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DOES HEURISTIC BIAS MATTER FOR LONG AND SHORT-TERM INVESTMENT DECISION-MAKING DURING THE COVID-19 PANDEMIC?

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ABSTRACT

Introduction/Main Objectives: This study examines the effect of heuristic behavior on investment decision-making in the long- and short-term during the COVID-19 pandemic in the Indonesian capital market. **Background Problems**: Traditional finance cannot fully explain how investors behave in the capital market. Investors will tend to use heuristics when making investment decisions because humans have cognitive limitations, as explained in the bounded rationality theory. Especially during the COVID-19 pandemic, investors have shown their irrationality due to the high uncertainty and panic caused by the COVID-19 pandemic. This phenomenon can only be explained by behavioral finance. **Novelty**: This study examines the effect of bias on the investment decision-making of investors who make long-term and short-term investments. Previous studies only tested the impact of bias directly, without differentiating the length of time of the investment. **Research Methods**: This study used partial least squares structural equation modelling (PLS-SEM) with WarpPLS tool. Testing the moderating effect was undertaken using multi-group analysis (MGA). **Finding/ Results**: The results of this study indicate that anchoring and availability bias have a positive effect on investment decision-making, while representativeness bias has no significant impact. Investment time moderates the effect of representativeness bias on irrational investment decision-making, while anchoring and availability bias are not supported. **Conclusion**: Anchoring and availability heuristics will increase irrational investment decisions, while the effect of representativeness heuristics on irrational investment decisions will decrease when investors make long-term investments.

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INTRODUCTION

At the end of 2019, the world was hit by the Coronavirus outbreak; this is known as COVID-19 in Indonesia. The spread of the COVID-19 virus in Indonesia increased the uncertainty and anxiety about security in Indonesia. This resulted in the cessation of several economic activities in the real sector, and indirectly harmed the movement of the Indonesia Stock Exchange (IDX). Ryandono et al. (2021) found that the global COVID-19 pandemic is terrible news, causing opposing average expected returns, negative average actual returns, negative average abnormal returns, and an increase in stock selling as a cut-loss strategy. Overall, stocks on the Indonesia Stock Exchange (IDX) were negatively affected by the COVID-19 pandemic (Herwany et al., 2021).

The negative impact of COVID-19 has caused investors to no longer make rational financial decisions, as described by traditional financial concepts. Traditional finance cannot fully explain how investors behave in the capital market. Investors will tend to use heuristics in making investment decisions during a pandemic, due to limited rationality, as described in the bounded rationality theory. Tversky & Kahneman (1974) define heuristics as rules of thumb, which individuals in situations of uncertainty use to make efficient and straight forward decisions. Such strategies, when used to make decisions, are faster, more efficient, and more accurate than the more complex methods, as they ignore part of the information (Gigerenzer & Gaissmaier, 2011).

Behavioral finance studies have identified several behavioral biases that influence investor decisions (Itzkowitz & Itzkowitz, 2017); intuitive reasoning, judgment, and options can all affect the quality of financial decisions (Bondt et al., 2013) or lead to irrational behavior (Bashir et al., 2013). Several studies have investigated the direct relationship between heuristics, investment decisions, and performance without considering these relationships and the underlying mechanisms by which these effects flow (Abdin et al., 2017). Shah et al. (2018) examine the heuristic biases influencing the investment decisions of individual investors and suggest that it is essential to consider intermediary or moderator variables to understand how psychological factors influence investment-related choices. The purpose of this study is to investigate the effect of heuristic errors on investment decisions over investment times (long and short). This study is necessary to obtain contextual data on the heuristic effect. The length of the investment period also influences investment decisions, as short-term investors are different from long-term investors (Lakshmi et al., 2013); short-term investors are more susceptible to heuristic bias than long-term investors because short-term investments increase the short-term returns on risky assets and investors look to sell them quickly, whereas long-term investments maximize the ultimate expected value of wealth (Vives, 1995), so short-term investors will be more susceptible to heuristic bias than long-term investors (Venkatapathy & Sultana, 2016).

This study employs partial least squares structural equation modeling (PLS-SEM) using the WarpPLS tool. The moderating effect in this study is tested using multi-group analysis (MGA) because the investment time was divided into two categories, the long-term, and the short-term. This study indicates that anchoring and availability bias have a positive effect on irrational investment decision-making, while the representativeness bias has no significant effect. Furthermore, the investment time moderates the effect of representativeness bias on irrational investment decision-making, but investment time does not moderate the effect of anchoring and availability on irrational investment decision-

making. This study aims to assess the behavior of stock investors in Indonesia during the COVID-19 pandemic using the behavioral finance concept. In the concept of behavioral finance for making decisions, investors do not always show rational behavior (Simon, 1955) because humans have limited rationality (Pompian, 2006); this is in contrast to the traditional financial concepts, which consider that investors are rational and value securities logically (Fama, 1970). The theory of limited rationality explains that people do not make rational decisions because of the limited information they possess, their limited cognitive thoughts, and the limited time they have to make rational decisions; thus, investors who intend to make optimal decisions will be limited to only making satisfactory decisions in complex situations due to their cognitive limitations (Simon, 1955). Furthermore, this study also identifies the impact of heuristics on irrational investment decisions based on investment time, both in the long- and short-term, to deepen the contextual results of the research.

LITERATURE REVIEW

1. Heuristic

Heuristics are described as rules of thumb, which people in conditions of uncertainty use to make green and easy choices (Ritter, 2003; Tversky & Kahneman, 1974). Asri (2013) defines heuristics as conduct simplification in the choice-making process. Tversky & Kahneman (1974) found that irrational human beings use heuristics in choice-making due to the fact that they fail to evaluate the best probability. Heuristics are beneficial whilst time is limited (Waweru et al., 2008) and records are few (Tversky & Kahneman, 1974).

Tversky & Kahneman (1974) introduce three heuristics that may be utilized by investors in their choice-making, particularly Representa-tiveness bias is a cognitive bias where people tend to make judgments or decisions based on how well an event or situation seems to match a certain prototype or stereotype. In other words, people tend to rely on generalizations or assumptions about what is typical or normal, rather than considering all available information or evidence. This bias can lead to errors in judgment or decision-making because people may overlook important factors that do not fit their preconceived notions or stereotypes representativeness bias can lead investors to make decisions based on superficial similarities between investments rather than a thorough analysis of the underlying fundamentals. Rasheed et al., (2018) explained that the representativeness heuristic can affect purchasing decisions made by buyers. The representativeness heuristic occurs when a person makes a decision based on how well the product or brand matches the general description or stereotype they have. Anchor bias and adjustment, or anchor bias, is a condition in which initial values are adhered to in order to make an adjusted estimate to produce a final answer (Tversky & Kahneman (1974). Anchoring bias involves relying on specific information as an "anchor" to make judgments in uncertain situations and adjusting accordingly. However, individuals may become overly attached to the anchor and resist making significant adjustments. This tendency can lead to bias or errors because individuals place excessive trust in the anchor information and ignore other relevant information. This behavior can potentially cause problems as individuals rely too heavily on the anchor information (Asri, 2013). Availability bias is the tendency to make decisions based only on information that is already available (Javed et al., 2017).

2. Investment Decision-Making

Investment decisions are the process of investing with the expectation of future income (Shah et al.,

2018). Investing in research and keeping a clear mind increases the chances of making a successful investment (Rasheed et al., 2018). Every investor wants to get the most out of his/her investment. All investors want to make optimal investment decisions (Sharpe, 1964). According to Merton (1987), optimal rational investment decisions depend on prior financial knowledge.

Standard financial thinking assumes that everyone is well-informed and always makes rational decisions. However, investors' thoughts and feelings can change the decision-making process from rational to irrational (Baker & Nofsiner, 2002). Investment decisions are based on a number of factors, including the company's current market share and potential, the technology used by the company, and the value creation over the closing period (Caselli & Negri, 2018). Behavioral finance suggests that investment decisions can be irrational due to imperfect information (Bikhchandani et al., 1992), and sometimes limited rationality (Pompian, 2006).

3. Investment Horizon

The investment horizon is the period of time a person plans to invest his/her money for (Wu [2002] in Junarsin & Tandelilin, [2008]). The classical theory states that when the investment horizon increases, the investment risk will decrease, at which time diversification occurs (Fisher & Statman, 1999); (Abramov et al., 2015). Therefore, the investment horizon is an interrelated element in investment decisions.

4 Hypothesis Development

4.1. Representativeness Bias Towards Investment Decision-making

Representativeness bias is the tendency to make decisions or judgments based on the extent to which a situation or event matches a pre-existing stereotype. This concept was introduced by Tversky and Kahneman (1974) as part of the theory of human decision-making processes. According to Tversky and Kahneman, representativeness can occur when people judge the likelihood of an event based on the extent to which the event is similar to a category or stereotype that is already in their minds. Representativeness bias can affect the decision-making process by causing people to ignore important information that doesn't fit the stereotypes they have in mind. This can lead to errors in making predictions or probability estimates, as well as in choosing the optimal option. Representativeness bias has a significant impact in the investment context. This bias can affect investors' decisions in evaluating investments and taking risks (Waweru et al., 2008).

A study of the effect of behavioral bias on individual investors' trading decisions shows that representativeness bias has a positive effect on irrational investment decisions (Ikram, 2016; Irshad et al., 2016; Dangol & Manandhar, 2020). Investors are only interested in investing because the company has a good reputation as a company that performed well in the previous year (Petkova et al., 2014). Thus, representativeness bias reduces the risk of decision-making (Yaowen et al., 2015). On the other hand, representativeness bias can contribute to irrational and risky investment decisions. Therefore, the researcher argues that representativeness bias lowers the quality of investment decision-making because investors suffering from it cannot always make rational decisions.

They show irrational market behavior. Based on the results of the discussion above, the first hypothesis of this study is:

H_1: Representativeness bias has a positive effect on irrational investment decision-making.

4.2. *Effect of Anchoring and Adjustment Bias on Investment Decision-making*

Anchoring and adjusted bias can be inferred as the tendency of investors to believe that the "fixes" they obtain are used as the main guide for investment decisions (Pompian, 2006), and these behaviors can lead to bias or error. This is because they tend to trust the information and not care about other details (Asri, 2013). Investors exposed to fixed bias are more likely to purchase stocks that meet their initial expectations (Khan et al., 2017).

A study by Ishfaq & Anjum (2015) found that peg bias has a positive effect on risky investment decisions. Lowies et al. (2016) show that pegging can influence the investment decisions of real estate fund managers registered in South Africa. This bias can lead to incorrect calculations and potential lost profits. After examining the relevant literature, the researcher hypothesizes that anchor bias tends to increase irrational investment decisions and makes investment mistakes and misjudgments that can lead to losses.

H_2: Anchoring and adjustment bias positively affect irrational investment decision-making.

4.3. *Effect of Availability Bias on Investment Decision-making*

Due to availability bias, decision-making is based only on the information already available (Tversky & Kahneman, 1974). Thus, it can be judged that these events are more frequent and more likely than others because decision-making is based solely on the available knowledge and not on the study of other alternatives (Javed et al., 2017). Availability bias prevents investors from choosing the right investment due to erroneous judgments (Shah et al., 2018).

Investor preferences depend on what they know (Harris & Raviv, 2005). Competition among investors requires investors to respond quickly to the available information (Bowers et al., 2014); as a result, instead of making rational decisions, they rely on shortcuts such as accessibility bias to make irrational decisions. Accessibility bias increases investors' irrational investment decisions (Rasheed et al., 2018; Mumtaz & Ahmad, 2020). A review of the relevant literature shows that economic bias leads investors to make bad or irrational investment decisions. Therefore, the third hypothesis of this study is as follows:

H_3: Availability bias has a positive effect on irrational investment decision-making.

4.4. *Investment horizon (long and short term) Moderates the Effect of Bias Heuristics on Investment Decision-making*

Investment timing mitigates the impact of heuristic errors on irrational investment decisions. All investors want to make rational investment decisions, as described by the traditional financial concepts, but in reality, investors do not behave rationally because of their limited rationality (Pompian, 2006). In uncertain situations, people make quick and easy decisions, reducing their efforts to find alternative solutions to system errors and the complex assumptions that lead to system errors. Ritter (2003) defines heuristics as rules of thumb that decision-makers use to make decisions easier in complex and uncertain environments, by reducing the complexity of probabilistic measurements and predicting values with more superficial judgments (Tversky & Kahneman, 1974).

Some investors invest their money in long-term and short-term investments. Short-term investments aim to increase the short-term returns on risky assets, and then they are sold. Short-term investors are more prone to bias than long-term investors because long-term investments maximize the ultimate expected value of wealth

(Vives, 1995), since short-term and long-term investors have different personalities, and the length of the investment period also affects their investment decisions. Overconfidence, herding, social pollution, and representation heuristics will be higher for short-term investors than for long-term investors (Lakshmi et al., 2013). Chaudary (2019) explores the effects of the salience heuristic. Research has shown that the salience heuristic has a positive effect on short-term and long-term investment decisions. Venkatapathy & Sultana (2016) state that short-term investors are more susceptible to heuristic bias than long-term investors. From a review of the literature, Hypothesis H4 of this study is as follows:

H4a: The effect of representativeness bias on irrational investment decision-making will decrease when investors choose long-term investments over short-term investments.

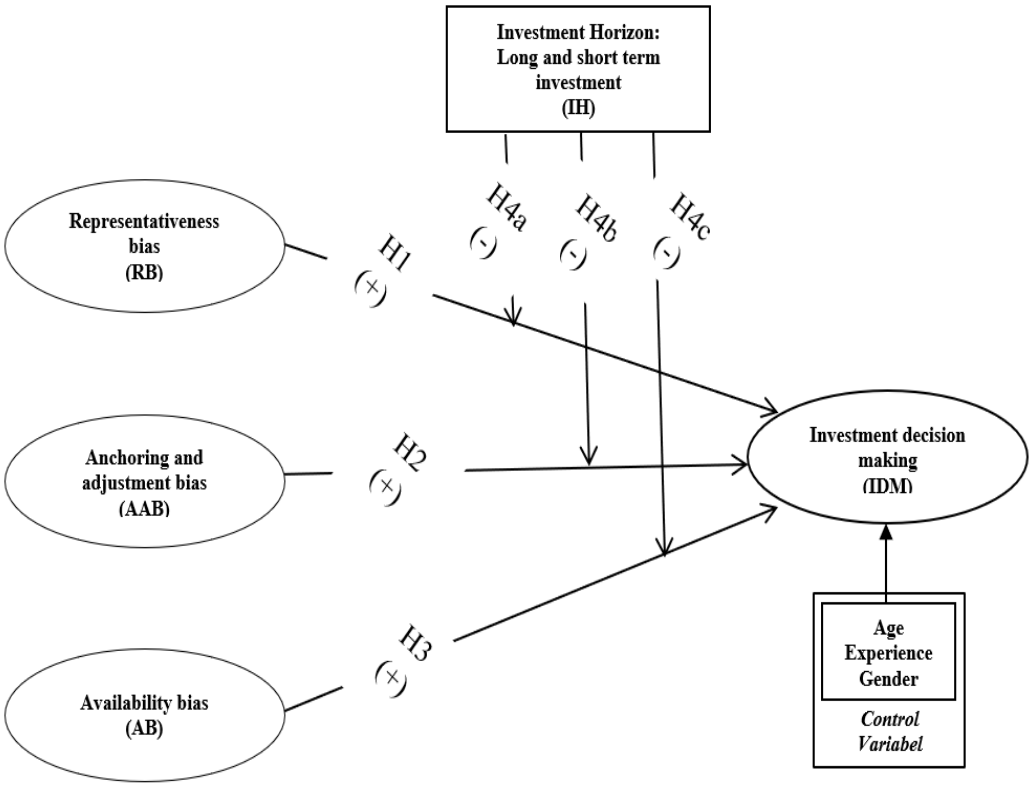
H4b: The effect of anchoring bias on irrational investment decision-making will be reduced when investors choose long-term investments over short-term investments.

H4c: The effect of availability bias on irrational investment decision-making will be reduced when investors choose long-term investments over short-term investments.

5. Research Model

After developing the hypotheses, the research model shown in Figure 1 was created.

Figure 1. Research model



METHOD, DATA, AND ANALYSIS

1. Sample

This study used samples with primary data from investors who met the established criteria. They must have invested in financial instruments in shares (stocks), have had a securities account with one of the securities companies in Indonesia, and be an individual investor. A total of 337 people participated as respondents, and 295 of them met the sample criteria; after considering the bias and outliers, the final sample used in this study came to 293. The research sample is in accordance with the sample standards required by Hair et al. (2014) the sample in a research model that has less than five or equal to five latent constructs with more than three indicators per each construct requires a minimum sample size of 100 observations (Nurhayati et al., 2021; Siahaan et al., 2022).

2. Data collection

The data were collected for this study using a survey technique. The questionnaires were distributed online to the respondents; some of them were members of a stock investors' chat group and some respondents were not members of the group. For those respondents who were not members of the investors' chat group, the questionnaires were distributed to them personally via short messages. The indicators for each construct in this study used various sources for the constructs of representativeness bias, anchoring and adjustment bias, while availability bias used measurement items developed by Nada & Moa'mer (2013) in Shah et al. (2018) and Abdin et al., (2017). The investment decision item measurement construct was developed by Scott & Bruce (1995). All items used a scale from 1 = strongly disagree to 5 = strongly agree. Then the investment horizon used a dummy variable "1" for long-term investment and "0" for short-term investment (Sultana et al. [2018]). Age, experience and gender were the control variables used in the study. The control variables were used to ensure that the independent variables used in the study were actually able to influence the dependent variable in the study.

The control variables were dedicated to assessing the external variables confounding the hypothesized relations; the function of the control variables was to prevent biased calculation results as a result of causal relationships; this also strengthened the empirical model, making it more accurate (Cooper & Schindler, 2014). The results of testing the control variables would not be discussed as a research hypothesis because the control variables were used as a robustness test of the model tested by the research's hypotheses. Differences in the age and experience of each respondent could have affected the quality of their investment decision-making, as stated by Abdin et al., (2017); Shah et al., (2018). In addition, gender differences could also have affected the investment decisions made by the investors. This was also in accordance with research conducted by Sudirman & Pratiwi (2022) who found gender differences owned by investors had an effect on their excessive self-confidence, which exposed the investors to bias when making their investment decisions.

3. Analysis methods

The data analysis method in this study used SEM-PLS, which is a multivariate analysis technique that examines the relationship between the latent variables in complex models (Hair et al., 2019; Kock, 2020). Using the SEM-PLS model, the testing was carried out in two stages, firstly testing the research instruments and then testing the hypotheses. Convergent validity testing used the average value of extracted variance (AVE) $\geq$ 0.5, and convergent validity would be confirmed if the loading factor value of each indicator was more than 0.5, and it would be said to be ideal when it had a value $\geq$ 0.7, while discriminant validity would be met if the AVE root value was

higher than the correlation value, then the construct reliability test used a value of composite reliability ≥ 0.70 (Hair et al., 2019); (Adi & Sukmawati, 2020).

Data collection in this study anticipated the presence of common method bias (CMB) and followed the recommendations of Podsakoff et al. (2003) by, (a) designing research procedures and (b) using statistical testing. In this study, the researchers did several things when carrying out procedural designs to mitigate CMB, namely: Measuring the predictor variables and criteria from various sources; separating the temporal measurements by creating a time lag between the predictor variables and the criterion; protect the anonymity of the respondents; improving the item scale so it avoided item ambiguity by defining ambiguous or unknown terms, avoiding items with multiple meanings, and avoiding normative questions; giving a code for each construct's name (RB, AAB, AB, and IDM), while the results of statistical testing for CMB in this study used Harman's one single-factor test. They finally tested the moderation hypothesis in this study using multi-group analysis (MGA) (Sarstedt et al., 2011; Sholihin & Ratmono, 2021).

RESULT AND DISCUSSION

1. Respondent background

The sample used in this study consisted of 293 people, 228 were men and 65 were women. Judging from their work, the largest group of respondents (131 or 44.2%) were private employees. Investors who had investment experience of less than one year numbered 117 people or 40%, 150 people (51%) had experience of investing for 1 to 5 years, and 26 people (9%) had been investing for more than five years. For the length of time for the investments, the researchers classified the sample into two groups of long-term and short-term investors; 150 (51%) of the investors chose long-term investments, and 143 (49%) chose short-term investments.

4.2. Hypotheses testing

The study applied SEM-PLS to test the hypotheses, due to the multivariate relations between the latent variables manifested in a complex model, which could be estimated simultaneously (Kock, 2018; Hair et al., 2014; Alif & Nastiti, 2022). According to Hair et al., (2014), convergent validity would be confirmed if the loading factor value of each indicator was more than 0.50 and ideal when it had a value of more than 0.70 with a p-value of less than 0.50, and elimination would be suggested for those with a loading factor value of less than 0.40. Referring to the above criteria, the study deleted some item statements, including two items from the construct of representativeness bias: (1) "I bought hot stocks in the market recently," (2) "I used trend analysis (observing stock movement patterns) in certain stock groups (LQ45, ISSI30, PEFINDO 25, JII, ISSI) when making stock purchase decisions." Three items from the anchoring bias construct were also deleted: (1) "I tend to sell my shares after the price reaches the highest point in the current year," (2) "I do not want to buy shares if the price is higher than last year's price," (3) "I use the initial share purchase price as a reference point for selling shares." One item of the availability bias construct was deleted as well: (1) "I prefer to buy shares of national companies rather than international stocks because there is more information on national stocks." Further, as previously reported, the results showed satisfactory reliability as the value of the whole construct's composite reliability was ≥ 0.70. Following the testing results, the research instruments are presented in tables 1 and 2.

Table 1. Combined loadings and P-value

	RB	AAB	AB	IDM	P-Value
RB1	0.69[b]				<0.001
RB2	0.74				<0.001
RB3	0.72				<0.001
RB4	0.29[a]				<0.001
RB5	0.56[b]				<0.001
AAB1		0.69[b]			<0.001
AAB2		0.65[b]			<0.001
AAB3		0.52[b]			<0.001
AAB4		0.71			<0.001
AAB5		0.57[b]			<0.001
AAB6		0.73			<0.001
AAB7		0.60[b]			<0.001
AB1			0.77		<0.001
AB2			0.82		<0.001
AB3			0.73		<0.001
AB4			0.63[b]		<0.001
AB5			0.76		<0.001
AB6			0.80		<0.001
AB7			0.24[a]		<0.001
AB8			0.68[b]		<0.001
IDM1				0.80	<0.001
IDM2				0.79	<0.001
IDM3				0.84	<0.001
IDM4				0.76	<0.001
IDM5				0.75	<0.001

Notes: a *Loading <0.50* b *Loading* >0.50 - <0.70. n = 293. RB: representativeness bias, AAB: anchoring and adjustment bias, AB: availability bias, IDM: investment decision-making

Source: The data is processed on Warp-PLS 7.0.

Table 2. Descriptive statistics, validity, and reliability testing

Construct	Mean	SD	CR	AVE	1	2	3	4	5	6	7
Representativeness Bias	4.06	0.55	0.81	0.58	**0.76**						
Anchoring and Adjustment Bias	3.71	0.63	0.82	0.53	0.36**	**0.73**					
Availability Bias	3.11	0.72	0.90	0.56	0.01	0.28**	**0.75**				
Investment decision-making	3.31	0.92	0.89	0.63	0.05	0.32**	0.44**	**0,79**			
Age	2.51	0.90	0.09	-0.18	-0.07	-0.10	0.09	-0.18	**1**		
Experience	1.22	0.41	-0.08	-0.09	-0.07	-0.16	-0.08	-0.09	0.37**	**1**	
Gender	1.69	0.62	0.07	-0.09	-0.00	-0.06	0.07	-0.09	-0.09	0.00	**1**

Notes: the diagonal line (Bold) is the AVE root of the correlation between constructs, CR: composite reliability, AVE: average variance extracted, SD: Standard deviation, ***P-value* < 0.01, **P-value* < 0.05.

Source: data processed in the Warp-PLS 7.0

Furthermore, testing of the common method bias was undertaken using Harman's one single factor test; the limit value, so as not to be exposed to method bias, was the variance value for factors that had a percentage of the variance (extraction sums of squared loadings) of less than 50% (Podsakoff et al., 2003; Malhotra et al., 2006). Table 3 shows the testing of the common method bias (CMB) with Harman's one single-factor, using the SPSS 25 analysis tools.

The results of the CMB test showed the value of the percentage of the variance was 20.25%, which was less than 50%, so it could be concluded that the model designed by this study was not exposed to method bias.

Tabel 3 Harman's one single-factor test results.

Total Variance Explained					
Initial Eigen Values			Extraction Sums of Squared Loadings		
Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
5.70	30.02	30.02	5.70	30.02	30.02

Source: The data is processed on the SPSS 25.

Figure 2. Hypothesis testing model

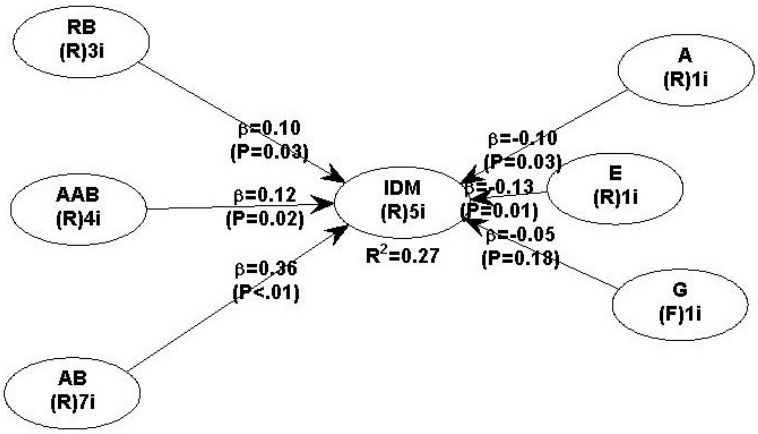


Table 4. Hypothesis testing results

Construct	Model 1	Model 2	Decision
Age	-0.06	0.01	
Experience	-0.13**	-0.12*	
Gender	-0.07	-0.04	
Representativeness bias		-0.04	Not supported
Anchoring and adjustment bias		0.20**	Supported
Availability bias		0.37**	Supported
R^2		0.27	

Notes: ***P-value*< 0.01, **P-value*< 0.05, n=293, the dependent variable is investment decision-making. Model 1 testing control variables, model 2 testing independent and control variables simultaneously

Source: data processed in Warp-PLS 7.0.

The theory of bounded rationality supported this study in making investment decisions by measuring investors' perceptions of trading on the IDX against heuristic biases in the investment decision-making process in the midst of the COVID-19 pandemic, which had an impact on irrational rather than rational decisions. Rational limitations possessed by investors would lead to a tendency to make irrational decisions because investors tend to make simple and quick decisions rather than carrying out their analysis using comprehensive information, resulting in conditions that have high uncertainty, especially in complex and high-risk situations such as during theCOVID-19 crisis, when investors demonstrated irrational behavior, as shown by the research's results. This research model also examined the impact of heuristic bias based on the length of the investment, to discover whether long-term investments or short-term investments were more likely to be exposed to heuristic bias.

The test results on representativeness, anchoring, and adjustment and availability bias obtained an R2 value of 0.27; this explained that the predictor variables for representativeness bias, anchoring, and adjustment bias, and availability bias were 0.27 or 27% and the predictor variables outside the research model explained the other 73%. The results of the representativeness bias test on investment decision-making obtained a coefficient value (β) of -0.04 with a p-value of 0.24, which was> 0.01, so Hypothesis 1 was not supported; representativeness bias did not have a positive effect on irrational investment decision-making, meaning that the idea that representativeness bias increased irrational investment decision-making was not proven in this study. Because heuristics are closely related to certain situations, but not because of someone's personality, investors rely on heuristics based on their knowledge and experience (Gigerenzer & Gaissmaier, 2011), so that investors do not always rely on representativeness bias in making investment decisions, as every investor has a habit of reacting in a specific way, in the context of certain decisions (Scott & Bruce, 1995). Previous research conducted by Lazuarni and Asri (2019) found that heuristics resulted in anomalies in the fundamental analysis that had been carried out. This had an impact on stock performance irregularities that were considered, based on the fundamental analysis carried out.

Further, Hypothesis 2,regarding anchoring bias's effect on investment decision-making, obtained a coefficient value (β) of 0.20 with a p-value of 0.001, which was< 0.01, so Hypothesis 2 was supported; anchoring and adjustment bias had a positive effect on irrational investment decision-making, meaning that anchoring bias increased the irrational investment decision-making. These results supported the research conducted by Dangol & Manandhar (2020), who found that anchoring and adjustment bias increased irrational investment decision-making. Anchoring bias caused misjudgment and had the potential to miss making a profit (Lowies et al., 2016); it also led to riskier investment decisions (Ishfaq & Anjum, 2015).

Hypothesis 3 examined availability bias's effect on investment decision-making, and the test results obtained a coefficient value (β) of 0.37 with a p-value of 0.001, which was< 0.01. Hypothesis 3 was therefore supported; availability bias had a positive effect on irrational investment decision-making. These results supported the research conducted by Rasheed et al. (2018); Mumtaz & Ahmad (2020) who stated that availability bias had a positive effect on irrational investment decision-making. Availability bias caused investors to rely on limited information when making investment decisions. This limited information led to specific investment patterns, and sometimes even irrelevant information also influenced investment

decisions (Kirchler et al., 2005). Khan (2017); Shah et al. (2018) examined the impact of availability bias on individual investors' investment decisions, and found that availability bias caused investors to make wrong investments and to invest irrationally.

Model 3 tested there presentativeness's bias toward investment decision-making and obtained a p-value of0.03 and a beta of -0.14, both of which were significantly negative. Anchoring bias toward investment decision-making obtained a p-value of 0.002 and a beta value of 0.23, both of which were significantly positive. Availability bias on investment decision-making obtained a p-value of 0.001 and a beta value of 0.33, both of which were significantly positive. Model 4 tested the representativeness bias's effect on investment decision-making and obtained a p-value of 0.17 and a beta value of 0.07, neither of which were significant. Anchoring bias toward investment decision-making obtained a p-value of 0.013 and a beta value of 0.18, both of which were significantly positive. Availability bias toward investment decision-making obtained a p-value of 0.001 and a beta value of 0.45, both of which were significantly positive.

Finally, in model 5, the multi-group analysis test used the pooled standard error method. The results of the representativeness bias test on investment decision-making, based on the length of time of the investment produced a p-value of 0.04, which was<0.05 with a negative direction, so that Hypothesis H4a was supported; meaning that it can be interpreted that the influence of representativeness bias on irrational investment decision-making will decrease when investors are more interested in making long-term investments. This showed that the effect of representativeness bias on irrational investment decision-making will decrease when investors are more interested in making long-term investments. These results showed that the length of the investment period, which also affected investment decisions, was due to the nature of short-term investors, which is different from that of long-term investors (Lakshmi et al., 2013) because short-term investments only maximize short-term returns on risky assets and investors look to sell them in the near future. Long-term investors look to maximize the expected value of final wealth (Vives, 1995), so short-term investors are more susceptible to heuristic bias than long-term investors (Venkatapathy & Sultana, 2016).

Furthermore, the testing of anchoring bias and availability bias toward investment decision-making based on investment time produced a p-value of 0.66, which was > 0.05, and a p-value of 0.27, which was > 0.05, respectively, so H4b and H4c were not supported. It can be interpreted that anchoring and availability bias increase irrational investment decision-making for long-term and short-term investors. These results support Chaudary's (2019) research, which showed that the salience heuristic positively impacted

Table 5 Testing the moderating effect with multi-group analysis (MGA)

Construct	Model 3	Model 4	Model 5	Decision
Representativeness bias	-0.14*	0.07		
Anchoring and adjustment bias	0.23**	0.18*		
Availability bias	0.33**	0.45**		
Representativeness bias*investment			(-1.99)*	Supported
Anchoring and adjustment bias*investment			(0.44)	Not supported
Availability bias*investment			(-1.09)	Not supported

Notes: ***P-value*< 0.01, **P-value*< 0.05, n= 293, model 3 testing based on long-term investment, model 4 testing based on short-term investment, model 5 testing multi-group based on the investment horizon.

Source: data processed in Warp-PLS 7.0.

investment decisions both in the short and long term.

CONCLUSION AND SUGGESTION

The purpose of this study is to explore the impact of heuristics (representativeness, anchoring, and availability bias) on investment decision-making on the IDX with the moderating role of investment time. The results prove that individual investors behave irrationally when making investment decisions. This is supported by the theory of limited rationality. Furthermore, anchoring and availability bias increase irrational investment decision-making, while the results for representativeness bias do not support this. This study also shows that the effect of bias on irrational investment decisions will be reduced when investors make long-term investment decisions, based on representativeness bias. At the same time, the anchoring bias and availability bias are not proven. The moderating effect of investment time on the relationship between representativeness, anchoring, and availability bias heuristics and investment decision-making is also found in a study conducted by Shah et al. (2018), which recommends investment time as a further test of the heuristic relationship with investment decision-making, and is the first such study undertaken in Indonesia. This study contributes to the existing literature on behavioral finance by providing further insights into the relationship between representativeness, anchoring and availability bias in investment decision-making for long-term and short-term investments.

Furthermore, this research has important theoretical and practical implications, and it is useful for financial practitioners, such as investors who play the stock exchange, portfolio managers, financial planners on the stock exchange, financial analysts, and everyone who manages corporate entities and is responsible for making financial decisions. This research will provide information that can help investors understand how they make decisions and what factors influence those decisions; then, by improving their decision-making ability due to the influence of heuristics, it will help investors realize and identify irregularities in their decision-making process, thereby helping them make wiser decisions. This research also helps minimize risk, because it helps investors understand how certain factors can affect investment risk, thereby helping them make more informed and more measurable decisions. The latter improves efficiency because it can help investors understand how to maximize their returns and minimize costs, thereby increasing efficiency and helping them make better investment decisions. As for the benefits for policymakers, this research is useful as it provides a basic argument for government intervention to help investors make wiser investment decisions. Furthermore, it helps regulators understand how heuristics affect investment decisions and helps them to make better regulations. Finally, it provides the basis for educational programs to help investors make wiser investment decisions and make the regulations more transparent.

This study has limitations. It only focuses on one cognitive bias, namely heuristics, even though there are still many cognitive biases such as mental accounting, hindsight, farming, and overconfidence bias that can be investigated in investment decisions. Future research is expected to be able to use qualitative studies, firstly to predict the factors that can influence investment decisions and then be tested quantitatively, and secondly, to be able to examine the impact of heuristics on the investment performance that will be generated, because this research only researches investment decision-making.

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