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Understanding Heuristics and Investor Behavior in Financial Markets

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Abstract

The purpose of this study is to analyze the heuristic factors that drive investors to overreact or underreact to earnings information. Heuristics, as cognitive shortcuts used to simplify decision-making under uncertainty, often lead to systematic biases in investor behavior. These biases can cause investors to deviate from rational evaluations of earnings announcements, resulting in market inefficiencies. The study focuses on identifying key heuristic factors, such as representativeness, anchoring, and availability that contribute to exaggerated or subdued reactions to earnings data. By understanding these behavioral tendencies, the research aims to shed light on the psychological mechanisms influencing investor decisions and their subsequent impact on financial markets. The findings of this study could offer practical insights for improving investment strategies, reducing market volatility, and enhancing the accuracy of financial forecasting. This research employs a full factorial within-subject laboratory experimental design to explore the heuristic factors influencing investor reactions to earnings information. The experimental design allows for a comprehensive examination of the interaction effects between two independent variables, ensuring that each participant is exposed to all treatment conditions. By using students with foundational knowledge of accounting and financial management, the study ensures that participants possess the requisite understanding of financial statements and market dynamics, thereby enhancing the validity of the findings. This approach provides valuable insights into how cognitive heuristics affect decision-making processes in a controlled, replicable environment. The results of the study revealed that psychological heuristics play a significant role in influencing investor behavior. Specifically, the representativeness heuristic was identified as a key factor contributing to overreaction behavior among investors. This occurs when investors rely on stereotypes or patterns, assuming that recent earnings information is representative of long-term trends, leading them to make exaggerated adjustments to their investment decisions. Conversely, underreaction behavior was found to be driven by the anchoring-adjustment heuristic, wherein investors base their judgments on initial reference points and fail to adequately adjust their evaluations in response to new earnings information. This results in a muted or insufficient response to changes in financial data. These findings highlight the importance of cognitive biases in shaping market behaviors, suggesting that investor psychology plays a pivotal role in market inefficiencies. Understanding these heuristics can provide valuable insights for financial analysts, educators, and policymakers in designing strategies to mitigate the effects of such biases on investment decisions and market stability.

Keywords: Heuristics, Investor Behavior, Market Inefficiencies

JEL Codes: G02, D91, G14

1. INTRODUCTION

Earnings estimation plays a crucial role for investors as it serves as a foundation for making informed investment decisions. Errors in predicting future earnings can lead to inaccurate assessments of a company's financial performance, which, in turn, may result in incorrect evaluations of the company's stock price. Such misjudgments can adversely influence decisions to buy, hold, or sell shares, potentially affecting the investor's financial outcomes. In the process of estimating a company's future earnings, accounting information, particularly earnings data, becomes indispensable for investors (Maurya, 2018). The disclosure of accounting information by companies significantly contributes to the analyses and decisions made by investors. Transparent and comprehensive disclosure is especially valuable, as it provides both quantitative and qualitative insights, enabling investors to form a more accurate picture of the company's financial health and prospects (Wahyuni et al., 2016; Zahid, 2018; Bashir & Rashid, 2019). The availability of clear and detailed accounting information reduces uncertainty and enhances the reliability of earnings estimations, supporting better decision-making and minimizing the risk of errors in predicting a company's future performance.

Generally, companies provide past information in current earnings announcements, using profit as a benchmark for investors to evaluate performance. However, in addition to historical data, future-oriented information, such as performance forecasts and economic conditions, is increasingly regarded as essential for making informed business decisions. This combination of past and future information constitutes a comprehensive disclosure strategy known as the multiple benchmark information disclosure form (Schrand & Walther, 2000; Krische, 2005; Han & Tan, 2007; Wahyuni et al., 2016; Maurya, 2018; Perveez, 2019; Karhan, 2019; Audi, Ali, & Roussel, 2021). The multiple benchmark disclosure strategy encompasses a broad spectrum of information, including mandatory and voluntary disclosures, internal and

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external insights, historical and forward-looking data, as well as quantitative and qualitative information. This approach provides a more complete and transparent view of a company's financial health and prospects. In this study, the multiple benchmark information disclosure form is used as a framework for presenting accounting information to investors, serving as a reference for estimating a company's future earnings (Schrand & Walther, 2000; Krische, 2005; Han & Tan, 2007; Wahyuni et al., 2016; Adjasi & Yu, 2021). Accounting information disclosed by companies often influences the perception biases of investors. This bias arises from the patterns in information that shape the decisions of various stakeholders, including investors, creditors, governments, and the general public. These perception biases can lead to anomalies in the capital market, disrupting the expected rational behavior of market participants. One commonly observed anomaly in capital markets is the phenomenon of overreaction, where investors excessively respond to new information, either positively or negatively (De Bondt & Thaler, 1987). Such anomalies highlight the importance of understanding how accounting disclosures influence decision-making and the need for strategies to mitigate the effects of perception bias to ensure market efficiency. Capital market inefficiency is often driven by excessive reactions from investors to new information. Investors tend to overvalue stocks when they perceive the information as good news, setting prices excessively high. Conversely, when faced with information they interpret as bad news, they undervalue stocks, leading to excessively low prices. This behavior reflects a deviation from rational market expectations and contributes to inefficiencies in pricing mechanisms (De Bondt & Thaler, 1987; Praditha et al., 2019; Qasim & Su, 2022; Banyen, 2022; Nasir, 2022; Audi, Ali, & Hamadeh, 2022). Understanding this phenomenon is critical for improving market efficiency, as it underscores the impact of behavioral biases on investment decisions and highlights the need for strategies to moderate overreactions in response to information.

Overreaction and underreaction behaviors are strongly tied to how investors respond to earnings information. Investors are often influenced by the patterns in the information they receive and tend to rely heavily on prior earnings data when estimating future earnings (Bloomfield et al., 2003). These behavioral anomalies in financial decision-making can be effectively explained through psychological principles. Tversky and Kahneman (1973) argue that such behaviors stem from intuitive prediction, where investors combine the perceived predictability of information with their impressions, leading to cognitive biases. This intuitive approach can result in either overreaction, where investors place excessive weight on new information, or underreaction, where they fail to fully adjust their expectations based on available data. The overreaction and underreaction behaviors observed in response to accounting information are further explained by cognitive heuristics. These mental shortcuts simplify complex decision-making but often lead to systematic biases, influencing how investors interpret and act on financial data. Recognizing these heuristics is essential for understanding market inefficiencies and improving investor decision-making processes.

Habbe (2017) investigates the impact of the representativeness heuristic and the anchoring-adjustment heuristic on investor overreaction and underreaction behaviors. The study reveals that investors tend to overreact to new information due to the influence of the representativeness heuristic, where they rely on perceived patterns or stereotypes in the data. Conversely, underreaction occurs when investors adopt a conservative approach, anchoring their predictions close to their initial beliefs or averages. These findings highlight how cognitive biases influence investor behavior, leading to deviations from rational decision-making and contributing to market inefficiencies. Investors using the representativeness heuristic can potentially earn higher returns by capitalizing on the misjudgments made by noise traders, compared to rational investors. This tendency encourages investors to rely on representativeness when making decisions, even though such approaches may lead to biased evaluations (Lo, 1989). Additionally, many investor decisions are influenced by their initial beliefs, such as past earnings, which they use as a reference point for future expectations. This behavior can be explained by the anchoring-adjustment heuristic, where investors begin with past information as their initial anchor and adjust their predictions based on new information received (Habbe, 2017; Sundari & Habbe, 2018; Praditha, 2019; Abdul, 2023; Sadashiv, 2023). The greater the alignment between an investor's current beliefs and the initial value (anchor), the more likely their decisions will be biased, leading to improper decision-making (Musthofa & Ancok, 2005). The anchoring-adjustment process is widely recognized as the foundation for many intuitive judgments in decision-making (Gilovich & Epley, 2006; Shahabuddin & Ali, 2024).

2. LITERATURE REVIEW

Individual investors, when evaluating a company's future earnings performance, are frequently influenced by cognitive psychological factors, which shape their decision-making processes. These biases and heuristic behaviors represent cognitive shortcuts, often resulting in errors in judgment and evaluation. Such behavior is not necessarily irrational but reflects how individuals process complex information and make decisions under uncertainty. These cognitive biases are a direct result of the psychological conditions of the investor, arising from systematic cognitive errors that can significantly impact their financial choices and market behaviors. From the perspective of cognitive psychology, these biases are produced by heuristics—mental shortcuts that simplify decision-making, but often at the cost of accuracy. Common heuristics such as representativeness, availability, and anchoring can cause investors to make decisions based on incomplete or overly simplistic information, leading to overreactions or underreactions to market events. While heuristics can be useful in reducing cognitive load, they can also lead to predictable errors in judgment, contributing to market inefficiencies and investor misbehavior. However, it is crucial to note that each investor possesses different cognitive abilities, which can influence how they respond to the same information or market events. People with higher cognitive abilities tend to approach decision-making more analytically and methodically, considering a wider range of

factors and adjusting their decisions based on more comprehensive information. In contrast, individuals with lower cognitive abilities may rely more heavily on heuristics and prior biases, leading to less nuanced or more impulsive decisions. This difference in cognitive processing can result in divergent choices and behaviors even when investors are faced with the same problem or data (An et al., 2012).

Furthermore, individuals with higher cognitive abilities are better equipped to understand complex financial concepts, evaluate future earnings more accurately, and recognize the potential long-term implications of their investment decisions. These investors may be more adept at processing and interpreting accounting information, market trends, and external factors in a way that minimizes cognitive biases. On the other hand, those with lower cognitive abilities might rely more on past experiences, emotional reactions, or superficial information, which can lead to suboptimal decision-making. This variation in cognitive abilities emphasizes the importance of cognitive diversity in investment behavior, particularly in markets where decision-making under uncertainty is common. Understanding how cognitive factors influence investor behavior can help both individual investors and market participants navigate potential pitfalls and make more informed, balanced decisions. It also suggests that financial education and cognitive training may be essential tools for improving investor decision-making and reducing the impact of cognitive biases in the financial markets. Cognitive psychology is a psychological approach focused on understanding mental processes involved in decision-making or problem-solving. In the context of finance and investment, one important aspect of cognitive psychology is mental accounting, which refers to the way individuals categorize and evaluate financial decisions based on subjective perceptions. This psychological bias influences how investors perceive and manage their investments, often leading to irrational decision-making (Nofsinger, 2016). Mental accounting can cause investors to treat different sources of money or investments in distinct ways, even if they are functionally equivalent. For instance, an investor may treat money earned from a bonus as "extra" income, spending it more freely than money earned through regular wages. This bias can impact how investment decisions are made, with investors being more risk-averse or willing to take greater risks depending on how they mentally categorize their financial resources. By understanding mental accounting, investors and financial professionals can better navigate the psychological factors that influence investment behavior.

Cognitive psychology deals with internal processes such as attention, perception, language, memory, thinking, decisions, judgment, and reasoning (An et al., 2012). In this context, cognitive psychology influences individual judgment, particularly through the use of heuristics. Heuristics are practical mental shortcuts that simplify decision-making, allowing individuals to make judgments quickly and efficiently. In this study, the heuristics explored are representativeness and anchoring-adjustment. Previous research has shown that these two heuristics significantly influence the decisions made by investors. For instance, the representativeness heuristic leads investors to make judgments based on stereotypes or perceived patterns, while the anchoring-adjustment heuristic causes investors to rely too heavily on initial information (anchors) and make insufficient adjustments based on new data (Bloomfield et al., 2003; Habbe, 2017; Richie & Josephson, 2017; Sundari & Habbe, 2018; Praditha, 2019). These cognitive biases can lead to suboptimal investment decisions, affecting both individual investors and overall market efficiency.

Heuristic representativeness is a psychological bias that explains how, under conditions of uncertainty, investors tend to favor historical data and patterns over other contextual factors when evaluating a company's performance. This bias occurs because investors are more comfortable making decisions based on familiar patterns rather than analyzing the full range of available information. As Boussaidi (2013) explains, investors may overly rely on a company's past performance results, assuming that trends will continue without fully considering the underlying reasons for those trends or the potential for change. This reliance on history, particularly when faced with uncertain outcomes, leads investors to make judgments based on what appears to be a similar situation or outcome. Tversky and Kahneman (1973) highlight that humans tend to make judgments and predictions by drawing comparisons or identifying patterns based on similarities. In the case of investors, this means that their decisions are often shaped by prior experiences with a company's performance. If a company has consistently posted positive earnings, investors are likely to predict that the company will continue to perform well in the future, without considering changes in the market, management, or other key factors that could influence performance. This tendency to extrapolate from past success is a form of cognitive shortcut that simplifies complex decision-making processes but can lead to errors in judgment.

The consequence of relying on heuristic representativeness is that investors may fail to recognize when the patterns they are seeing no longer hold true. For example, if a company's past growth is based on unsustainable practices or external factors that have now changed, the investor may continue to expect future success, resulting in an overvaluation of the stock or an inappropriate investment decision. Furthermore, this bias can prevent investors from considering new or emerging information that could significantly affect future performance. As a result, heuristic representativeness can lead to overconfidence, excessive optimism, and ultimately errors in predicting a company's future prospects. While heuristic representativeness allows investors to make decisions more quickly by relying on familiar patterns, it also introduces a significant risk of misjudgment. Investors who fall victim to this bias may overlook crucial variables that are not reflected in past performance, leading to suboptimal investment choices. By understanding this bias, investors and financial analysts can better guard against the potential pitfalls of over-relying on historical patterns and incorporate a more holistic and forward-looking approach to decision-making.

Investors who use representativeness heuristics in making investment decisions often believe they can identify patterns in what are essentially random events (Laih, 2016). This heuristic is widely applied because it is seen as highly effective in everyday decision-making. It helps investors quickly identify patterns in complex situations, allowing them to make

decisions that seem reasonable or plausible, even when the patterns they observe may not be statistically valid. Representativeness heuristics can also save time by simplifying decision-making, enabling investors to make judgments without requiring in-depth analysis or extensive information. However, while representativeness heuristics can be useful in making quick decisions, they can also lead investors astray. By focusing on patterns that may not exist or misinterpreting the significance of observed trends, investors can make irrational choices. This cognitive bias can cause investors to overestimate the likelihood of future success based on past performance, even in the absence of fundamental support for such predictions. As a result, relying on representativeness heuristics can lead to poor investment decisions, which may ultimately result in financial losses (An et al., 2012). For example, an investor might see a company with a history of consistent growth and assume that this pattern will continue indefinitely, overlooking the possibility of market shifts, changes in company management, or broader economic factors that could influence the company's future performance. This type of misjudgment illustrates how the representativeness heuristic can lead to biased decision-making and hinder rational financial planning. In the context of investing, such reliance on patterns without thorough analysis may contribute to overconfidence, excessive risk-taking, and underperformance in the market. The anchoring-adjustment heuristic is a cognitive bias that describes how initial information, often referred to as the "anchor," significantly influences a decision-making process. This effect is particularly strong when the anchor is presented at the start of a particular situation or decision. The anchor sets a reference point, and individuals tend to make adjustments from this starting point, but these adjustments are often insufficient, resulting in biased judgments. According to Richie and Josephson (2017), this phenomenon highlights how decisions can be disproportionately shaped by the first piece of information encountered, even if that information is irrelevant or arbitrary. One common strategy for making decisions under uncertainty is to begin with a known reference point, such as past performance or a similar event, and then adjust it based on new information until a final estimate is reached (Tversky & Kahneman, 1973; Gilovich & Epley, 2006). This process, while efficient, often leads to biased decision-making because the adjustment from the initial anchor is typically not large enough to account for all relevant factors, which can lead to overconfidence or underadjustment in the final estimate.

The anchoring-adjustment model asserts that in many decision-making situations, individuals rely heavily on the initial value (the anchor), even when that value is not entirely relevant or accurate. They make adjustments from this anchor based on subsequent information, but the adjustments are often insufficient to correct for biases introduced by the anchor. This effect can be particularly pronounced in financial decision-making, such as forecasting future earnings or stock prices. For example, investors may base their expectations for a company's future performance on its past earnings, treating historical performance as an anchor for predicting future results (Wahyuni et al., 2016). In the context of earnings estimation, the initial earnings figure (the anchor) can shape how investors perceive future growth or decline. If a company has consistently performed well, its past earnings may serve as an anchor for investors, leading them to expect similar results in the future. However, this reliance on past performance may lead to an overestimation of future earnings, especially if the underlying conditions of the company or the market have changed. Conversely, if the company has experienced a downturn, investors might anchor their predictions to the lower earnings, leading to overly conservative expectations that fail to account for potential recoveries or improvements. This reliance on anchors in decision-making processes underscores the importance of understanding the psychological factors that shape investor behavior. Recognizing the impact of the anchoring-adjustment heuristic can help investors, financial analysts, and decision-makers improve the accuracy of their forecasts by consciously accounting for potential biases and making more deliberate adjustments in response to new information.

Adjustments made during the anchoring process are typically inadequate because they stop once an acceptable estimate has been reached, even if that estimate is not fully accurate. This inadequacy in adjustment occurs when the initial anchor value is outside the distribution of acceptable values, meaning the anchor is either extreme or incorrect (Bahnik et al., 2016). In these situations, the final estimate is disproportionately influenced by the anchor, leading to biased judgments that don't fully reflect the new information or context. However, the anchoring effect does not always arise from inadequate adjustments alone. According to Gilovich and Epley (2006), the anchoring effect may also occur due to an increase in the accessibility of information that aligns with the anchor, rather than from the failure to adjust properly. In other words, the anchor value not only serves as a starting point but also makes certain information more accessible or salient in the decision-making process. This increased accessibility of information that is consistent with the anchor can reinforce the initial estimate, further embedding the bias in the decision-making process. For example, if an investor is given a high anchor value for a company's earnings and then adjusts based on new information, their adjustments may still be insufficient, leading them to make overly optimistic predictions. Alternatively, the anchor may cause the investor to recall past successes or information that aligns with the high earnings figure, making it easier for them to justify a higher estimate, even if the new data suggests otherwise. This mechanism demonstrates how anchoring can persist even when adjustments are made, as the initial value triggers a selective focus on information that supports the anchor, rather than fostering a more balanced or objective assessment.

The Market Efficiency Hypothesis is one of the most extensively researched topics in finance. A key phenomenon related to market inefficiency is overreaction, which typically occurs in the shares of winners and losers. Overreaction is often seen when price reversals happen specifically in the stocks of losers or winners, meaning that price corrections are more likely to occur in these stocks (Rosenberg et al., 1985). The reversal of stock prices typically involves the shifting of loser stocks into winner stocks, or vice versa, indicating a correction in the market. This means that loser stocks, after being

undervalued for some time, may experience a rapid upward adjustment in price, aligning them more closely with their true market value. Similarly, winner stocks may face price corrections if they are overvalued. This rapid correction of prices demonstrates that investors are quickly reacting to market changes, buying or selling shares in an attempt to capitalize on perceived mispricings. Such phenomena point to a lack of perfect market efficiency, where investor behavior, often driven by biases or emotional responses, leads to swift changes in stock prices. This overreaction and subsequent price reversal show that markets may not always correctly reflect the underlying value of stocks, at least in the short term.

The market reaction to events is rooted in psychological research conducted by Kahneman and Tversky (1979), who found that individuals tend to show excessive reactions to events that are perceived as dramatic. Such events often contain new information, which is then absorbed by the market and used by investors to make their investment decisions. De Bondt and Thaler (1987) suggest that the hypothesis of market overreaction is primarily driven by market participants who overestimate stock prices in response to information perceived as positive news. In this context, stock portfolios are typically divided into two groups: the winner portfolio and the loser portfolio. Overreaction occurs because of information asymmetry, where some investors receive relevant information that influences their investment decisions, while others do not. Those who have access to this information are likely to make rational decisions based on their analysis of the news, while those who lack such information may make irrational investment choices. As a result, the difference in information access leads to biased investment decisions, causing price fluctuations and market inefficiencies, which is a hallmark of the overreaction phenomenon in financial markets.

3. METHODOLOGY

This research utilizes a full factorial 2x2 within-subject laboratory experimental design. The design involves a variation of two or more treatments (explanatory variables) to observe the separation of influences on dependent variables, as well as the potential for interactive effects between these explanatory variables. The purpose of this experimental design is to assess whether the subjects experience the heuristic biases of representativeness and anchoring-adjustment while estimating a company's future earnings based on the pattern of earnings information provided. The participants in this study were 25 final-year students majoring in accounting and financial management at STIE Tri Dharma Nusantara, Makassar, Indonesia. These students had attended capital market schools (Sekolah Pasar Modal – SPM) on the Indonesia Stock Exchange. The students were treated as proxies for investors, with the assumption that while they were well-educated, they had limited investing experience, mainly drawn from the training provided by the SPM program. To assess the effectiveness of the experimental treatment and ensure that the subjects understood the assignment, manipulation checks were carried out. These checks involved giving participants three binary questionnaire questions (true or false) designed to evaluate their understanding of the experiment. By using manipulation checks, the study ensured that the treatment was effectively applied and that participants grasped the experimental task, which is critical for the validity of the study's conclusions.

4. RESULT AND DISCUSSION

The demographic data provides an overview of the sample's age and gender distribution. In terms of age, the majority of the respondents are either 21 years or 22 years old, with both age groups having an equal frequency of 31 respondents, each constituting 44% of the sample. Respondents aged 23 years make up a smaller proportion, with a frequency of 9, accounting for 12% of the total sample. This indicates a relatively young demographic, with most participants clustered around 21 and 22 years of age. Regarding gender, the sample has a slightly higher representation of females, with 34 respondents (56%) identifying as female, compared to 31 respondents (44%) identifying as male. This suggests a fairly balanced gender distribution, though females make up a slightly larger proportion of the sample. Overall, the demographic data highlights a youthful and nearly gender-balanced sample, with a strong concentration of respondents aged 21 and 22.

Table 1: Demographic

		Frequency	Percent
Age	21 year	31	44%
	22 year	31	44%
	23 year	9	12%
Gender	Male	31	44%
	Female	34	56%

The error estimation table provides insights into the relationship between past earnings (PE) and current earnings (CE) across both positive and negative values. When both past earnings and current earnings are positive, the error estimation is relatively low at 6,460, indicating that predictions for firms with consistent positive earnings align closely with actual outcomes. This suggests a stable and predictable relationship between past and current earnings in this scenario. In cases where past earnings are negative but current earnings are positive, the error estimation is much higher at 72,650. This large discrepancy suggests that firms transitioning from negative past earnings to positive current earnings experience a less predictable pattern, potentially influenced by recovery strategies or external factors not accounted for in the model.

For firms with negative past earnings and negative current earnings, the error estimation is -3,910. This smaller error indicates that the model performs reasonably well in predicting earnings for firms consistently underperforming in both past and current periods. In scenarios where past earnings are positive but current earnings turn negative, the error estimation is -35,670. This substantial deviation highlights challenges in predicting sudden downturns or shifts from profitability to losses, which may result from unexpected factors such as market disruptions or poor management decisions. The model appears to perform best in cases where earnings remain consistent (either positive or negative) but struggle to accurately estimate transitions between positive and negative earnings, particularly when current earnings improve after past losses.

Table 2: Error Estimation

	CE positive	CE negative
PE positive	6,460	72,650
PE negative	-35,670	-3,910

Note: PE is past earning (t-1 and t-2), CE is current earning (t0)

The ANOVA results provide insights into the statistical significance of the differences being tested, adjusted for potential violations of the sphericity assumption through the Greenhouse-Geisser correction. The sum of squares, representing the total variability explained by the model, is 155,418.397. This reflects the degree of variation in the dependent variable that is attributable to the factors under consideration. The degrees of freedom, adjusted by the Greenhouse-Geisser correction, are 1.447, ensuring the validity of the results despite any deviations from sphericity. The mean squares, calculated by dividing the sum of squares by the degrees of freedom, amount to 107,437.586. This represents the average variability explained by the model per degree of freedom. The F-statistic, which compares the explained variance to the unexplained variance, is exceptionally high at 4273.062. This indicates a strong relationship between the factors and the dependent variable. The significance value, reported as 0.000, confirms the statistical significance of the findings. This p-value is well below conventional thresholds, providing strong evidence to reject the null hypothesis. These results demonstrate a substantial and significant effect, supported by the robustness of the Greenhouse-Geisser adjustment.

Table 3: ANOVA

	Sum of Squares	df	Mean Squares	F	Sig.
Greenhouse-Geisser	155418,397	1,447	107437,586	4273,062	0,000

Investor overreaction behavior towards earnings information is often driven by psychological heuristic factors, particularly the representativeness heuristic. This heuristic, as explained by Tversky and Kahneman (1973), describes how investors make decisions based on perceived similarities or patterns between current information and past experiences. When investors use the representativeness heuristic, they tend to make judgments and predictions based on how similar new information is to previously encountered data. In the context of earnings information, the representativeness heuristic causes investors to overreact when they observe patterns that resemble those from the past. For instance, if a company's earnings performance shows a positive trend over multiple periods, investors may predict that the same pattern will continue, leading them to overestimate future earnings and potentially inflate the company's stock price. Similarly, if negative earnings patterns are observed, investors might react too harshly, selling off shares based on the assumption that poor performance will persist. This behavior demonstrates how investors, influenced by representativeness, may overreact to new information that mirrors past patterns, failing to fully account for changes in the market, company, or economic environment.

Both research results have highlighted the prediction bias that arises due to the representativeness heuristic experienced by investors when assessing the future earnings performance of a company. Investors tend to overestimate future earnings when the information they receive shows a positive value or an increase, whereas they tend to underestimate future earnings when the information shows a negative or declining value. This finding is consistent with the research of Habbe (2017), Boussaidi (2013), Sundari and Habbe (2018), and Praditha (2019), who have shown that investors make errors in predicting future earnings due to the influence of the representativeness heuristic bias. This psychological bias explains that under conditions of uncertainty, investors tend to rely on the similarity of past performance to make predictions about future outcomes. In other words, investors often assume that past trends will continue, leading them to predict future performance based on patterns they have observed, even if the underlying conditions have changed. Boussaidi (2013) notes that this bias causes investors to make predictions that are aligned with past patterns, reinforcing the tendency to either overreact to positive news or underreact to negative news. The representativeness heuristic thus plays a significant role in shaping investor behavior and contributes to the errors in judgment that lead to market inefficiencies.

Underreaction behavior occurs when investors are faced with new information that is unrelated or inconsistent with their initial beliefs or past information. This situation leads investors to rely on psychological heuristics, particularly the anchoring-adjustment heuristic, in their decision-making process. The anchoring-adjustment heuristic suggests that investors tend to base their judgments on initial information (the anchor) and then make adjustments to account for new information received (Tversky & Kahneman, 1973). The initial anchor acts as a reference point, and investors adjust their expectations accordingly, though often inadequately, based on the new information. Investors are often "anchored" to the

initial value or belief they hold, and their adjustments tend to be insufficient in response to new data. This can lead to underreaction, where investors fail to adjust their predictions fully in light of new information. Both research results are consistent with studies by Wahyuni and Hartono (2012), Boussaidi (2013), Habbe (2017), and Sundari and Habbe (2018), which show that the anchor significantly influences investors' estimations of future earnings. Even after receiving new information, the strong influence of the anchor can persist, leading to irrational or biased decisions. The anchoring effect can remain strong enough to affect decisions even if the anchor is not informative or reasonable, as demonstrated by Bahnik et al. (2016). This highlights that the anchor's influence extends beyond rationality, causing long-lasting biases. Anchors, being powerful cognitive references, also have wide-ranging implications for decision-making processes in various contexts (Furnham & Boo, 2011). This shows that the anchoring effect is not just a temporary bias but can continue to influence investor behavior and decision-making in the long run.

5. CONCLUSION

The phenomenon of overreaction and underreaction can be psychologically explained and is reinforced by the results of this study. It has been shown that investors generally make intuitive assessments, which means they are, consciously or unconsciously, influenced by psychological heuristics. This tendency of investors to rely on heuristics is evident from the research findings, which indicate that investors tend to overestimate future earnings when the earnings information reflects positive movement. In this context, the representativeness heuristic plays a key role, as investors are more likely to predict future performance based on past positive trends, leading them to overestimate future earnings. This behavior illustrates how psychological biases shape investor decision-making, causing them to make predictions based on patterns rather than considering a broader range of relevant factors. As a result, overreaction occurs, and investors fail to adjust their expectations adequately when new, potentially contradictory information becomes available. Conversely, investors tend to underestimate a company's future earnings if past earnings information shows a negative movement. When information is presented in such a pattern, investors are likely to rely on the representativeness heuristic, as they assume that future performance will mirror past trends. This cognitive shortcut leads investors to make judgments based on the similarity between current and past information. In this case, investors tend to overreact to the negative information, assuming that the decline in earnings will continue into the future, even if other factors may suggest a potential recovery. This overreaction is a manifestation of the representativeness heuristic, where the negative pattern becomes overly influential in shaping future expectations. As a result, investors may underestimate future earnings, failing to consider the possibility of a turnaround or improvement in the company's performance, which could lead to biased investment decisions. Conversely, investors exhibit underreaction behavior when faced with information that follows a different movement pattern from the initial reference point. Investors who are presented with information showing positive-negative movements tend to overestimate future earnings, as they are anchored to the positive information. In contrast, when information with a negative-positive pattern is provided, investors tend to underestimate future earnings, influenced by the negative pattern. These results highlight the role of the anchor as the initial belief or reference point, which influences how investors estimate future earnings. The anchoring effect causes investors to anchor their predictions to the initial value, whether it is positive or negative, and then make adjustments based on the new information presented. However, these adjustments are often insufficient, leading to overreactions in the case of positive patterns and underreactions when negative patterns are observed. This behavior underscores how investors' initial beliefs, formed from past information, heavily influence their future expectations, contributing to biases in decision-making.

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