to investing, experienced investment professionals rated themselves above average in performance in comparison to their peers (Combrink & Lew, 2020). Overconfidence can be beneficial because it allows investors to make decisions without relying on the choices of other investors or market news, but it can also be detrimental if the decision is solely based on investor confidence without considering in-depth analysis of market conditions. Malik *et al.* (2019) shows that overconfidence bias has a positive relation with investment decisions. Further it is also found that risk tolerance mediates their relationship. While the findings of research by Kansal and Singh (2018) shows that overconfidence has no significant effect on investor decision making because, according to them, gender, age and general education do not affect the level of overconfidence but investment experience and invest in large cap stocks are more subject to the overconfidence.

The next factor that can influence investment decisions is herd instinct bias. Herding bias is a type of investing behavior in which an investor tends to follow the decisions of other investors without first conducting personal analysis such as fundamentals or techniques. Armansyah (2021) explained that herding is a phenomenon that occurs to investors or a group of investors as a result of the desire of investors to achieve the same profit by mimicking the behavior of other investors. This is one of the irrational actions of investors who do not base their investment decisions on available information or facts, but rather on the actions of other investors or market noise. Gavrilakis and Floros (2022) shows that investors exhibit irrational behavior, such as making decisions based on the decisions of other investors, investors tend to react quickly when other investors' decisions change in investing especially when constructing a portfolio. The COVID-19 pandemic also has an impact on the capital market, one of which is that investors have doubts about market conditions, causing herding as in Espinosa-Méndez & Arias (2021) research which found robust evidence that the COVID-19 pandemic increased herding behavior in the capital markets of Europe. While the results by Rahman and Gan (2020) shows that herding bias has no significant effect on investor decision making because investors in tend to conduct fundamental and technical analysis before making investment decisions.

The next emotional bias behavior that can affect investment decisions is endowment bias. Endowment bias is a condition where a person adds value to his or her goods, because it is considered as their own property which has a substantial influence on the economy (Ericson & Fuster, 2014). One of these behaviors can also be seen when someone appreciates an asset that is already his property. Endowment bias itself shapes individual behavior in making investment decisions which results in lower investment decision making. This is in line with research by Peñón and Ortega (2018), that there is an endowment effect in risky decision making between entrepreneurs and company owners that influences entrepreneurial behavior.

Another behavior that can influence investment decision making is confirmation bias. Confirmation bias is a term that describes a person's unwillingness to change previously made beliefs (Cheng, 2018). This bias more or less affects investors in the election. In selecting stocks on the stock exchange, investors will do quite a lot of considerations because investments have two types of timeframes, namely short-term and long-term which will be used to meet their welfare in the future. Before choosing an investment, one must find a model that is compatible with him/her and strengthen his/her opinion with that decision, because confirmation bias behavior can occur. When investors are looking for a compatible model, they will join the community. In this case, investors exhibit confirmation bias by joining virtual communities to seek information that confirms their previous beliefs and opinions (Trehan & Sinha, 2021). Kurniawan and Murhadi (2018) demonstrates that confirmation bias has no impact on investment decisions, particularly when purchasing life insurance. Investors can quickly determine which investments are appropriate and suitable for their future needs. While Cheng (2018) shows positive results in the relationship of confirmation bias that influence the decision-making of the investors, because there is a correlation when making investment decisions and receiving information that supports an investment they previously made.

One of the information processing biases that can influence investors in making decisions is the recency bias. Recency bias occurs because it is influenced by the recency effect that occurs in a person's tendency to make a judgment that is more influenced by the information that investors last saw or heard (Ahlawat, 1999). Recency effect itself is a final assessment that has a big influence on a decision that will be taken by investors (Almilia *et al.* 2013). It can be said that recency bias is a behavior bias that occurs in an individual because of remembering or based on the latest information they have just obtained (Patel, 2005). Pinsker (2011) emphasizes that sequential information

with consistently positive (+) or negative (-) information can cause a recency effect on investors when evaluating stock prices on the capital market. This will make investors experience recency bias in assessing stock prices. Pinsker (2011) also conducted tests on information patterns and the influence of sequences in the form of fundamental analysis because this analysis is more easily recognized by respondents, namely on information about the company's financial performance and information about the value of the stock price.

Recency bias will result in poor stock investment decision planning because investors who experience recency bias in making stock investment decisions will be able to cause stock selection errors, resulting in lower-than-desired returns. Rudiawarni *et al*. (2020) testing the effect of sequential information on an investor in investing in shares shows that investors will experience a recency bias because they trust the information that has just been received and the investment decision-making process of investors tends to be positive because it pays attention to sequential information rather than the root of the information. These results are also in line with the findings by Pinsker (2011) shows that for sequential conditions it is relatively positive rather than simultaneous conditions on recency bias.

Behavioral Finance Theory

Behavioral finance theory is based on classical and neoclassical economic theory, and behavioral finance is a study that seeks to comprehend investor behavior when making investment decisions (Selden, 1912). Investor responses to the opportunities and challenges presented by the ever-changing economic environment influence investor behavior in making investment decisions. Behavioral finance seeks to explain as well as improve understanding of investors' reasoning patterns, including the emotional processes involved and their influence on decision-making. From a human standpoint, behavioral finance attempts to explain the what, why, and how of finance and investing (Ricciardi & Simon, 2000; Statman, 2008; Zaleskiewicz, 2015). Behavioral finance, for example, studies financial markets and provides explanations for many stock market anomalies (such as the January effect), speculative market bubbles (such as the recent Internet retail stock frenzy of 1999), and crashes (the crashes of 1929 and 1987).

Overconfidence in Investment Decisions

The first construct in the model is overconfidence which refers to the tendency of individuals to feel more about their knowledge, abilities and accuracy of information, so that they become too optimistic about the future and their ability to control it (Ackert & Deaves, 2010). According to prospect theory, individuals will make decisions in risky conditions based on the conditions that occur so that the decisions taken also refer to this. Someone with high overconfidence tends to override the impact of risk when choosing the type of investment (Hribar & Yang, 2016). Overconfidence causes investors to overestimate their knowledge and underestimate their predictions because they believe they have superior abilities (Chen *et al*., 2007). Based on the above arguments, the following hypotheses are proposed:

H_1: Overconfidence affects investment decisions.

Herding Bias t`owards Investment Decisions

Herding bias is another variable in the model. In the financial context, particularly in the capital market, herding bias is a condition in which an investor tends to mimic the behavior of other investors or groups of investors. In general, investors tend to follow the outcomes of other investors' investment decisions, assuming that the outcomes will be consistent with expectations. These findings suggest that novice investors tend to mimic the decisions of other investors rather than conducting fundamental or technical analysis. Gavrilakis and Floros (2022) shows that herding bias has a positive and significant influence on portfolio investment decisions. Based on the reviews, this study hypothesized that herding bias is positively related to investment decisions.

H_2: Herding bias affects investment decisions.

The Endowment Bias in Investment Decisions

The third variable that we will introduce and test in our model is endowment bias. Endowment bias is a condition where a person adds value to his or her goods, because it is considered as their own property which has a substantial influence on the economy (Ericson & Fuster, 2014). The effect of endowment that plays a role in individual decision making, resulting in higher risk taking by individuals. Peñón and Ortega (2018) shows that in risky decision making between entrepreneurs and company owners there is an endowment effect that affects the behavior of entrepreneurs. Based on this, the following hypothesis is proposed:

H_3: Endowment bias affects investment decisions.

Confirmation Bias in Investment Decision

Another construct that we will examine in the model is confirmation bias. Confirmation bias is the

behavior of a person who puts aside opinions that conflict with his thoughts. This behavior can make investors take information related to stock products that are in accordance with their views and make this information their choice. The greater the behavior of the confirmation bias, the easier it will be to form investment decisions. The result was confirmed by Park *et al.* (2012), Cheng (2018), Akhtar and Das, (2019), Trehan and Sinha (2021) which shows that there is a confirmation bias towards investment decisions, while Kurniawan and Murhadi (2018) shows different results that confirmation bias does not affect investment decisions. Based on this empirical evidence, the following hypothesis is proposed:
H_4: Confirmation bias affects investment decisions.

Recency Bias towards Investment Decision

The construct that is also tested into the model is recency bias. Recency bias is a behavior carried out by individuals where the information obtained is biased so that it only remembers the last information received. Pinsker (2011) shows that investors experience recency bias in making stock investment decisions, and this will be able to cause problems because events that have just occurred do not necessarily reflect events that actually occurred. Furthermore Pinsker (2011) states that recency bias tends to occur in information presented sequentially compared to simultaneously. This certainly affects the investment decisions of investors. Based on this description the following hypotheses is proposed:
H_5: Recency bias affects investment decisions.

The following hypothesis is proposed to investigate the combined effect of overconfidence, herding bias, endowment bias, confirmation bias, and recency bias on investment decisions.
H_6: Overconfidence, herding bias, endowment bias, confirmation bias, and recency bias together affect investment decisions.

Research Methods

The subjects in this study are 205 individual investors who are members of securities companies by sampling respondents who invest in the Indonesian capital market with the sampling technique used is the convenience sampling method through the distribution of electronic questionnaires to online respondents of investors in Indonesia who are members of the network media on capital market investor group. Criteria for respondents with a minimum age of 18 years who are members of securities companies and investors carry out investment activities through the media provided by securities companies. This study uses primary data obtained directly through e-questionnaires then processed descriptively and statistically using the PLS-SEM (Partial Least Square-Structural Equation Modeling) approach. PLS-SEM is designed to overcome problems in multiple regression and aims to produce a model that transforms a set of correlated explanatory variables into a new set of variables that are not mutually correlated. PLS-SEM analysis is divided into two stages, namely, the outer model and the inner model. The validity and reliability of the indicators on the latent variables can be seen using the outer model, while the test for the influence between latent variables can be seen through the inner model. The outer model in this study is divided into two, namely, explanatory factor analyzes and confirmatory factor analyzes. Explanatory factor analysis (EFA) is used in the indicator measuring the latent variable is formative, while confirmatory factor analysis (CFA) is used in the indicator measuring the latent variable is reflective. In confirmatory factor analysis, an indicator is said to be valid if the loading factor value of the indicator measuring the latent variable is greater than 0.4 and the average variance extracted (AVE) value > 0.5 (Hair Jr. *et al.*, 2017). The indicator is said to be reliable if the value of composite reliability (CR) and Cronbach Alpha (CA) > 0.7. Whereas in the explanatory factor analysis, the indicator is said to be valid if the loading factor value of the indicator measuring the latent variable is greater than 0.4 with a significance value < 0.05, while the value of composite reliability (CR) and Cronbach Alpha > 0.7 then the indicator is said to be reliable.

The inner model describes the relationship between latent variables. The inner model is divided into two stages, namely hypothesis testing and the coefficient of determination. In hypothesis testing, the relationship between latent variables is said to be significant if the value of *p-value* < $\alpha = 0.05$ or *t-count* > 1.96. While the coefficient of determination, there are three criteria, namely, the influence between the latent variables are said to be strong if the value of $R^2 > 0.67$; moderate if $0.33 < R^2 \leq 0.67$; weak if the value of $0.19 < R^2 \leq 0.33$ and said to be very weak if the value of $R^2 \leq 0.19$ (Chinn, 1998; Hwang & Takane, 2004; Monecke & Leisch, 2012; Ghozali, 2014). Measurements for the endogenous and exogenous variables in the model were collected using a 5-points Likert scale. The indicators used in this study refer to research conducted by Pinsker (2011), Pompian (2012), Ngoc (2014), Weber *et al.* (2013), Khan *et al.* (2017), and Özen & Ersoy (2019). Several indicator items are adjusted to suit the conditions of the capital market in Indonesia.

Table 1
Measurement Items

Construct	Items	Code	References
Investment Decision an individual's decision to invest capital in one or more assets in order to profit in the future.	Capital market is unpredictable.	ID1	Weber *et al.* (2013), Khan *et al.* (2017)
	I intend to put more money into stocks.	ID2	
	I prefer to save because I am never sure when everything will collapse and I will need money.	ID3	
	I understand how to manage money.	ID4	
	I understand how to invest the money I have.	ID5	
	Market uncertainty keeps me from buying stocks.	ID6	
	I budget money very well.	ID7	
Herding Bias the tendency of an investor to follow the decisions of other investors in making investments.	I follow other investors' investment choices.	HB1	Ngoc (2014)
	I follow the action of selling/buying other investors' shares.	HB2	
	I react quickly to follow the market reaction.	HB3	
Overconfidence Bias individuals' tendency to overestimate their knowledge, ability, and information accuracy, or to be overly optimistic about the future and their ability to control it.	When I make a plan, I'm sure it will work.	OC1	Khan *et al.* (2017)
	My predictions on stocks are always right.	OC2	
	I can identify stocks that will perform well in the future.	OC3	
	My investment performance is much better than other investors.	OC4	
	My investment skills are much better than other investors.	OC5	
	My investment experience is more than other investors.	OC6	
	I know more about investing than other investors.	OC7	
Endowment Bias adding value to their own goods, because they are considered their own property which has a substantial impact on the economy.	I have shares that I have owned for a long time so it is difficult for me to sell.	EB1	Pompian (2012)
	I keep the shares I already own, despite being advised to sell them.	EB2	
	I really appreciate the shares bequeathed to me.	EB3	
	I am reluctant to transfer the shares I own even if it sells or bequeaths.	EB4	
	I will sell the shares I own at a higher offer price.	EB5	
Confirmation Bias the attitude of someone who tends to pay more attention to information or views that are in line with his views than those that are contrary.	I based myself on the initial information obtained.	CB1	Özen and Ersoy (2019)
	I feel doubts occur when there is other information during stock selection.	CB2	
	I ignore information related to stock selection that is contrary to belief.	CB3	
	I don't change my mind even if I start to lose investments that I believe will be profitable.	CB4	
	When I lose an investment, I don't change my belief in my investment.	CB5	
Recency Bias behavior carried out by individuals who only remember or are based on the latest sources of information that have just been obtained.	I'm basing my decision on the most recent information I've gathered.	RB1	Pinsker (2011)
	I will look at the investment record of one to three years to see how the investment has performed recently.	RB2	
	I will choose stocks that have a good trading performance record.	RB3	
	I pay attention to the history of good stock performance while doing fundamental analysis.	RB4	

Results and Discussion

This study employs primary data from members of securities companies and investors who perform investment activities through the media provided by securities companies. Data was collected using an electronic questionnaire, and 205 able data were obtained. The following is the description of the respondents.

Based on Table 2, most respondents were 122 male respondents (59.51%) with an age range of 22–26 years as many as 66 respondents (32.20%), 68 people worked as entrepreneurs (33.17%) and domiciled in East Java (35.12%) or about 72 respondents. respondents have experience investing in the capital market 1–2 years (70.73%).

Table 2
Respondent Description

Demographics	Category	Frequency	Percentage
Gender	Male	122	59.51%
	Female	83	40.49%
Age	18–21 years	48	23.41%
	22–26 years	66	32.20%
	27–31 years	46	22.44%
	32–36 years	25	12.20%
	More than 36 years	20	9.76%
Profession	College student	46	22.44%
	Private Employees	55	26.83%
	Entrepreneur	68	33.17%
	Government Employees	16	7.80%
	Others	20	9.76%
Monthly	1,000,000 to 2,999,999	42	20.49%
Expense (IDR)	3,000,000 to 4,999,999	74	36.10%
	5,000,000 to 6,999,999	67	32.68%
	More than 7,000,0000	22	10.73%
Domicile	East Java	72	35.12%
	Central Java	52	25.37%
	West java	30	14.63%
	Jakarta	19	9.27%
	Denpasar	6	2.93%
	Medan	5	2.44%
	Balikpapan	6	2.93%
	Makassar	4	1.95%
	Pekanbaru	3	1.46%
	Others	8	3.90%

Source: Processed questionnaire results

Statistical Results

The data was processed using WarpPLS version 8.0 through several stages with the Partial Least Square-Structural Equation Modeling (PLS-SEM) method and path estimate. The measurement model (outer model) obtained is then evaluated based on the substantive content model by comparing the relative size of the weight and the significance of the weight, then the inner model is evaluated by looking at the variance percentage and looking at the *R-squared* value and seeing the coefficient of the structural path. The outer and inner models' results are shown below.

Outer Model

The Figure 2 is the result of the Partial Least Square regression.

Based on the results of the initial processing, the loading factor value < 0.7 with AVE value < 0.6, so that several indicators were eliminated and repeated experiments were carried out to get the best AVE value, the indicators that were tried to be eliminated were ID5, ID6, OC7, and HB1. Repeated experiments were carried out so that the final output of the loading factor outer model can be seen in Figure 2, Tables 3 and 4. Almost all the loading factor values of the indicators have values above 0.6. Some indicators are maintained even though they have a value of < 0.6 because the output has the best AVE value from all experiments. While the AVE value > 0.6 according to Chinn (1998) an indicator is said to have good reliability if its value is greater than 0.7 while a loading factor of 0.5 to 0.6 can still be maintained for models that are still under development, so these results indicate that the validity criteria have been met.

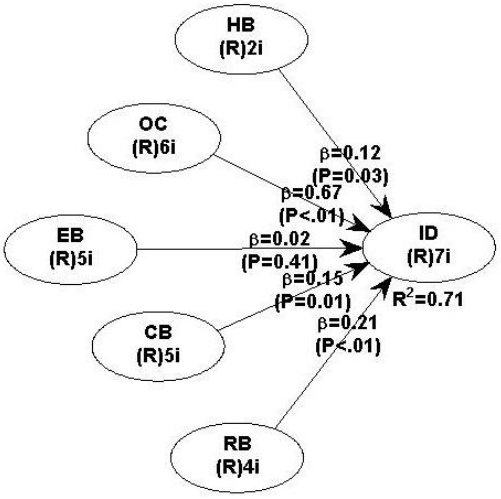

Figure 2. PLS-SEM model

Table 3 also shows the value of composite reliability and Cronbach's Alpha has a value above 0.7 so this result indicates that the reliability criteria have been met. It can be concluded that all indicators are able to measure investment decision variables, overconfidence, herding bias, endowment bias, confirmation bias, and recency bias.

Inner Model

The next stage of the PLS-SEM analysis is the structural model evaluation stage. At this stage, the results of the full collinearity VIF, p-*value, R-squared* and path coefficients are seen to get the influence of each variable, either directly or indirectly. Based on table 3, it can be seen that the adjusted *R-squared* value for investment decisions is 0.700 with an *R-squared* value of 0.707 with a *p-value* < 0.005 (< 0.001). This model also does not show multicollinearity because the VIF values are all below 5. The *R-squared* value is in the position > 0.67 so the influence of the variable is strong.

Table 3
Outer Model

	CR	CA	AVE	Full VIFs	*R-squared*	Adjusted *R-squared*
Overconfidence Bias	0.848	0.642	0.736	2.706		
Herding Bias	0.926	0.903	0.678	1.736		
Endowment Bias	0.828	0.739	0.498	2.796		
Confirmation Bias	0.875	0.821	0.584	2.482		
Recency Bias	0.787	0.639	0.485	2.224		
Investment Decision	0.803	0.714	0.37	2.026	0.707	0.700

Table 4
Path Analysis and Hypothesis Testing

Path	Coefficients	*p-value*	Effect Size	Conclusion
Overconfidence → Investment Decision	0.674	< 0.001	0.481	Supported
Herding Bias → Investment Decision	0.125	0.035	0.060	Supported
Endowment Bias → Investment Decision	0.016	0.407	0.008	Not Supported
Confirmation Bias → Investment Decision	0.152	0.013	0.071	Supported
Recency Bias → Investment Decision	0.211	< 0.001	0.088	Supported

The effect of overconfidence on investment decisions was found to be significant, with a coefficient of 0.674 and *p-value* < 0.001. Based on these results, hypothesis 1 is accepted, which means that there is a significant and positive effect between overconfidence on investment decisions. Thus, investors' overconfidence can influence decision making in capital market investments. This shows that capital market investors tend to have excessive confidence in making investment decisions, this can endanger the investments made if they do not pay attention to the fundamentals of the stock. In this study overconfidence is proven to be a predictor of investment decisions. The results of this study support the results of research by Armansyah (2021) that overconfidence has proven to be a predictor of investment decisions by capital market investors and also supports and Nofsinger (2016), Khan *et al.* (2017), Tjandrasa and Tjandraningtyas (2018), and Qasim *et al.* (2019. This is possible, confidence is needed in making investment decisions in the capital market because every decision taken has risks. Every investment decision requires confidence from investors to make a decision but overconfidence will also lead to disaster. Excessive self-confidence by continuing to carry out fundamental analysis will have a positive impact on capital market volatility, this is an advantage, but the drawback is that without good information and fundamental analysis it will cause investment losses as in Mushinada and Veluri (2020). These results are different from the results of research by Anwar *et al.* (2017) and Rahman and Gan (2020) has a significant negative impact on investor's decision especially in portfolio diversification and Fachrudin *et al.* (2017) which shows overconfidence has no effect on investment decisions.

The effect of herding bias on investment decisions was found to be significant, with a coefficient of 0.125 and a *p-value* of 0.035 (< 0.05). Based on these findings, hypothesis 2 is accepted, which means that there is a significant and positive influence between herding bias on investment decisions. Thus, investors tend to follow the decisions of other investors without using fundamental or technical analysis, thus influencing decision making in capital market investment. It is not known whether herding behavior occurs in novice investors or old investors, however, by looking at the demographics of respondents, most of whom have 1–2 years of investment experience, investors are classified as beginners. Investment experience is only one of the causes of herding, the availability of information can also encourage investors to do herding. Availability of information or consensus that has been formed is the cause of herding behavior. Herding on the right information will result in a positive investment, whereas herding on the wrong information will result in investment losses; these are the benefits and drawbacks of herding behavior in investment decisions. In this study herding bias proved to be a predictor of investment decisions. The results of this study support the results of research by Gavrilakis and Floros (2022) that herding bias is proven to be a predictor of investment decisions of capital market investors and also supports Qasim *et al.* (2019) where investors tend to follow the investment behavior of other investors in making investment decisions. Even according to Armansyah (2018) shows that herding behavior can lead to financial crises due to the absence of fundamental analysis and blindly following the decisions of other investors. The results of this study are different from the results

in research by Rahman and Gan (2020) which shows that herding has no significant effect on capital market investment decisions.

The effect of endowment bias on investment decisions was found to be insignificant, with a coefficient of 0.016 with a *p-value* of 0.407 (> 0.05). Based on these findings, hypothesis 3 is rejected, which means that there is no significant effect of endowment bias on investment decisions. Thus, the behavior of investors in providing added value to their property does not have an influence on investment decisions, because it does not have a substantial impact on the owner's economy. This shows that capital market investors tend to focus on substantial economics, providing added value with the aim of gaining economic advantage so that the impact experienced is difficulty in selling their assets. Respondents chose to keep it by waiting for a higher bid price. This is quite reasonable because investors have high confidence and confidence in investing and are careful in making decisions. In this study, endowment bias was not proven to be a predictor of investment decisions and supports the results of research by Konstantinidis *et al.* (2019) which shows that endowment behavior will disappear if individuals are faced with a market environment that offers many opportunities. Individuals will have more investment options in the capital market so that the tendency to maintain assets will decrease. The results of this study are different from the results by Peñón and Ortega (2018) who found that endowment bias occurs in decision making and risk in entrepreneurs in Cali, Colombia.

The effect of confirmation bias on investment decisions was found to be significant, with a coefficient of 0.152 and a *p-value* of 0.013 (< 0.05). Based on these findings, hypothesis 4 is accepted, which means that there is a significant influence between confirmation bias on investment decisions. Thus, the behavior of someone who puts aside opinions that conflict with his thoughts can influence decision making in capital market investments. This shows that capital market investors tend to ignore or take information related to stock products that are in accordance with their views and make that information their choice in the investment decision-making process, this is quite reasonable because investors have good information sharing media from securities companies, so that information is more accessible easy to get. In this study Confirmation Bias proved to be a predictor of investment decisions. The results of this study support research by Park *et al.* (2012), Cheng (2018), Akhtar and Das (2019), and Trehan and Sinha (2021) that confirmation bias is proven as a predictor of investment decisions from capital market investors where investors tend to exercise control over the information they receive in making investment decisions. The results of this study are different from the results by Kurniawan and Murhadi (2018) who found that confirmation bias does not affect investment decisions, this is possible due to regional demographic differences as well as technological and communication developments so that there are differences in information dissemination.

The effect of recency bias on investment decisions was found to be significant, with a coefficient of 0.211 and *p-value* < 0.001. Based on these findings, hypothesis 5 is accepted, which means that there is a significant influence between recency bias on investment decisions. Thus, the behavior of remembering the last information received affects decision making in investing in the capital market. This shows that investors who experience recency bias in making stock investment decisions will be able to cause problems because the events that have just occurred do not necessarily reflect the events that actually occurred. The rapid growth of communication media also supports the occurrence of recency bias, due to the large number of information inputs in a communication room that become a source of information for investors. Recency bias tends to occur in information presented sequentially compared to simultaneous. In this study, recency bias is proven to be a predictor of investment decisions. These results support research by Rudiawarni *et al.* (2020), Durand *et al.* (2021), Rabbani *et al.* (2021) that recency bias is part of the investment decisions of capital market investors where bias behavior is carried out by an individual who only remembers or is based on the latest source of information he just obtained. This psychological condition of investors is possible because it is in accordance with prospect theory that there is a continuous bias motivated by psychological factors that influence investors' minds in making investment decisions.

The effect of overconfidence, herding bias, endowment bias, confirmation bias, and recency bias together on investment decisions was found to be significant, with an *R-squared* value of 0.707 (Table 3 and Figure 2) with p-value < 0.001. Based on these findings, hypothesis 6 is accepted, which means that there is a significant and positive effect of overconfidence, herding bias, endowment bias, confirmation bias, and recency bias on investment decisions.

Conclusion

Based on the results of the research that has been done, it can be concluded that the variables overconfidence, herding bias, confirmation bias, and recency

bias each have a significant effect on investment decisions on the capital market in Indonesia, while the endowment bias variable has no effect on investment decisions. Together, overconfidence, herding bias, endowment bias, confirmation bias, and recency bias variables have an influence on investment decisions. This is possible because the power of information and the ease of access to information become the power in decision making, and this information makes investors have various perceptions in responding to information. This perception will shape investment decisions, influencing changes in Indonesia's overall economic conditions. Good investment leads to economic growth, and vice versa. Considering the differences in investing viewpoints, investors or users of investment information must consider the information received so that the confidence, reviews, and confirmations made by investors, or even those that lead to herding, can lead to good results for the economy, because incorrect information can cause a crisis. It is this finding of behavioral bias that provides an additional theoretical contribution to existing research and proves that recency bias influences investment decisions in the Indonesian capital market, thereby expanding the theory of capital market investor behavior.

The findings of this study can have technical implications for practitioners, especially for providers of communication media between investors. The results obtained indicate that investors pay attention to the development of issuers through information media provided by securities companies and social media owned as well as input obtained from other investors in assisting analysis in the decision-making process. Referring to this condition, the developer of communication media can see it as an opportunity to provide good service through information analysis of market conditions and the introduction of issuers so as to attract more investors' interest in capital market investment. The results of this study will change over time (not permanently) due to the diversity of investors who invest in Indonesia. Generation differences will also lead to different investment styles and different views on the information received, resulting in different research results (Sukamulja *et al.*, 2019; Rahman & Gan, 2020), demographic differences (Pradita & Wiwik, 2019), and differences in financial literacy (Baihaqqy *et al.*, 2020; Putri & Simanjuntak, 2020).

Suggestions that can be conveyed in accordance with the development of this research are that in future other research can develop investment behavior models by including more financial behavior and financial behavior deviations because these factors are still considered as the main trigger of market behavior, in addition to the personality traits approach or the big five personality traits and ocean models can also be used to develop this research so that it is able to give different results or the same as the results of this study for future scientific developments.

This study has several limitations. First, research data was collected through respondents who responded to electronic questionnaires distributed through forums or groups and e-mails with the hope of reaching respondents according to the specified criteria. Thus, this study may not represent all capital market investors in Indonesia. Future research can collect data from various sources, such as through system user discussion forums and cross-cultural studies. Second, this research focuses on the benefits of using technology and information, especially communication media between investors where the financial behavior of investors has its own space to voice and get support for thinking on information that supports their opinions. Future research can develop more detailed models that can explain more factors related to behavioral finance. The use of other approaches is also recommended in an effort to develop this research in order to achieve more up-to-date research, which can overcome the existing limitations.

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