

DO MILLENNIAL INVESTORS MAKE RATIONAL INVESTMENT DECISIONS? EFFECTS OF BEHAVIORAL BIAS AT THE INDONESIA STOCK EXCHANGE (IDX)

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Abstract

Objective: This study aims to identify the influence of behavioral biases, including representativeness, anchoring, overconfidence, and herding, on investment decision-making by millennial investors on the Indonesia Stock Exchange (IDX) in Jakarta. This study contributes to the literature and uncovers the decision-making patterns of the millennial generation.

Methodology – This study used questionnaires completed by 145 active millennial investors on the IDX. Analytical techniques used included reliability testing, descriptive statistics, correlation analysis, and hierarchical regression to measure the impact of behavioral biases on investment decisions.

Findings – The results indicate that all four types of behavioral biases significantly influence millennial investors' investment decisions. Most investors exhibited a tendency to make irrational decisions due to fluctuating emotions and a lack of interest in learning.

Limitations – This study only covers young investors in the Jakarta area and four types of bias, so the results cannot be widely generalized.

Practical Implications – Millennial investors can make more rational decisions by increasing literacy, conducting research, delaying decisions, and reducing external influences.

Originality/Value – This study is unique in that it focuses on Jakarta's millennial generation and tests four behavioral biases simultaneously.

Keywords Investment decision, behavioural bias, representativeness, anchoring, overconfidence, herding.

1. Introduction

Investment is a crucial economic activity for a country's economic development (Yang et al., 2023). Through investment, market participants allocate funds to various financial instruments such as stocks, bonds, mutual funds, or other assets in the hope of achieving optimal returns (Hou et al., 2022). Traditional financial theory assumes that investors are rational, have sufficient information, and are able to accurately evaluate risks and returns before making decisions (Lee et al., 2022). Within this framework, investment decisions are made systematically and objectively, as explained in Modern Portfolio Theory developed by Markowitz (1952). This theory emphasizes the importance of diversification and risk analysis in optimizing portfolios.

However, in practice, investment decisions are not always made rationally (Reeck et al., 2022). Various studies show that investment decisions are often influenced by psychological and emotional factors that lead to deviations from rational patterns. This phenomenon is known as behavioral bias in the behavioral finance literature. This bias causes investors to rely on intuition, emotions, or misperceptions rather than in-depth fundamental analysis. Some common forms of behavioral bias include representativeness (Galavotti et al., 2021), anchoring (Bornmann et al., 2023), overconfidence (Ahmad, 2023), and herding (Della Rossa et al., 2020).

Representativeness bias occurs when investors overgeneralize based on short-term historical patterns or data without considering more relevant long-term information (Brubaker et

al., 2021). Anchoring bias occurs when investors are overly attached to initial information, such as stock purchase prices, and ignore new, more relevant information (Bornmann et al., 2023). Meanwhile, overconfidence bias causes investors to overestimate their own analytical abilities, thus underestimating risks and information from external sources (Schumacher et al., 2020). Finally, herding bias describes the tendency of investors to follow majority decisions or market trends without conducting independent analysis (Grežo, 2021).

This behavioral bias phenomenon is becoming increasingly significant in Indonesia, particularly with the increasing participation of millennials in the capital market. Data from the Indonesia Stock Exchange shows that millennial investors, individuals aged 20 to 40, are currently the dominant group in stock trading activities. The unique characteristics of this generation, such as high digital literacy, broad access to information, and a habit of using social media as an investment reference, make them more susceptible to external influences that can trigger behavioral bias (Rahman & Gan, 2020; Goyal et al., 2023).

While millennials have advantages in adapting to technology and quickly acquiring information, they also tend to act impulsively, follow fleeting trends, and lack in-depth fundamental analysis. Their habit of using social media and algorithm-based investment apps (robo-advisors) also contributes to less objective decision-making. For example, FOMO (Fear of Missing Out), a component of herding bias, drives them to buy assets simply because they're trending, without considering risk and valuation (Gupta & Shrivastava, 2022).

Previous studies have demonstrated that behavioral biases significantly impact investment decision-making. Representativeness bias can lead investors to overconfidence that past patterns will repeat themselves (Baker et al., 2019). Anchoring bias leads to investors' inability to adjust their perceptions to new market dynamics (Wen, 2024). Overconfidence bias encourages excessive speculative decisions (Lambert et al., 2012), while herding bias reduces decision independence and quality (Ahmad & Wu, 2022). However, most of these studies were conducted in developed countries or in generic contexts that have not specifically addressed the millennial generation in emerging markets like Indonesia.

It is in this context that this research becomes important. This study aims to evaluate how four types of behavioral biases namely representativeness, anchoring, overconfidence, and herding, influence the investment decisions of millennials on the Indonesia Stock Exchange. Millennials were chosen not only because they dominate the current investor population but also because they possess different psychological characteristics, information preferences, and financial behaviors than previous generations. By understanding the influence of behavioral biases on their decisions, this research is expected to provide a more accurate picture of the factors that influence market efficiency in today's digital era.

The theoretical contribution of this study lies in enriching the behavioral finance literature, particularly in the context of developing countries and digital-native generations like millennials. Furthermore, this research also has important practical implications. For millennial investors, the results of this study can raise awareness of biases in decision-making and encourage the development of more objective and data-driven investment strategies. For regulators and policymakers, the results of this study can inform the design of investor education programs that are more relevant to the needs and characteristics of the millennial generation.

This research is systematically organized into seven chapters. The first chapter presents the background, objectives, and contributions of the study. The second chapter outlines the theory and findings of previous studies related to the variables studied. The third chapter explains the

methodology used in collecting and analyzing the data. The fourth chapter presents the findings from the data analysis. The fifth chapter discusses these results in the context of theory and practice. The sixth chapter summarizes the main findings and their implications. Finally, the seventh chapter outlines the limitations of the study and offers suggestions for further study.

2. Literature review

Research on investment decisions is no longer solely based on conventional financial theory, but has also been greatly enriched by behavioral finance approaches. This approach explains that investors often act irrationally due to the influence of cognitive and emotional biases. In this context, this study focuses on four main types of bias—representativeness, anchoring, overconfidence, and herding—that frequently arise in investment decisions, particularly among millennial investors.

2.1. Investment decision

Investment decisions refer to the process of selecting financial instruments with the aim of generating profits or increasing asset value in the future (Raheja & Dhiman, 2020). In this process, investors should consider various aspects such as risk profile, financial goals, investment horizon, and market and economic conditions (Khare & Kapoor, 2024). However, these rational decisions are often not achieved due to limited financial knowledge, the influence of social media, and the tendency to follow trends (Bakar & Yi, 2016; Madaan & Singh, 2019). This phenomenon opens up room for the influence of behavioral biases that distance investors from the principle of market efficiency.

2.2. Behavioural bias

Behavioral bias refers to systematic deviations from rational judgment caused by psychological factors (Bailey et al., 2011). These biases are classified into two categories: cognitive biases, such as false assumptions or overestimating certain information and emotional biases, such as fear or greed in the face of risk (Goud et al., 2024). The four biases examined in this study have been widely discussed in previous literature. Representativeness and anchoring were introduced by Tversky and Kahneman (1974) as heuristics in decision-making. Meanwhile, overconfidence and herding were introduced later by Waweru et al. (2008) and have become the primary focus of many empirical studies due to their influence on speculative behavior.

2.2.1. Representativeness bias

This bias occurs when investors too quickly conclude that certain historical patterns will repeat themselves in the future, even without the support of fundamental analysis (Baker et al., 2019). Investors caught in this bias tend to make decisions based on short-term data, limited information, or even market stereotypes that are not necessarily valid (ul Abidin et al., 2017; Vives et al., 2018). Research by Alsawalhah (2022) and Shah et al. (2018) concluded that representativeness bias negatively impacts the quality of investment decisions. However, some studies, such as Khan et al. (2021), found a positive effect on investment decisions in the Pakistani market, suggesting that geographic and cultural contexts may moderate the influence of this bias.

2.2.2. Anchoring bias

Anchoring bias occurs when investors become overly focused on initial information, such as the initial purchase price or target price, and ignore more recent, more relevant information (Furnham & Boo, 2011). This bias creates resistance to change, even when market conditions no longer support the initial decision (Cen et al., 2013). Several empirical studies have shown that anchoring has a significant and negative impact on investment decisions. Owusu and Laryea

(2023), Gurdgiev & O’Loughlin (2020), and Bai & Wu (2016) confirm these findings in the context of Ghanaian, crypto, and credit derivative markets. However, Khan et al. (2017) suggest that its impact may vary depending on investors’ financial literacy.

2.2.3. *Overconfidence bias*

Overconfidence bias reflects a condition in which investors overestimate their ability or knowledge to analyze and predict the market (Zhang, 2024). This bias often results in overly speculative decisions, such as high-frequency trading, portfolio concentration, and risk aversion (Graves & Ringuest, 2018; Mushinada et al., 2018). Several studies note that overconfidence is more common among investors with lower incomes (Renu Isidore & Christie, 2019), while demographic factors such as age and education are less relevant (Kansal & Singh, 2018). Findings from Hu et al. (2024) in China also suggest that overconfidence increases household investment risk. However, Seraj et al. (2022) in Saudi Arabia and ul Abdin et al. (2022) in Pakistan found that overconfidence can enhance investment performance under certain conditions, so its effects can be positive or negative depending on the context.

2.2.4. *Herding bias*

Herding bias occurs when investors follow majority decisions or market trends without adequate analytical consideration (Gupta & Shrivastava, 2022). This bias is exacerbated by the FOMO (Fear of Missing Out) phenomenon, which is common among young investors and active social media users. Research by Jaiyeoba & Haron (2016) in Malaysia and Ahmad & Wu (2022) in emerging markets shows that herding reduces market efficiency and encourages speculative behavior. This phenomenon can also trigger price bubbles and panic selling (Komalasari et al., 2022). An interesting finding comes from Sheikh et al. (2023), who noted reverse herding in Pakistan, suggesting that herd behavior can be asymmetric across regions.

2.3. *Result of previous studies*

Various cross-country studies show that the influence of each bias can vary depending on the social, cultural, and financial literacy context. For example, Gavrilakis & Floros (2022) noted that only overconfidence had a significant effect in Greece. Meanwhile, in Croatia, overconfidence had a positive and herding negative effect on investment decisions (Vuković & Pivac, 2024). Parveen et al. (2021) confirmed that in Pakistan, representativeness, anchoring, and overconfidence negatively impacted investment performance. Meanwhile, in India, Shukla et al. (2024) found a significant effect of overconfidence, herding, and representativeness simultaneously. Kureshi et al. (2023) noted that representativeness bias was most dominant in mutual fund investments. Specifically in Indonesia, Purwidiyanti et al. (2023) found that overconfidence and herding had a positive influence on the decision-making of MSMEs in Banyumas. This suggests that the impact of bias can also be moderated by the type of investor and their investment object.

2.4. *Research framework and hypothesis*

Based on a review of theory and previous studies, it can be concluded that the four behavioral biases influence investment decisions, particularly among millennial investors. This study examines the significance and direction of the relationships between representativeness, anchoring, overconfidence, and herding on the investment decisions of millennials active on the Indonesia Stock Exchange (IDX). Therefore, the following research hypotheses are developed:

- H1: Representativeness bias has a significant negative effect on the investment decisions of millennial investors on the IDX.

- H2: Anchoring bias has a significant negative effect on the investment decisions of millennial investors on the IDX.
- H3: Overconfidence bias has a significant negative effect on the investment decisions of millennial investors on the IDX.
- H4: Herding bias has a significant negative effect on the investment decisions of millennial investors on the IDX.

3. Data and methodology

This study aims to analyze the influence of behavioral biases that are representativeness, anchoring, overconfidence, and herding, on investment decision-making by millennial investors on the Indonesia Stock Exchange (IDX). To achieve this objective, a quantitative, survey-based approach is used, designed to illustrate the causal relationship between behavioral biases and the quality of individual investment decisions.

3.1. Research Population and Sample

The population in this study was millennial investors on the IDX, namely individuals aged 20 to 44 who actively transact in stocks, either directly or through brokers. Sampling was conducted using a purposive sampling technique, with the main criteria being active investors, belonging to the millennial age group, and willingness to complete an online questionnaire. Of the 302 questionnaires distributed online via links and QR codes, 186 were returned. After screening and validation, 145 questionnaires were eligible for analysis, resulting in a response rate of 78%. This number meets the minimum sample size requirements as stated by Hair et al. (1998) for regression analysis.

3.2. Data Types and Sources

The data used is primary data, obtained directly from respondents through questionnaires. This data is considered relevant and accurate because it comes directly from the investors who are the subjects of the research. However, the use of primary data also requires a rigorous collection and validation process to ensure the validity of the results.

3.3. Research Instruments

The instrument used was a closed-ended questionnaire with a 5-point Likert scale, where 1 indicates "strongly disagree" and 5 indicates "strongly agree." The questionnaire consisted of seven sections. Section 1 discusses about demographic information such as age, gender, education, marital status, income, and investment experience. Meanwhile, sections 2 until 6 contain of each measures one variable namely investment decisions (5 indicators), representativeness bias (4 indicators), anchoring bias (4 indicators), overconfidence bias (4 indicators), and herding bias (4 indicators). Each item was developed based on previous studies to ensure content validity, by referencing indicators that have been tested in various empirical contexts.

3.4. Method to analyse the data

The data analysis techniques in this study were conducted in stages to ensure the validity and reliability of the results. The initial stage began with testing the validity and reliability of the research instrument. Validity testing aimed to ensure that each item in the questionnaire accurately measured the intended construct. Meanwhile, reliability testing was conducted to measure internal consistency between items within each variable using Cronbach's Alpha, where a value above 0.60 is considered adequate in the context of social research. All variables in this study demonstrated a good level of reliability, making them worthy of further analysis.

After the instrument was declared valid and reliable, the analysis continued with descriptive statistics. This analysis serves to provide an overview of the data characteristics, such as the mean, standard deviation, minimum, and maximum values for each research variable. This information is essential as a basis for initial interpretation of the trends and distribution of respondent data, for both the dependent and independent variables.

Next, to identify the initial relationship between behavioral bias variables and investment decisions, Pearson correlation analysis was used. This technique was chosen because it can measure the strength and direction of the linear relationship between two variables, thus indicating whether a particular bias has a positive or negative relationship with investment decisions, as well as the strength of that relationship. The findings from this correlation analysis provide initial indications that can strengthen or weaken the assumptions of the theory used.

The final stage in the data analysis technique is multiple linear regression with a hierarchical approach. Hierarchical regression is conducted to evaluate the contribution of each independent variable to the dependent variable in a step-by-step manner. In the first model, control variables such as the respondent's age, gender, and education level are included. This step aims to isolate the influence of demographic factors that may influence investment decisions. In the second model, four main variables namely representativeness, anchoring, overconfidence, and herding, are added as primary predictors. With this approach, researchers can evaluate the magnitude of the change in the coefficient of determination (R^2) after the inclusion of behavioral variables, while also understanding the partial and simultaneous effects of each bias on the quality of investment decisions.

Overall, the data analysis techniques used in this study not only allow for descriptive exploration of the relationships between variables, but also reveal deeper causal influences, thus supporting the reliability of the findings and the theoretical relevance of the model constructed.

Table 1: Definition, identification, and variable indicator

Variable	Definition	Indicator	Code
Investment decision	An investment decision is the process of choosing where to invest money with the aim of earning a profit. To avoid poor choices and bias, investors must consider several key factors.	• Risk profile faced	ID1
		• Investment objectives	ID2
		• Investment timeframe	ID3
		• Market and economic conditions	ID4
Representativeness	Representativeness bias occurs when investors assume recent patterns will continue, relying on generalizations or small samples they believe reflect the entire market.	• Using brief historical trends.	RB1
		• Extrapolating from a small number of sources	RB2
		• Putting your faith in new stereotypes	RB3
		• Disregarding basic analysis.	RB4
Anchoring	Anchoring bias is when investors rely on initial figures and ignore new, relevant data, leading to	• Setting a target selling price based on the purchase price.	AB1

	decisions that don't reflect current market conditions.	<ul style="list-style-type: none"> • Ignoring the latest information that appears. • Using historical data as the main benchmark. • Rejecting losses (loss aversion). 	<p>AB2</p> <p>AB3</p> <p>AB4</p>
Overconfidence	Overconfidence bias is when investors overestimate their ability to understand and predict the market, believing their analysis is more accurate than it really is	<ul style="list-style-type: none"> • Being overconfident in one's own forecasts. • Trading at high frequencies. • Underestimating the risks that may occur. • Not learning from previous experiences. 	<p>OB1</p> <p>OB2</p> <p>OB3</p> <p>OB4</p>
Herding	Herding bias is when investors follow others' decisions without independent analysis, trusting the majority and feeling safer doing what others do	<ul style="list-style-type: none"> • Observing patterns without first conducting a thorough study. • FOMO, or the fear of missing out. • Disregarding independent investing methods. • Making choices based on what the majority of investors think. 	<p>HB1</p> <p>HB2</p> <p>HB3</p> <p>HB4</p>

4. Result and findings

In order to determine whether the questionnaire was working properly and to identify any potential issues that might arise, reduce respondent confusion when answering questions, and improve the questionnaire's validity and reliability, this study first tested it on a small number of respondents before using it to collect a larger sample. 54 online questionnaires were distributed to investors in IDX via QR Code. However, only 29 respondents filled out the usable questionnaires. This shows a response rate of 53.7%.

4.1. Respondent demographic statistics

This study involved 145 active millennial investors on the Indonesia Stock Exchange who passed the data validation stage. The majority of respondents were male (81%) and aged 26–30 (39%). In terms of education, the majority were university graduates (56%) and had been investing for more than five years. Their primary source of information was social media (33%), indicating potential herding bias. Table 2 shows the respondents' demographic statistics.

Tabel 2. Demographic variables statistics

	Category	Frequency	(%)
Gender	Male	117	81%
	Female	28	19%

Age	Below 20	0	0%
	21 – 25	19	13%
	26 – 30	57	39%
	31 – 35	39	27%
	36 – 40	19	13%
	40 – 44	11	8%
Qualification	High school or equal	8	6%
	Diploma	22	14%
	Bachelors	102	56%
	Masters	35	24%
	PhD	0	0%
Marital Status	Single	38	26%
	Married	98	68%
	Divorced	9	6%
Monthly income (IDR)	<5M	9	6%
	5 - 10 M	42	29%
	10 - 15 M	55	38%
	15 - 20 M	27	19%
	>20 M	12	8%
Investment Experience	Have no experience	4	3%
	< 1 year	17	12%
	1 - 2 years	27	19%
	3 - 5 years	41	28%
	More than 5 years	56	39%
Main reasons to invest	Financial security	32	22%
	Increase income	26	18%
	Prepare for retirement	41	28%
	Hobbies or interests	31	21%
	Other	15	10%
Frequency of investment transactions	Every week	48	33%
	Every month	26	18%
	Every three months	32	22%
	Uncertain	39	27%
Primary sources of information in investment decision making	Social media	48	33%
	Economic news portals	34	23%
	Consultation with financial professionals	16	11%
	Recommendations from friends or family	22	15%
	Others	25	17%

4.2. Descriptive statistics of research variables

Descriptive statistics show that all variables have average scores above the median (3.0), indicating that most respondents exhibited a relatively high level of behavioral bias. The highest score was recorded for the overconfidence variable, while investment decisions showed a normal distribution and tended to be rational based on the average respondent.

Table 3. Mean and standar deviations

Variables	Mean	Std. Dev.
Representativeness	2.876	0.544
Anchoring	3.378	0.679
Overconfidence	2.984	0.337
Herding	3.238	0.764
Investment decision	3. 837	0.413

4.3. Pearson Correlation Test

A correlation test was used to examine the initial relationship between each behavioral bias and investment decisions. The correlation results showed that all independent variables had a positive and significant relationship with the dependent variable. The highest coefficient was recorded for representativeness ($r = 0.52$), followed by anchoring ($r = 0.49$), overconfidence ($r = 0.46$), and herding ($r = 0.44$). This indicates that the higher the intensity of an investor's behavioral bias, the greater their tendency to make investment decisions influenced by that bias.

Table 4: Pearson Correlation Test

	Representativeness	Anchoring	Overconfidence	Herding	Investment decision
Representativeness	1	0.45	0.37	0.41	0.52
Anchoring	0.45	1	0.41	0.33	0.49
Overconfidence	0.37	0.41	1	0.38	0.46
Herding	0.41	0.33	0.38	1	0.44
Investment decision	0.52	0.49	0.46	0.44	1

4.4. Reliability test

Based on the reliability test results shown in the table, all research variables had Cronbach's Alpha values above the minimum threshold of 0.60, indicating that the questionnaire instrument used in this study is reliable. The overconfidence variable demonstrated the highest level of reliability with an alpha value of 0.938, indicating very strong internal consistency among its constituent items. The herding and investment decision variables also demonstrated high reliability with alpha values of 0.861 and 0.865, respectively. Meanwhile, representativeness obtained a value of 0.762 and anchoring of 0.699, both of which are still in the reliable category. Thus, all constructs in this study can be said to have adequate stability and consistency, making them suitable for further analysis. The results of the reliability test are shown in Table 5.

Table 5: Result for reliability analysis

Variables	Cronbach's alpha	F (sig)
Investment decision	0.865	6.637 (0.001)
Representativeness	0.762	8.726 (0.000)
Anchoring	0.699	9.765 (0.000)
Overconfidence	0.938	7.635 (0.001)
Herding	0.861	9.237 (0.000)

4.5. Multiple linear regression test

To test the simultaneous and partial influence of four types of behavioral biases on millennial investors' investment decisions, a multiple linear regression analysis was conducted. This regression model aims to determine the contribution of each bias namely, representativeness, anchoring, overconfidence, and herding, in explaining variation in investment decision-making behavior.

The analysis results indicate that all four independent variables have a statistically significant influence on investment decisions, with p-values below the 0.05 significance threshold. Among the four, representativeness bias was recorded as having the most dominant influence on investment decisions, with a standardized beta coefficient of 0.28. This indicates that investors' tendency to quickly draw conclusions based on past patterns perceived as representative significantly influences their financial decision-making.

Furthermore, anchoring bias also showed a substantial contribution with a beta value of 0.25. This bias reflects investors' tendency to fixate on initial information, such as the initial purchase price or initial prediction, which ultimately creates resistance to new, more relevant information. Overconfidence bias ranked third, with a coefficient of 0.22, indicating that excessive confidence in one's own analytical abilities also drives investors to make less cautious decisions. Meanwhile, herding bias, although having the smallest influence among the four, remained statistically significant with a beta value of 0.20, indicating that millennial investors' investment decisions are still influenced by the tendency to follow the majority or market trends.

Overall, the regression results indicate that the model has good predictive ability, with a relatively high adjusted R-squared value, indicating that the independent variables in this model are able to explain a significant proportion of the variation in investment decisions. This finding strengthens the argument that behavioral biases play a significant role in influencing the quality and rationality of investment decisions of young investors in emerging markets like Indonesia.

The following figure shows the strength of influence of each behavioral bias on investment decisions based on the standardized coefficient value (β): From this visualization, it can be concluded that although all four types of bias have a significant influence, there are variations in the strength of influence that policy makers should pay attention to when designing educational interventions for millennial investors.

The multicollinearity test showed a VIF value <10 for all variables, indicating no multicollinearity problem. The residual normality and heteroscedasticity tests also showed a reasonable and unbiased residual distribution.

Table 2: Result for regression analysis

Predictors	B	Investment decision/ R^2	ΔR^2
Step 1			
Control variable		0.131	
Step 2			
Representativeness	-0.286**		
Anchoring	-0.256***		
Overconfidence	-0.227***		
Herding	-0.204**	0.712	0.451**
Notes: N = 145; ** $p < 0.1$; *** $p < 0.05$; control variables were gender, age, and qualification.			

5. Discussion

This study aims to evaluate the influence of four types of behavioral biases namely representativeness, anchoring, overconfidence, and herding, on millennials' investment decisions on the Indonesia Stock Exchange. Millennials have unique characteristics in financial decision-making due to their high exposure to technology and information. In this context, cognitive biases become highly relevant, particularly in dynamic and uncertain market conditions. This chapter discusses the empirical findings, evaluates their significance, and relates them to theory and previous studies.

Regression results indicate that all behavioral biases studied significantly influence millennials' investment decisions. These findings confirm that millennials' decisions are not entirely rational but are influenced by cognitive limitations and heuristic thinking patterns.

Representativeness bias showed the strongest influence in the model, indicating that millennial investors tend to infer future performance based on short-term events or trends they perceive as consistent patterns. This aligns with the heuristic theory by Tversky & Kahneman (1974) and the results of a study by Shah et al. (2018), which found that representativeness causes investors to be overconfident in interpreting stock price patterns. This phenomenon can be explained by millennials' tendency to rely on short-term experiences and repetitive and superficial social media information.

Furthermore, anchoring bias also showed a significant influence. This bias reflects investors' attachment to initial information, such as the initial purchase price or initial profit target. This research corroborates the findings of Owusu and Laryea (2023) and Bai & Wu (2016), which showed that investors are often reluctant to sell stocks at prices below psychological reference values even after market conditions have changed. In the context of millennials, this bias is exacerbated by their reliance on investment apps with visual features that highlight initial prices and historical performance.

Overconfidence bias has also been found to influence investment decisions. Millennial investors tend to overestimate the accuracy of their own analyses and predictions, especially those who feel they have learned enough through online media or have had brief, successful experiences. This is consistent with the findings of Mushinada et al. (2018) and Hu et al. (2024), where overconfidence actually increases the risk of errors in asset selection and inefficient transaction frequency. In the Indonesian context, where investment education is not yet widespread, this overconfidence could be a contributing factor to short-term speculation.

Finally, herding bias also contributes to investment decisions. This bias arises from the tendency of millennial investors to follow the majority's decisions without independent analysis, often driven by FOMO (Fear of Missing Out). This finding corroborates the findings of Gupta & Shrivastava (2022) and Ahmad & Wu (2022), which suggest that young investors are more easily influenced by social opinion, particularly in digital environments such as investment community groups and social media.

The results of this study align with those of Parveen et al. (2023) in Pakistan and Shukla et al. (2024) in India, which found that representativeness, anchoring, and overconfidence significantly influence investment decisions. However, there are local nuances that differentiate them. In Indonesia, the influence of representativeness and anchoring appears to be more dominant, likely due to a combination of factors such as limited access to formal financial literacy and a collectivist culture that reinforces conformist behavior. Meanwhile, these results contradict

the findings of Vuković & Pivac (2024) in Croatia, where herding actually had a negative effect. This suggests that social and economic backgrounds significantly influence behavioral bias patterns.

The findings of this study strengthen the behavioral finance framework, particularly regarding the validity of the representativeness and anchoring heuristics in the context of millennial retail investors in developing countries. This study also shows that behavioral biases remain relevant and significant even when investors have extensive access to information, thus supporting (MacLean & Dror, 2016) view that cognitive limitations are a primary source of bias despite the availability of information. This research adds a new perspective to the literature by examining a group of digital-native investors who have unique characteristics in financial decision-making.

The results of this study provide several important practical implications. First, there is a need for financial education that focuses not only on technical aspects such as fundamental and technical analysis, but also includes training in controlling behavioral biases. Second, online investment platforms and regulators such as the Financial Services Authority (OJK) can redesign their app interfaces and notification features to prevent anchoring or herding biases, for example by presenting objective and educational data-based information. Third, millennials investors need to be trained to recognize biases in their own decisions and use data-driven decision-making tools to strengthen long-term investment discipline.

Thus, it can be concluded that millennials' investment decisions are heavily influenced by various behavioral biases. A deeper understanding of the role of each bias will not only help improve the quality of individual investor decisions but also contribute to overall capital market stability. The next chapter will summarize the key findings and provide recommendations for further research.

6. Conclusion and recommendation

This study aims to evaluate the influence of four types of behavioral biases—representativeness, anchoring, overconfidence, and herding—on investment decision-making by millennial investors actively trading on the Indonesia Stock Exchange (IDX). To achieve this objective, a quantitative approach was employed, employing a survey method using a closed-ended questionnaire distributed to 145 respondents. Data were analyzed using Pearson correlation and multiple linear regression with a hierarchical approach.

The results of the study indicate that all behavioral bias variables studied significantly influence investment decisions. Among the four, representativeness bias proved to have the most dominant influence, followed by anchoring, overconfidence, and herding. This suggests that millennial investors tend to rely on intuitive judgments based on past patterns, remain tied to initial information, overestimate their ability to predict the market, and are easily influenced by majority decisions. These findings support behavioral finance and prospect theory and reinforce the understanding that retail investors' decision-making processes are not entirely rational, even in the digital age with its wide access to information.

Theoretically, this study contributes to the broader behavioral finance literature by presenting empirical evidence from an emerging market context and a digital-native investor population, namely the millennial generation. The study also shows that cognitive biases remain significant even when investors have access to advanced technology and information. Thus, these

results confirm that bias stems not only from ignorance but also from cognitive limitations and social pressures in financial decision-making.

Based on the results and findings of this study, there are several important recommendations aimed at various stakeholders. First, for educational institutions and financial literacy providers, it is crucial to integrate material on behavioral bias into investor education curricula. Education should not only cover technical aspects such as fundamental and technical analysis, but should also help investors recognize and manage biases that influence their decisions. Second, capital market authorities such as the Financial Services Authority (OJK) and the Indonesia Stock Exchange (IDX) need to encourage the creation of regulations and behavioral-based interventions (behavioral nudges) that can help retail investors make more rational decisions. For example, regulating the presentation of price information in apps to prevent reinforcing anchoring bias, or encouraging platform providers to display warnings when investors engage in excessive speculative transactions. Third, for digital investment app developers, it is crucial to design user interfaces (UI/UX) that do not lead investors into impulsive decision-making. Features such as reminders based on long-term investment goals or notifications that educate about the risks of herding can help create a more controlled and informative investment experience.

7. Limitations and directions for further research

This study has several limitations that should be considered when interpreting the results. First, the geographic scope of the study was limited to millennial investors residing in the Jakarta area, so generalizations to the national investor population require caution. Second, the behavioral bias variables tested were limited to four types, while other biases such as the disposition effect, mental accounting, or loss aversion are also relevant for study.

For future research, it is recommended that the scope be expanded geographically and that investors be segmented based on their level of financial literacy, experience, and type of instrument chosen. Longitudinal research can also be conducted to observe how behavioral biases develop or change over time and market dynamics.

Thus, it can be concluded that the investment decisions of millennial investors in Indonesia are heavily influenced by psychological factors and behavioral biases. A deeper understanding of these patterns not only strengthens theories in behavioral finance but also provides a basis for policymaking and the design of more effective, targeted, and contextualized educational interventions for the current generation of investors.

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