

-RESEARCH ARTICLE-

INVESTMENT IN PANDEMIC: DO BEHAVIORAL AND DEMOGRAPHIC FACTORS PLAY A ROLE?

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—Abstract—

The roots of financial conduct can be traced to psychology, which demonstrates that individuals cannot make decisions without being influenced by psychological conditions and demographic considerations. In addition, numerous empirical research findings about financial-based psychology have surfaced, strengthening suspicions about conventional financial conceptions. Therefore, the study of financial behavior should be expanded and investigated in greater depth to understand better how behavioral aspects influence individual investors. The study's primary objective is to investigate the behavioral bias factors that influence the investment decisions of individual investors in the Indonesian stock market during the COVID-19 pandemic. The study will also attempt to analyze how behavioral biases influence the investment decisions of

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individual investors in the capital market, taking demographic factors into account. The study sample was comprised of 238 questionnaire recipients. A quantitative investigation employs primary data. The statistical testing instrument employed is SmartPLS version 3.3.2. Non-probability sampling is the method employed. During the COVID-19 pandemic, the data demonstrated that behavioral bias factors strongly influenced investment decisions.

In contrast, demographic characteristics such as gender, age, education, income, and overall investment experience did not significantly influence the investment decisions of individual investors during the COVID-19 pandemic, either directly or by mitigating the aforementioned behavioral bias effects. Nevertheless, there are significant gender differences in the moderating effect of heuristic and market bias on investment decisions. In addition, the investment experience variable reveals a significant difference between investors with a high level of experience and those with a low level of experience concerning the moderating effect of prospect bias on investment decision-making. This study has ramifications for investors' investment decisions. Behavioral and demographic aspects might be considered by investors when choosing investments.

Keywords: Behavioral Bias, Investment Decisions, Financial Behavior, Demographics

JEL Classification: D25, E22, G41

1. INTRODUCTION

The COVID-19 pandemic has had a substantial economic impact characterized by stock price volatility, market instability, and excessive confidence in financial institutions that cannot be adequately described by the conventional paradigm of finance theory (Bansal, 2020). S. R. Baker et al. (2020) demonstrate that no prior pandemic epidemic comparable to the Spanish Flu has affected the stock market as much as COVID-19. According to his research on the U.S. stock market, government limits on economic and social activities distance are the primary reason why the stock market reacted significantly more strongly to the COVID-19 epidemic than to the 1918-1919, 1957-1958, and 1968 pandemics. During COVID-19, capital market conditions in Indonesia were volatile, as evidenced by the Composite Stock Price Index (JCI) falling 31.1% year-to-date to its lowest level of 4,330.67 on March 18; however, by January 2021, it had recovered to the level of 6,428 whereas, in early 2020, COVID-19 did not exist in Indonesia. www.idx.co.id. However, COVID-19 acted as a stimulus for the increase of Indonesian investors. According to KSEI data, the number of investors in Indonesia increased by 67% during the epidemic. Single Investor Identification (SID) numbers rose to 4.16 million from 2.50 million in the prior year KSEI, 2020. The market rebound during the epidemic and the rise in investors must be carefully analyzed. According to (S. R. Baker et al., 2020), other elements, such as psychological ones coming from the investor's perspective, might cause a swift and enormous market rebound. This market

anomaly can be explained by behavioral finance, which attempts to comprehend how emotions and cognition influence investment behavior. (Kengatharan et al., 2014).

The economic and financial theory presupposes that people act rationally and evaluate all relevant information while making decisions (Waweru et al., 2008). Bernstein et al. (1996) provides evidence of irrationality, inconsistency, and ineptitude in human decision-making, particularly in difficult situations. Behavioral finance is based on psychological findings that human decision processes are susceptible to cognitive illusions, which can be categorized into two groups: illusions of heuristic decision processes and illusions rooted in the adoption of mental frameworks in prospect theory, as well as herding behavior and market factors, which also influence decision-making (Waweru et al., 2008). The results of a review of past studies demonstrated that the assumptions of economic rationality underlying Portfolio Theory are not supported by investment decision-making. (Kinatta et al., 2021; Lowies et al., 2016); financial products (Sahi et al., 2013); stock investment (Ko et al., 2013; Li et al., 2020; Shah et al., 2018); world bond markets (Park et al., 2019), Equity (Jain et al., 2020), and equity crowdfunding (Jain et al., 2020). (Cicchello et al., 2022). Similar state-free research tests the bias model of investor glare by Bakar et al. (2016) in Malaysia, Rasheed et al. (2018) in Pakistan, Bankole (2019) in Nigeria, Subramaniam et al. (2017) in Sri Lanka, Raheja et al. (2020) in India, and Liu (2019) in China and (Kartini et al., 2021) in Indonesia explains that behavioral bias factors have been shown to influence investor The results of a study (Kartini et al., 2021) examining the cognitive and emotional characteristics of 165 investors in one of Indonesia's provinces found that anchoring bias, representativeness, overconfidence, loss aversion, optimism, and herding behavior promote investing decisions.

There are also prior studies in investment decision-making models that incorporate investor prejudice with variables of financial literacy G, 2021, investor type (Ullah et al., 2014), perception of market efficiency (Shah et al., 2018), and demographic characteristics (Shah et al., 2018). (H. K. Baker et al., 2019). With the advancement of investor behavior research and knowledge, bias in investment decision-making is also demonstrated by several literature review papers that map the topics of past and present research and the potential for future research subjects (Kumar et al., 2015; S. K. Mittal, 2022; Zahera et al., 2018). The findings of the complete literature review indicate that behavioral finance is a burgeoning finance topic, with most extant empirical research confined to developing nations and dependent on secondary data. 17 distinct types of biases have been discovered as a result of the analysis so that investors can understand behavioral biases, make sound investment decisions, and limit risk and prejudice in investment decision-making.

Among these behavioral elements, demographic considerations also influence investing behavior. Nonetheless, these studies were conducted during normal stock market

conditions and not during a pandemic, such as the present COVID-19 epidemic. [Metawa et al. \(2019\)](#) demonstrate that demographic parameters such as age, gender, and education significantly affect the behavioral aspects that influence investment decisions on the Egyptian stock market. Age, income level, and investment experience are the most influential demographic variables on individual investor behavior biases, according to [H. K. Baker et al. \(2019\)](#). [Hendrawaty et al. \(2020\)](#) also demonstrate the impact of demography on investing decisions, financial knowledge, and risk tolerance in Indonesia. [Bashir et al. \(2013\)](#) found that demographic considerations do not influence investment decisions in Pakistan.

This study addresses the void left by prior research by retesting the behavioral biases of individual respondents in Indonesia, correlating those biases to demographic characteristics, and testing throughout the Covid 19 period. In terms of respondents' geographical factors, demographic characteristics such as age, gender, education, income level, and investment experience, as well as behavioral biases (Heuristic, prospects, markets, and herdings) of individual investors to investment decisions, there has been no research or research that comprehensively examines these variables in Indonesia during the COVID-19 pandemic before this study. The originality of both studies is in their examination of how heuristic behavior bias proxies affect investment decisions directly or indirectly, as influenced by demographic factors. In addition, it will investigate how various components of behavioral bias in each demographic factor are utilized in this study. The originality of both studies is in their examination of how heuristic behavior bias proxies affect investment decisions directly or indirectly, as influenced by demographic factors. In addition, it will investigate how various components of behavioral bias in each demographic factor are utilized in this study. This study has ramifications for investors' investment decisions. Behavioral and demographic aspects might be considered by investors when choosing investments. This investigation is also based on investor financial behavior. Consequently, the outcomes of this study will contribute to the advancement of behavior theory. Based on the Indonesia Stock Exchange's vitality data, the JCI stock index declined and then recovered in 2020, just as the pandemic was not yet over; this study aims to investigate this phenomenon so that when a global phenomenon occurs in the future, the results of this study can be considered by investors when making investment decisions.

2. LITERATURE REVIEW

2.1 Behavioral Finance

Financial behavior is the study of how humans behave and react to available information and then utilize it to make judgments that maximize the rate of return (utility) of investment decisions while paying attention to its inherent risks. ([Murbarani, 2019](#)). In decision-making theory, the concept of a rational investor signifies that the action chosen in decision-making is the action that will provide the highest predicted utility.

(Puspitaningtyas, 2013). Behavioral finance is founded on the psychological premise that human decision-making processes are susceptible to cognitive illusions, which can be categorized as cognitive illusions of heuristic decision processes and cognitive illusions rooted in the adoption of mental frameworks in prospect theory. Additionally, herding behavior and market considerations impact decision-making. (Waweru et al., 2008). According to Waweru et al. (2008), heuristics are rules of thumb that humans employ when making complex decisions under uncertain settings. In situations where all pertinent information is obtained and examined objectively, decision-making is wholly illogical. Instead, decision-makers utilize ad hoc methods. This study has five components of heuristic behavior bias: Overconfidence, Gambler's fallacy, Availability bias, Anchoring, and Representativeness. Prospect theory provides a framework for explaining how behavioral factors influence investing risk tolerance. For instance, profits and losses are valued instead of the ultimate net asset, and likelihood is substituted by decision weight. According to Waweru et al. (2008), Prospect theory explains numerous states of thought that are anticipated to influence an individual's decision-making process. Loss aversion, Regret aversion, and Mental accounting are the four components of prospect theory dimensional behavior bias examined in this study.

It has been demonstrated empirically that market factors strongly influence the decision-making behavior of investors. (Sochi, 2018) Discover how investors are affected by happenings in the stock market that are of interest to them, even when they cannot predict the future performance of their investments. Waweru et al. (2008) identify market elements such as price movements, market information, stock trends, prior stock trends, consumer preferences, overreactions to price changes, and corporate fundamentals underlying stock prices. According to (Sochi, 2018), in financial markets, herding behavior is investors' tendency to imitate other market participants' investments. Practitioners are typically skeptical of vulture factors because these investors rely more on collective knowledge than personal information. Waweru et al. (2008) highlight key factors influencing individual investment decisions, including purchasing, selling, stock selection, stock volume, and herding speed. Numerous research has investigated the effect of demographic variables on behavioral biases in investment decision-making. Each investor is of different age, gender, income level, and investment experience; therefore, these demographic factors can either diminish or amplify the impact of these behavioral biases. The empirical evidence from prior studies will be used to explain these variables briefly.

2.2 Age Factor

Age factors influence the investment decision-making process, with older people being better at decision-making than younger people due to their greater knowledge and experience. (Korniotis et al., 2011) Even though age negatively correlates with risk-taking (Sadiq et al., 2014), Chitra et al. (2014) demonstrate that age significantly

influences the behavioral biases of representativeness anchoring and overconfidence. In addition, the findings of [Jamshidinavid et al. \(2012\)](#) concur with [Li et al. \(2020\)](#), indicating that younger investors tend to behave as if they are herding older investors.

2.3 Gender Factor

Among other demographic factors, [Chavali et al. \(2016\)](#) describe gender difference as the most important variable that can explain the majority of differences in behavioral biases, as evidenced by research ([Li et al., 2020](#); [Tekçe et al., 2016](#)) indicating that women have a more significant disposition effect than men. However, men are more susceptible to overconfidence than women. On the herding factor, women tend to follow other investors' investment decisions with less deliberation than men.

2.4 Educational Factors

Investigate education factors [Alquraan et al. \(2016\)](#) significantly impact investment decisions, particularly for those with bachelor's degrees and diplomas. [Jamshidinavid et al. \(2012\)](#) also found that the greater the level of education, the greater the investors' confidence. [Chitra et al. \(2014\)](#) also discovered a significant relationship between representativeness and anchoring biases. Similarly, [Hibbert et al. \(2013\)](#) demonstrate that the level of education of both men and women influences investment decisions equally.

2.5 Income Level

[M. Mittal \(2010\)](#) Cognitive biases are more prevalent among investors with higher incomes, whereas investors with lower incomes are more susceptible to prospect theory-based biases. [Tekçe et al. \(2016\)](#) found that low-income men are more frequently subjected to bias. However, the findings of [Huei-Wen \(2011\)](#) have little effect on the income level of investors.

2.6 Investing Experience

[Sochi \(2018\)](#) contends that the herding effect will reduce as investors increase their financial literacy. According to [Hibbert et al. \(2013\)](#), as cited in [Zahera et al. \(2018\)](#), an investor's investment experience will considerably impact his investment risk-taking. While [Bodnaruk et al. \(2015\)](#) discovered that experienced investors invested without soliciting stock advisor suggestions, less experienced investors were susceptible to bias. According to [Kaustia et al. \(2012\)](#), more investor experience decreases overconfident behavior. This study focuses on behavioral theory models. The four dimensions [Waweru et al. \(2008\)](#) identified for behavioral bias variables influencing investing decisions are heuristic, prospect, market, and vulture. Different research conducted in other nations has yielded diverse findings about the influence of behavioral bias variables on investment decisions. While previous research has demonstrated that demographic factors play a role in the investment decisions of individual investors, the purpose of this

study is to examine whether demographic factors such as age, gender, education, income level, and investment experience influence the behavioral biases of individual investors in the context of the COVID-19 pandemic in Indonesia. Based on the conceptual structure, the following hypothesis can be advanced:

- H₁. Behavioral bias factors affect individual investor investment decisions during the COVID-19 pandemic
- H₂. Demographic factors affect individual investors' investment decisions during the COVID-19 pandemic
- H₃. The influence of behavioral bias factors on individual investment decisions during the COVID-19 pandemic is moderated by demographic factors

3. METHODOLOGY

This study's population consists of all individual investors on the Indonesia Stock Exchange. According to the most recent data on the number of individual investors using Single Investor Identification (SID)-(KSEI), KSEI Single Investor Identification or SID is the only identify of investors utilized to conduct transactions and settlements on the Indonesian capital market. As a result, the number of individual investors in the Indonesian stock market reached 1,592,698 as of December 10, 2020. Each member of the population did not have a known or predetermined chance of being chosen as a sample. Hence nonprobability sampling techniques were utilized. Convenience sampling is employed in this study as a more targeted methodology. The sample was chosen with convenience in mind. The encountered population individuals are willing to serve as respondents for the study's samples (Darmawan, 2013). In cross-sectional research, the research design and time of data collection are incorporated. Several respondents were sent surveys directly or via a Google form link to collect data. In parallel research, data analysis is comparable (Chira et al., 2008). A Likert scale is a mixed rating scale requiring responders to agree or disagree with statements expressing positive or negative sentiments toward items. PLS-SEM is the data analysis approach used. This study conducted PLS-SEM testing using SMART PLS software version 3.3.2. The questionnaire was pre-tested on 30 investor samples and finalized before being used for the main spread to acquire accurate and reliable results. The distribution of the questionnaire yielded 238 responses. Therefore, the quantity is sufficient for testing the model, as it meets the recommended minimum of 10 times the number of indicators. (Hair et al., 2011).

4. RESULT AND DISCUSSION

According to the test results, the contract value of each variable is greater than that of the other variables. Consequently, each variable contract in the study retains a high level of discriminant validity. In addition, the validity of discriminants can be determined

using cross-loading values. The value on the indicator block must exceed the correlation value between blocks of latent variables.

Upon examination of the value data, all indicators have a value less than 0.90. Consequently, all latent variables have excellent discriminant validity. Reliability tests are conducted to determine the consistency of an instrument's measurement results, despite being conducted at different times, locations, and with different populations. Construct reliability is deemed reliable when both the composite reliability and Cronbach's alpha are greater than 0.7.

Based on [table 1](#), it is known that the contract value of each variable is greater than that of the other variable; thus, it can be stated that each variable contract in the study still possesses a high value of discriminant validity. The discriminant validity can also be determined based on the cross-loading value, which requires that the value of the same indicator block be greater than the correlation value between latent variable blocks. In this study, the cross-loading values are listed in [Table 1](#).

Table 1. Cross Loading

	<i>Heuristic</i>	<i>Prospect</i>	<i>Market</i>	<i>Herding</i>	<i>Investdec</i>
HEU2	0.727	0.431	0,553	0,481	0,487
HEU3	0.833	0.436	0,613	0,525	0,667
HEU4	0.798	0.524	0,630	0,547	0,473
HEU5	0.859	0.613	0,642	0,596	0,611
HEU6	0.853	0.351	0,685	0,294	0,777
PRO2	0.457	0.805	0,564	0,488	0,530
PRO4	0.461	0.799	0,511	0,438	0,353
PRO5	0.469	0.801	0,581	0,492	0,338
PRO6	0.457	0.859	0,580	0,498	0,403
MF1	0,531	0.536	0,811	0,415	0,621
MF2	0,689	0.555	0,843	0,496	0,665
MF4	0,674	0.536	0,845	0,476	0,667
MF5	0,602	0.643	0,725	0,600	0,486
MF6	0,568	0.498	0,759	0,400	0,599
HER1	0,502	0.577	0,493	0,821	0,326
HER2	0,408	0.418	0,445	0,830	0,339
HER3	0,465	0.373	0,480	0,833	0,373
HER4	0,512	0.556	0,503	0,778	0,383
INV1	0,686	0,449	0,710	0,462	0,898
INV2	0,722	0,523	0,701	0,365	0,916
INV3	0,670	0,432	0,686	0,372	0,921

Reliability tests are conducted to determine the constancy of the regularity of an instrument's measurement results, despite being performed at different times, locations, and with diverse populations. When the composite reliability and Cronbach's alpha are more than 0.7, the construct dependability is deemed dependable. The results of the computation for the reliability test are shown in [Table 2](#) below.

Table 2. Measurement Model Test

Construct	AVE	Composite Reliability	Cronbach's Alpha
<i>Heuristic</i>	0,666	0,875	0,908
<i>Prospect</i>	0,665	0,836	0,889
<i>Market</i>	0,831	0,857	0,897
<i>Herding</i>	0,637	0,833	0,888
<i>Investdec</i>	0,666	0,898	0,936

According to the results of the calculations, the average variance extracted (AVE) value for all variables is greater than 0.5. This signifies that the indicator has been declared suitable for measuring variables. In addition, each construct's composite reliability and Cronbach's alpha value were greater than 0.70, indicating that all variables were deemed reliable for analyzing the measurement model. Internal or structural model testing is then conducted to determine the relationship between the construct, the significance value, and the R-square of the research model. Structural models determine relationships between latent constructs by examining parameters' estimated coefficient and their significance level. The structural model utilized in this study is depicted in [Figure 1](#).

The variable investment choice R-square value is 0.668%. The value acquisition explains that 69.2% of investment choice variables are defined by heuristic variables, prospects, market factors, and loadings, while 30.8% are explained by variables not included in this study 1998. The value falls under the category of moderate to moderate. The variable investment choice has a Q-square value of 0.547.047. This indicates that external constructs have a substantial predictive value for their endogenous counterparts ([Hair et al., 2011](#)). Two latent variables, namely heuristic and market variables show a moderate influence, with respective values of 0.238 and 0.228, but prospect and vending variables have no effect.

The testing of hypotheses is based on the findings of internal model testing, including the path coefficient and t-statistic. Examining the significant value between contract, t-statistics, and p-values, among others, to determine if a hypothesis is accepted or denied. These numbers are determined from statistics t or t-tests study utilizing bootstrapping methods. T-values are calculated from table t, with a significance level p-value of 0.05

(5%) generated from t-statistics greater than 1.96. The test value is displayed in table 3 of the bootstrapping findings.

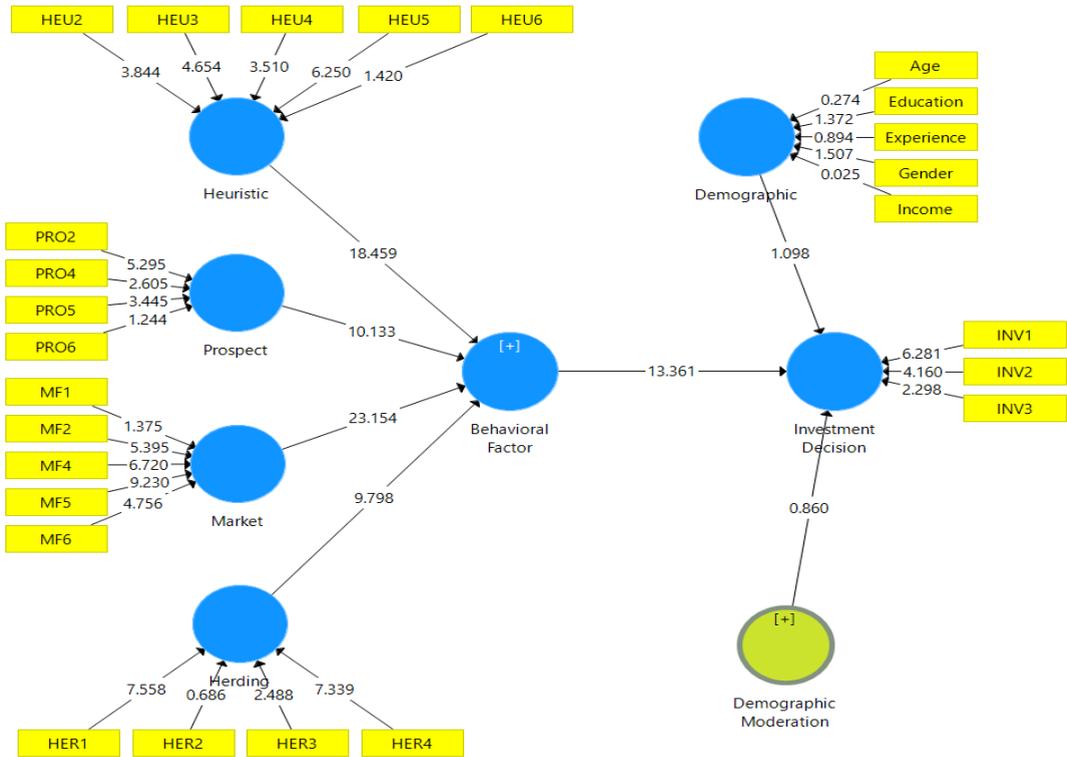


Figure 1. Evaluation Of Structural Models

Table 3. Hypothesis Testing

Hypothesis	Path	Path Coefficients	t-values	p-values
H1	Behavioral Bias → Investdec	0,043	18,172***	0,000
H2	Demographic → Investdec	0,102	1,080	0,280
H3	Demographic (Moderating) → Investdec	0,099	1,118	0,264

*Significant $p < 0,10$; ** $p < 0,05$; *** $p < 0,01$

H1: Behavioral bias factors have a significant effect on individual investor investment decisions during the COVID-19 pandemic

The first hypothesis test examines whether behavioral biases significantly impact individual investors' investment decisions during the COVID-19 pandemic. T-statistical coefficients of 18,172 and p-values of 0.000 indicate that behavioral bias factors

significantly influenced investment decisions, so the results can be interpreted as supporting the first accepted hypothesis.

H2: Demographic factors have a significant effect on individual investor investment decisions during the COVID-19 pandemic

During the COVID-19 pandemic, the second hypothesis test examined whether demographic factors significantly influenced the investment decisions of individual investors. The t-statistical coefficient of 1,080 and the p-value of 0.280 indicate that demographic factors did not influence investment decisions so the second hypothesis can be rejected.

H3: The effect of behavioral bias factors on individual investment decisions during the COVID-19 pandemic is moderated by demographic factors

The third hypothesis examines whether demographic characteristics minimize the impact of behavioral bias factors on the investment decisions of individual investors during the COVID-19 pandemic. The test results demonstrated that demographic factors were insufficient to moderate the impact of individual investor behavior bias on investment decisions during the COVID-19 pandemic, as indicated by t-statistical coefficients of 1.118 and p-values of 0.264, so the third hypothesis is rejected.

By conducting a bootstrapping analysis test on the SmartPLS application, you can determine the impact of each behavioral bias factor on the investment decisions of individual investors. For instance, the results of each behavioral bias variable are shown in [Table 4](#) below.

Table 4. Testing of Each Behavioral Bias Factor

Path	Path Coefficients	t-values	p-values
Heuristic → Investdec	0,453	3,691***	0,000
Prospect → Investdec	-0,017	0,229	0,819
Market → Investdec	0,493	3,301***	0,001
Herding → Investdec	-0,106	1,802*	0,072

Note: * Significant $p < 0,10$; ** $p < 0,05$; *** $p < 0,01$

The test results in [table 4](#) showed that the *heuristic coefficient values → Investdec*, were 3,691 and *p-values* were 0.000 due to t-statistical values > 1.96 and *p-values* < 0.05 . Thus it proves that *heuristic* factors have a significant influence on investment *decisions*. The second test showed that *the Value prospect → Investdec's* t-coefficient was 0.229, and the *p-value* was 0.819 because of the t-statistical value < 1.96 and *p-value* > 0.05 . Thus it proves that the *prospect* factor proved not to influence investment *decisions*. The third test showed that the *Market → Investdec* t-statistic coefficient value was 3,301, and the *p-value* was 0.001 because the t-statistical values were > 1.96 and *p-values* < 0.05 . Thus

it proves that the market factor *proved* to have a significant influence on investment *decisions*. Finally, the fourth test showed that *the Herding* → *Investdec* t-statistical coefficient values were 1.802 and *p-values* were 0.072 due to t-statistical values <1.96 and *p-values* >0.05. Thus it proves that the *vulture* factor proved not to influence investment *decisions*.

The study used five demographic factors that moderated the influence of behavioral factors on individual investor investment decisions in Indonesia during the COVID-19 pandemic. The moderator variables are Gender, Age, Education, Income, and experience investing. So it will be tested the influence of each moderator variable on the relationship between exogenous latent variables and endogenous latent variables in moderator testing using *the multi-group analysis* method by looking at the difference in the value of parameter coefficients in each group.

4.1 Gender Moderator Variable

Testing involving *gender* moderator variables was conducted by looking at influences based on the gender of respondents. Gender moderator variables are divided into categories based on the male sex and female sex. Here are the test results that can be seen in [table 5](#)

Table 5. Results of PLS-MGA Test Variable Gender Moderator

Variable	Male		Female		MGA
	Path Coefficients	t-Value	Path Coefficients	t-Value	p-Value new
Heuristic → Investdec	0,177	2,593***	0,796	4,769*	0,001***
Prospect → Investdec	-0,093	1,290	-0,043	0,351	0,717
Market → Investdec	0,807	9,135*	0,144	0,745	0,008**
Herding → Investdec	-0,026	0,499	-0,181	1,889*	0,166

Significant $p < 0,10$; ** $p < 0,05$; *** $p < 0,01$

Based on [table 5](#), it can be seen that the *p-value* of *heuristic* → *investdec* variables in both the male and female respondent groups had significant values. Thus, the two groups were shown to moderate the influence of heuristic variables on investment decisions jointly. While the *Market* → *Investdec* variable of the male respondent group had a significant influence, there was no significant influence in the group of female respondents. Thus it can be concluded that the role of the group of female respondents proved to weaken the influence of market factor variables on investment decisions. While the Variables *Prospect* → *Investec* and *Herding* → *Investdec* did not significantly influence the group of male and female respondents.

The effect of differences in *gender* moderator variables in moderating latent variables is seen through the *new p-value* value. [Table 11](#) shows two gender moderator variable

relationships that are proven to have significant differences between male and female respondents in moderating latent variables, namely on the heuristic → *invesdec* and *Market* → *Investdec* variables. While the *Variables Prospect* → *Investec* and *Herding* → *Investdec* had no significant differences among the male and female respondents.

4.2 Variable Moderator Age

Testing involving age-moderator variables is conducted by examining the respondents' age. The moderator age variable is divided into the Younger Age category, which includes respondents aged 18 to 30 years, and the Older Age category, which includes respondents aged 31 to 41 years and older. The test results are presented in Table 6 below.

Table 6. PLS-MGA Test Results Variable Moderator Age Path

Variable	Younger Age		Older Age		MGA
	Path Coefficients	t-Value	Path Coefficients	t-Value	p-Value new
Heuristic → Investdec	0,403	2,564**	0,549	3,124***	0,550
Prospect → Investdec	-0,034	0,372	0,012	0,098	0,759
Market → Investdec	0,553	2,965***	0,381	1,722*	0,563
Herding → Investdec	-0,070	1,046	-0,164	1,731*	0,421

*Significant $p < 0,10$; ** $p < 0,05$; *** $p < 0,01$

Table 6 shows that the *p-value* of the *Heuristic* → *Investec* variables of both young and old respondents has a significant value. Thus, the two groups are proven to jointly moderate the influence of heuristic variables on investment decisions. While the *Market* → *Investdec* variable of the younger group of respondents had a significant influence, there was no significant influence in the older group. Thus it can be concluded that the role of the older group of respondents was shown to weaken the influence of market factor variables on investment decisions. While the *Variables Prospect* → *Investec* and *Herding* → *Investdec* did not significantly influence younger and older age groups.

The effect of *age* moderator variable differences in moderating latent variables is seen through the new *p-value* value. Based on the table, all variables have no meaningful differences between younger and older respondents.

4.3 Education Moderator Variable

Examining the respondent's degree of education is a moderator variable during testing. The education moderator variable is separated into two categories: Lower Education, which includes respondents with a high school diploma or less, and Diploma and Higher Education, which includes respondents with a bachelor's degree or higher. The test results are presented in Table 7 below.

Table 7. PIs-MGA Test Results Variable Moderator Education Path

Variable	Lower Education		Higher Education		MGA
	Path Coefficients	t-Value	Path Coefficients	t-Value	p-Value new
Heuristic → Investdec	0,538	3,266***	0,379	2,310**	0,500
Prospect → Investdec	0,054	0,422	-0,053	0,596	0,486
Market → Investdec	0,361	1,854*	0,593	2,976***	0,419
Herding → Investdec	-0,136	1,377	-0,092	1,397	0,732

* Significant pada $p < 0,10$; ** $p < 0,05$; *** $p < 0,01$

Based on [table 7](#), it can be seen that the p -value variable *Heuristic* → *Investec* both the group of low-educated respondents and higher-educated respondents have significant value. Thus, the two groups are proven to jointly moderate the influence of heuristic variables on investment decisions. While the *Market* → *Investdec* variables of the higher-educated group of respondents had a significant influence, there was no significant influence in the lower-educated group of respondents. Thus it can be concluded that the role of the lower-educated respondents was shown to weaken the influence of market factor variables on investment decisions. In comparison, *the Variables Prospect* → *Investdec* and *Herding* → *Investdec*) did not significantly influence the lower-educated and higher-educated respondents.

The effect of differences in *education* moderator variables in moderating latent variables is seen through the *new p-value*. Based on [table 7](#), all variables have no meaningful differences among low-educated and higher-educated respondents.

4.4 Income Moderator Variable

Testing involving *income* moderator variables is done by looking at the respondent's income level. The income moderator variable is divided into two categories: *the Lower-income* category, namely respondents with income levels of <5 Million to 10 Million, and *Higher Income*, which are respondents with income levels of 11 Million to 15 Million and above. Here are the test results that can be seen in [table 8](#)

Table 8. PIs-MGA Test Results Variable Moderator Income Path

Variable	Lower Income		Higher Income		MGA
	Path Coefficients	t-Value	Path Coefficients	t-Value	p-Value new
Heuristic → Investdec	0,441	3,181***	0,545	2,664***	0,661
Prospect → Investdec	-0,024	0,316	0,078	0,449	0,567
Market → Investdec	0,511	3,186***	0,382	1,561	0,638
Herding → Investdec	-0,054	0,948	-0,275	2,075**	0,133

*significant $p < 0,10$; ** $p < 0,05$; *** $p < 0,01$

Based on [table 8](#), it can be seen that the *p-value* variable *Heuristic* → *Investdec* both the group of respondents who are low income and respondents who are high-income have significant value; thus, the two groups proved together to moderate the influence of *heuristic* variables on investment decisions. While on *the Market* → *Investdec* variables, the group of low-income respondents had a significant influence, in the higher-income group of respondents, there was no significant influence; thus, it can be concluded that the role of the group of respondents with higher incomes was shown to weaken the influence of market factor variables on investment decisions. Then in the *Herding* → *Investdec* variable, the group of high-income respondents had a significant influence, but in the group of respondents with lower incomes, there was no significant influence, it can be concluded that the role of the group of respondents who were lower incomes proved to weaken the influence of the *vulture* factor variable on investment decisions.

The *Prospect* → *Investdec* variable had no significant influence among the lower-income and higher-income respondents. The difference in *income* moderator variables in moderating latent variables is seen through the new *p-value*, based on [table 8](#). Again, all variables have no meaningful difference between low-income and high-income respondents.

4.5 Experience Moderator Variable

Testing involves experiencing moderator variables by looking at the old experience invested. Therefore, the experience moderator variable is divided into the Lower Experience category. Here are the test results that can be seen in [table 9](#).

Table 9. PLS-MGA Test Results Variable Moderator Experience Path

Variable	Lower Experience		Higher Experience		MGA
	Path Coefficients	t-Value	Path Coefficients	t-Value	p-Value new
Heuristic → Investdec	0,502	3,801***	0,182	1,269	0,120
Prospect → Investdec	0,051	0,660	-0,256	2,080**	0,046**
Market → Investdec	0,407	2,496**	0,827	4,933***	0,087*
Herding → Investdec	-0,107	1,799*	0,031	0,326	0,215

*significant $p < 0,10$; ** $p < 0,05$; *** $p < 0,01$

Based on [table 9](#), it can be seen that the *p-value* variable *Market* → *Investdec* both the group of respondents with low experience and higher experienced respondents have significant value. Thus, the two groups are proven to jointly moderate the influence of market *factor* variables on investment decisions. While the *Heuristic* → *Investdec* variable of the low-seasoned group of respondents had a significant influence, there was no significant influence in the higher-experienced group of respondents. Thus, it can be

concluded that the role of the higher experienced group of respondents was shown to weaken the influence of *heuristic* variables on investment decisions. Then on the *Prospect* → *Investdec* variable, the group of high-experienced respondents had a significant influence, but in the lower group of experienced respondents, there was no significant influence, it can be concluded that the role of the group of low-experienced respondents proved to weaken the influence of the *Prospect* factor variable on investment decisions. Finally, the *Herding* → *Investdec* variable had no significant influence among the lower experienced and more experienced respondents.

A variable moderator experience relationship is shown to have a significant difference between the low-experienced and the higher-experienced respondents in moderating latent variables, namely on the *Prospect* → *Investec* variable. While the variables *Heuristic* → *Investdec*, *Market* → *Investdec*, Furthermore, *Herding* → *Investdec* had no meaningful difference among the group of experienced respondents of low investment and experienced respondents of higher investments.

5. DISCUSSION

5.1 Effect of Behavioral Bias Factors on Individual Investor Investment Decisions in the COVID-19 Pandemic

Various cognitive biases covered by behavioral finance have a substantial impact on the behavior of individual investors. His research successfully mapped the behavioral bias factors influencing investment decisions via four cognitive bias dimensions: heuristics, prospects, market factors, and vultures. Consequently, this study is also an effort to enhance the literature review by evaluating the negligible impact of individual investor behavior bias in investment decision-making on the Indonesian stock exchange, particularly during the COVID-19 pandemic. During the COVID-19 pandemic, the findings of this study indicate that behavioral bias factors significantly impact individual investors' decisions in Indonesia. Consistent with previous research by [Waweru et al. \(2008\)](#), these findings point to a behavioral bias that influences investment decisions. Individual investors must be cautious when making investment decisions during a global crisis like the current COVID-19 pandemic. In his study of behavioral biases during financial crises, [Rizzi \(2008\)](#) concluded that a person's financial behavior could collect, interpret, and process information that can influence their investment decision-making in times of uncertainty. Consequently, it is crucial to recognize our unconscious behavioral biases during times of crisis and determine the best course of action for future investment decisions. ([Bansal, 2020](#)).

Prior research on behavioral bias has focused on identifying which behavioral characteristics have a systematic impact on financial market behavior. Although financial behavior does not state that everyone will be affected by the same behavior bias, Jahanzeb demonstrates this. Consequently, the next step will analyze specifically

the impact of behavioral bias on the investment decisions of individual investors, as exemplified by heuristic biases, prospects, market factors, and vultures.

5.2 The Effect of *Heuristic* Factors on Individual Investor Investment Decisions in the COVID-19 Pandemic

Investing-related decisions are intricate. During the present COVID-19 pandemic, all investors face unstable conditions and financial uncertainties. This volatility makes decision-making more difficult than normal. Especially in a fast-changing environment, it is challenging to take advantage of opportunities and better resources to make the most harmonious investment selections feasible with the knowledge provided. However, when a decision is made, the opportunity has generally passed and is typically irrelevant. Cognitive and heuristic biases play a crucial part in the decision-making process of individual investors in such a complicated environment (Waweru et al., 2008).

The heuristic theory is an indispensable rule of thumb for making decisions under unclear conditions. Individuals unable to assess probability optimally owing to a lack of time and data will make heuristic judgments. As a result, individuals will collect knowledge through shortcuts to making the decision-making process more manageable, straightforward, and effective.

This study's heuristics dimensions included representativeness, overconfidence, anchoring bias, and availability bias. The outcomes of this study demonstrate that during the COVID-19 pandemic, individual investors in Indonesia made irrational investment decisions driven by heuristic bias. Moreover, the data demonstrated that heuristic considerations considerably and positively impacted the investment decisions of individual investors in Indonesia during the COVID-19 epidemic. These results are congruent with, which found that representativeness, overconfidence, information availability, and price anchoring are major determinants of heuristic behavior that effects the investment decisions and performance of Indian NSE investors.

This study presents empirical evidence that representativeness bias affects investing decisions. Psychologically, representational bias accelerates the decision-making process of individual investors. Most people focus their decisions on previous occurrences and present trends, ignoring other elements that may directly—or indirectly—contribute to logical decision-making (Irshad et al., 2016). When people base their judgments on representativeness, they err since something more representative does not necessarily reflect the actual state (Tversky et al., 1974). During the COVID-19 pandemic, for instance, investors in Indonesia tend to follow the pattern of stock price swings merely. When a market meltdown occurs, investors panic-buy by ignoring the sample size and the stock's average return. Chen et al. (2007) argue that investors view a small sample as representative of the entire population by ignoring the entire population and the law of probability. As a result, individual investors invest in stocks

with abnormally high returns soon, choosing them due to a representative bias (Korniotis et al., 2011). These findings are comparable to those of Waweru et al. (2008), Irshad et al. (2016), and Rana et al. (2014).

The factor of overconfidence effects investing decisions as well. This suggests that individual investors in Indonesia were susceptible to overconfidence bias during the COVID-19 outbreak. Overconfident investors tend to make improper or dangerous investments and engage in excessive trading, which can negatively influence returns. This is evident by the fact that, during the pandemic, IDX statistics 2020 trades per day or week in Q2-Q3 2020 indicate that the market conditions are highly volatile. Numerous investors take advantage of this situation by engaging in high-risk, rapid trades. These findings are congruent with those of Waweru et al. (2008), and Bakar et al. (2016).

Availability and anchoring variables similarly influence investment decisions. This study's findings are congruent with those of Waweru et al. (2008) and Le Luong et al. (2011), who discovered that availability and anchoring bias had a substantial impact on investment decisions. Nofsinger et al. (2013) explain that availability bias may lead investors to concentrate on only the stocks they are familiar with. Individual investors were hesitant to seek information on other market stock exchanges during the COVID-19 pandemic. According to Fauziyyah et al. (2021)'s research, the Asian market was hit harder than the European market. The impacts of availability bias on individual investors in Indonesia during the COVID-19 pandemic remain high despite the increased availability of information on the stock market.

5.3 The Effect of *Prospect* Factors on Individual Investor Investment Decisions in the COVID-19 Pandemic

The lack of influence of the prospect factor on investment decisions suggests that individual investors in Indonesia during the COVID-19 pandemic tend to be rational when confronted with the risk of available investment options. Individual investors are confronted with stock market conditions impacted by the COVID-19 pandemic, which is unprecedented; therefore, individual investors in Indonesia's investment experience do not influence investment decisions during the COVID-19 pandemic beyond the prospect factor. This study's findings are consistent with those of Danepo (2018) and Kengatharan, who found no statistically significant impact of outlook bias on investment decisions.

5.4 The Effect of *Market* Factors on Individual Investor Investment Decisions in the COVID-19 Pandemic

It is demonstrated that market dynamics greatly influence investor investment decisions. Individual investors in Indonesia during the COVID-19 epidemic tend to concentrate on popular stocks, volatility in stock price movements, company fundamentals, and news

that can attract attention to the stock market, all of which rely on stock market information (Waweru et al., 2008).

During the COVID-19 pandemic, the Indonesian stock market's market information factor must issue qualitative and quantitative full disclosure guidelines regarding the related risks faced by entities affected by the COVID-19 economy in the company's operations as shareholder and investor obligations.

Individual investors interested in market information, particularly financial news, and participating in financing discussions can impact increased stock buying and selling when confronted with anomalous events such as the COVID-19 pandemic, as evidenced by data from the Indonesian stock exchange, where the volume of share buying and selling transactions increased during the COVID-19 pandemic (RTI). The obvious rationale for these findings is that they are interested in market information regarding various financial developments. They recognize that when COVID-19 declines, it presents an opportunity to purchase quality equities at attractive valuations. Nonetheless, the increased activity also causes investors to trade their holdings more frequently, increasing the fragile market's volatility (Shantha, 2019).

This study confirms the findings of others (CAO et al., 2021; Ghalandari et al., 2013; Waweru et al., 2008) that market factors affect investment decisions. When making investing decisions, these investors rely only on the quality of the information they possess.

5.5 The Effect of *Vulture* Factors on Individual Investor Investment Decisions in the COVID-19 Pandemic

The vulture factor demonstrated no effect on investment decisions. According to available evidence, individual investors in Indonesia during the COVID-19 pandemic tended to be rational despite large fluctuations in stock prices and high market volatility. The findings of this study parallel those of Abakar Yi In addition, the findings of this factor are consistent with a model of cross-sectional absolute deviations (CSAD), which indicates that there was no vulture activity on the Indian stock market during the COVID-19 pandemic.

The influence of herding is typically caused by a lack of knowledge among investors, where the available information is difficult to process, especially among individual investors as opposed to institutional investors, who, in the end, choose to imitate the institutional investor's decision. According to Kaminsky et al. (1999), during the Asian financial crisis of 1997-1998, countries in Asia, particularly emerging markets, exhibited vulture-like behavior. In contrast to the 1998 crisis, however, the availability of information remains extremely restricted. During the COVID-19 pandemic, the Indonesian capital market's data and information are easily accessible from anywhere, at any time, and by anyone, allowing the market to observe and investors to be better

informed. Consequently, the behavior of individual investors in Indonesia during the COVID-19 pandemic is more rational in terms of making investment decisions.

5.6 The Effect of Demographic Factors on Individual Investor Investment Decisions during the COVID-19 Pandemic

Demographic factors have shown no direct influence on investment decisions. This can be interpreted that differences in the demographic factors of individual investors in Indonesia during the COVID-19 pandemic do not influence investment decisions. The results of this study are similar to [Geetha \(2012\)](#), where no effect on all demographic variables on the number of factors that influence investment decisions,

The study is consistent with gender, age, education, Income, and Experience having no significant influence on investors' investment decisions. According to a study, in the past few years, people still assume that an investor who invests in stocks is an investor who is > 40 years old, has an income of > Rp.10,000,000, and has investment experience >5 years because there are not many dependents on life or have retired from his job. The age of investors is 58.39% less than 30 years old. The education is 53.54% from high school. The income is only 33.77% less than 10 million rupiahs. The profiles indicate that during the COVID-19 pandemic, demographic factors do not drive the decision to invest. Therefore, investment is already a necessity for everyone regardless of demographic aspects.

5.7 Effect of Demographic Factors as Moderation Variables on the Effect of Behavioral Factors on Individual Investor Investment Decisions in the COVID-19 Pandemic

Demographic characteristics did not considerably mitigate the effect of behavioral bias on investing decisions. During the COVID-19 pandemic, demographic characteristics have not considerably mitigated the impact of behavioral bias on the investing decisions of individual investors in Indonesia. Nevertheless, based on the research results on the demographic variables' involvement, gender has significant differences between men and women on heuristic and market variables, which can be interpreted as follows: in heuristic factors, groups of women and men exhibited significantly different heuristic bias effects, which is consistent with previous research indicating that groups of men tend to be more confident than groups of women ([Waweru et al., 2008](#)). According to [Kudryavtsev et al. \(2011\)](#), men think more autonomously, but women are more likely to collaborate and follow other ideas or information. Regarding market considerations, market prejudice tends to affect men. Men's investment decisions tend to be influenced by trends in momentary price changes, current market information conditions, and the personal preferences of widespread stock.

In contrast, women's investment decisions tend to be unaffected by these factors. According to [Graham et al. \(2002\)](#), men tend to simplify information processing instead

of doing more deep and comprehensive processing. Reflecting on the present COVID-19 pandemic conditions, where all current market information tends to concentrate on today's impact, male investors sometimes utilize it as a basis for their decisions. Regarding age demographic moderators, the results indicated no significant difference between the younger and older age groups. However, there was evidence that a younger person is more likely to be affected by market factors. In contrast, as investors age, the influence of these market factors will diminish over time. This is because investors, as they are popularly referred to (Yuwono et al., 2021), are less experienced, especially in pandemic situations like these, and tend to rely on actively transacting data. Only through changes in stock indexes. Chen et al. (2007) claim in their research that younger people tend to be more market-oriented,' while older people have life experiences.

In the Education moderators, there was no significant difference between those with a high level of education and those with a lesser level of education. Still, the results indicated that market bias had a bigger impact on those with a higher level of education. The findings of this study concur with (Lutfi, 2011) that investors with a higher level of education have superior decision-making knowledge and abilities. In situations where a great deal of information regarding the stock market is extensively disseminated, such as the present COVID-19 pandemic, investors tend to focus on and be influenced by occurrences that grab market attention and may be important or irrelevant to the company's future stock performance (Waweru et al., 2008).

In the income demographic moderator, there was no significant difference between the high-income and low-income groups. However, based on the study's findings, it can be inferred that as an individual's money increases, the influence of market bias diminishes over time. Still, they are also more sensitive to vulture influence. According to Zhu (2003), a high-income investor is more likely to have an excellent financial advisor and to be able to process more complex information than a low-income investor. Moreover, Rana et al. (2014) noted that wealthy investors are more likely than poor investors to receive knowledge from financial specialists when investing in high-risk assets. Due to the current circumstances of the COVID-19 epidemic, excessive market volatility fluctuations, and high investment risk, low-income investors typically rely on market information. In contrast, high-income investors have easy access to more detailed market information from various sources, such as financial advisors and financial specialists. However, as a result, wealthy investors are susceptible to the influence of herding behavior. Regarding lead factors, there was a substantial difference between the high-experience and low-experience groups of novice demographic moderators. The results demonstrated that the more experience a person has, the more susceptible they are to prospect bias. These results are pertinent to Hue Ton. Younger investors are typically more eager to take risks than their elder counterparts. As a result of their investing expertise, they see that present economic conditions are unclear, so they favor low-risk companies with poor returns and feel secure from the upheaval of the current COVID-

19 epidemic conditions. While viewed from a heuristic perspective, the more experience an investor has, the more heuristic bias will diminish over time. This is supported by research by [Chen et al. \(2007\)](#) on emerging markets, which indicates that investors with extensive experience will strive to be more rational, learning from past mistakes. Investors with limited experience tend to focus on recent experiences and extrapolate current trends rather than average-view trends and statistical probabilities ([Waweru et al., 2008](#)).

Consequently, they are more hopeful. The behavioral responses to investment activity in foreign nations vary. Sri Lankan research on the Colombo stock exchange reveals:

1. Herding: stock trading options affect investment. Trading shares, buying and selling, and herding speed do not improve performance.
2. Heuristic: overconfidence harms investment performance while anchoring positively affects investment performance.
3. Prospects: aversion to loss and aversion to regret not to affect investment.
4. Market: market information and customer preferences do not affect investment. The results do not support the notion that all behaviors

These elements positively impact investment performance; just a few of the criteria mentioned above have any impact on investment performance ([Kengatharan et al., 2014](#)). Other research findings indicate that Heuristics positively influences investment decision-making. Heuristics play a significant role in investors' investment decision-making. Prospect theory is an essential aspect of investing decision-making. The Market component is highly regarded in making financial judgments and vice versa. Herding is a significant aspect of investors' investing decision-making. The heuristic has a beneficial effect on investors' investment performance. Heuristics have a crucial role in investing performance. The market has a significant role in determining the investment performance of investors. The effect of herding on investment performance is beneficial. Specifically, herding is a significant contributor to investing success.

Other research, particularly during the COVID-19 epidemic, indicates that the heuristic influences investment decision-making favorably. Heuristics play a significant role in investors' investment decision-making. Prospect theory is an essential aspect of investing decision-making. The Market component is highly regarded in making financial judgments and vice versa. Herding is a significant aspect of investors' investing decision-making. The heuristic has a beneficial effect on investors' investment performance. Heuristics have a crucial role in investing performance. The market has a significant role in determining the investment performance of investors. The effect of herding on investment performance is beneficial. In particular, herding is essential for investment performance. These diverse studies demonstrate that investment patterns

vary by nation. Consequently, it can serve as a comparison and variation in future research and as a business consideration.

6. CONCLUSIONS

This study examined the influence of heuristic variables, prospects, markets, and herdings on the investment decisions of individual investors in Indonesia during the COVID-19 pandemic. During the COVID-19 pandemic, the results indicated that behavioral bias factors significantly influenced the behavior of individual investors in Indonesia. In addition, the findings revealed that bias factors such as heuristics and markets had a significant impact on investment decisions. In contrast, prospect and vulture had no significant impact on the investment decisions of individual investors during the COVID-19 pandemic. Demographic variables such as gender, age, education, income, and total investment activity Experience did not significantly affect the investment decisions of individual investors during the COVID-19 pandemic, either directly or by mitigating the effect of the behavioral bias effects described above. Men and women moderate the impact of heuristic and market biases on investment decisions in distinctive ways. In addition, the experience factor in investing reveals a significant difference between investors with high experience and those with low experience regarding the moderating effect of prospect bias on investment decision-making.

This study is still restricted to bias factors, specifically Heuristic, prospect, Market, and vulture. In contrast, numerous other behavioral biases can affect investment decisions. In addition, this research was conducted in Indonesia during the COVID-19 pandemic. It is suggested that additional research be conducted in other countries because the impact of the pandemic varies by location so this study may produce different results. In researching the post-pandemic period, if possible, the results of this study can serve as a reference for future studies.

7. SUGGESTION

Additionally, numerous other behavioral biases can influence investment decisions. This study was conducted in Indonesia during the COVID-19 pandemic, and it is advised that future researchers undertake studies in other countries because the impact of the pandemic differs from place to place and may give varied results. Whenever possible, post-pandemic research is conducted to serve as a reference for future studies.

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