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Behavioral Finance In Decision Making: An Experimental Study Of Investor Bias And Indonesian Private Market Anomalies

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ABSTRACT
This research aims to identify the influence of cognitive bias on investment decisions in the Indonesian capital market, with a focus on overconfidence, herd behavior and loss aversion. Using an experimental approach, 100 individual investors participated in an investment simulation to test related hypotheses. Data was collected through questionnaires and observations during the simulation, analyzed using linear regression and ANOVA. The results show that overconfidence increases transaction frequency and risk, herd behavior causes behavior to follow the majority which triggers market volatility, and loss aversion causes investors to hold losing stocks for too long and quickly sell profitable stocks. These findings provide important insights for investment managers and market regulators to design strategies that reduce the negative impact of cognitive biases and improve market stability and performance.

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INTRODUCTION

Behavioral finance is a branch of finance that combines elements of psychology and economics to understand how psychological factors influence financial decision making. Unlike traditional finance theory which assumes that investors are rational and make decisions based on perfect information, behavioral finance recognizes that investors are often irrational and influenced by various cognitive and emotional biases. (Barberis, N., & Thaler, R. 2003)

Behavioral finance is a field of study that combines psychology and economics to understand how cognitive and emotional biases influence investment decisions. Behavioral finance has become an interesting subject in the world of investment and finance. This concept combines human psychology with financial decisions, and has become a rapidly growing focus of research. One of the most interesting areas in behavioral finance is investor decision making and market anomalies, especially in the context of the Indonesian capital market. (Kahneman, D., & Tversky, A. 1979)

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Experimental studies of investor bias and anomalies in Indonesia's primary market have provided valuable insights into how human behavior influences financial markets. One of the most common investor biases is overconfidence, where investors tend to underestimate risk and be overconfident in market predictions. A study conducted in Indonesia found that most investors tend to be overconfident in making investment decisions, which in the end can lead to errors in their portfolio allocation. (Shefrin, H. 2000)

Experiments on investor bias are one of the research approaches used in behavioral finance to understand how various cognitive biases influence investment decisions. Cognitive biases are patterns of thinking that can cause deviations from rational decisions. By using experimental methods, researchers can create controlled situations to observe investor behavior in conditions that resemble real financial markets. (De Bondt, WFM, & Thaler, R. 1985) Apart from overconfidence, studies also highlight other biases such as loss aversion, where investors tend to avoid losses rather than seek profits, and representation effects, where financial decisions are influenced by the way the information is presented. By understanding these biases, investors can be more alert to decisions that could impact their portfolio performance. (Jegadeesh, N., & Titman, S. 1993)

Market anomalies are also an important area in behavioral finance. Market anomalies refer to market patterns or behavior that do not conform to efficient market theory. An experimental study of Indonesian capital market anomalies found that the Indonesian capital market is susceptible to momentum effects, where shares that have experienced price increases tend to continue to experience price increases, even though rationally this should not be the case. (Yuliana, R., & Oktaviani, A. 2020)

Market anomalies refer to patterns or behavior of financial markets that cannot be explained or predicted using efficient market theory. Efficient market theory assumes that market prices correctly reflect all available information, making it impossible to beat the market or identify stocks that are systematically undervalued or overvalued. (Wibowo, N., & Gunadi, W. 2018). However, in practice, the market often exhibits various anomalies that indicate that asset prices do not always accurately reflect their true value or available information. Market anomalies can vary from relatively minor effects to significant and consistent patterns over a period of time.

In the context of the Indonesian capital market, understanding behavioral finance is very important considering market volatility which is often influenced by the behavior of individual investors. This research aims to identify the main biases that influence investment decisions in Indonesia and analyze their impact on market anomalies. (Shiller, R.J. 2003)

This research highlights the importance of understanding market behavior in more depth, and how psychological factors can influence stock prices and overall market performance. Investors who understand these market anomalies can make smarter investment decisions and can take advantage of market patterns that do not always match. This research uses an experimental approach to test hypotheses about the influence of cognitive biases on investment decisions. The research sample consisted of 100 individual investors who participated in investment simulations. Data was collected through

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questionnaires and observations during the simulation, and analyzed using regression and analysis of variance (ANOVA) techniques.

Previous studies have identified several cognitive biases that are common among investors, including overconfidence, herd behavior, and loss aversion. Overconfidence causes investors to overestimate their ability to choose the right shares, while herd behavior leads investors to follow the actions of the majority, without considering fundamental information. Loss aversion describes an investor's tendency to be more afraid of losses than of enjoying equivalent gains. (Thaler, RH 2005)

Previous research on Behavioral Finance in decision making has explored how psychological and emotional factors influence individual and institutional financial decisions. One of the main findings is the presence of cognitive bias. For example, individuals are often overconfident in their ability to predict markets or choose appropriate investments, which can lead to excessive risk taking and suboptimal decisions (Barber & Odean, 2001). Financial decisions are also often influenced by the initial information received, a phenomenon known as anchoring. For example, the initial purchase price of a stock can influence further selling or buying decisions even though the information is irrelevant (Tversky & Kahneman, 1974). In addition, according to prospect theory by Kahneman and Tversky (1979), individuals feel the pain of losses more than the pleasure of equivalent gains, causing them to tend to avoid risks after experiencing losses, which is called loss aversion.

Emotional effects also play an important role. Financial markets are often influenced by emotions of fear and greed, which can lead to herd behavior and economic bubbles (irrational exuberance) (Shiller, 2000). Investment decisions can be influenced by an individual's emotional condition at a certain time, such as sunny weather which is associated with more positive market sentiment (Hirshleifer & Shumway, 2003).

Research also finds that investors often use heuristics or rules of thumb in decision making. The representativeness heuristic makes investors tend to make decisions based on stereotypes or easily recognized patterns, which can lead to ignoring other important information (Kahneman & Tversky, 1974). The availability heuristic shows that decisions are often influenced by the most memorable or newest information, not the most relevant or accurate (Tversky & Kahneman, 1973).

Mental accounting is another important concept, where individuals tend to divide their finances into various mental “accounts” and make decisions based on each of them, rather than viewing their entire portfolio or financial situation holistically (Thaler, 1999). Framing effects indicate that the way information is presented or framed can influence financial decisions. For example, the decision to accept or reject an investment may be influenced by whether the potential outcome is presented as a gain or a loss (Tversky & Kahneman, 1981).

Herding behavior is also frequently observed, where investors follow the majority decision or market trend even though the decision may not be based on rational analysis. This could be due to a desire for social conformity or the assumption that the majority has more information (Banerjee, 1992). In a specific context, research finds that retail investors often exhibit less rational trading behavior than institutional investors, such as excessive trading which can reduce their profits (Barber & Odean, 2000). Apart from that, decisions regarding

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asset allocation in pension funds are also influenced by psychological factors such as status quo bias and framing effects (Benartzi & Thaler, 2001). Overall, research in the field of Behavioral Finance shows that financial decision making is not always rational and is influenced by various psychological factors. This has important implications for financial education and financial product design, which should consider these psychological aspects to help individuals make better decisions.

The results of previous research regarding investor bias and market anomalies in Indonesia reveal several important findings. This research uses experimental methods and empirical data to identify patterns of irrational investor behavior and market deviations from efficiency. One of the investor biases found is overconfidence, where investors are too confident in their ability to choose shares that will provide high profits. Research by Trinugroho et al. (2017) shows that overconfidence among retail investors in Indonesia causes higher share price volatility. Apart from that, herding behavior is also often found, where investors tend to follow the actions of other investors, especially in situations of uncertainty or when information is imperfect. The study by Setiyono et al. (2018) reveal that this herding behavior occurs especially during periods of high volatility, causing stock prices to become more volatile. The disposition effect also often occurs in the Indonesian capital market, where investors tend to sell shares that produce profits too quickly and hold shares that lose money for too long. A study by Rahmawati and Sari (2015) shows that this disposition effect reduces investors' overall profit potential.

Apart from investor bias, market anomalies are also found in Indonesia. One of the identified market anomalies is the January Effect, where stocks tend to provide higher returns in January compared to other months. Research by Wirawan (2016) found that this anomaly was significant on the Indonesian Stock Exchange, indicating that the market was not completely efficient. Another anomaly is the Day of the Week Effect, where stock prices show different patterns depending on the day of the week, with returns lower on Mondays and higher on Fridays. A study by Suryanto (2014) supports the existence of the Day of the Week Effect in the Indonesian stock market. Apart from that, a size effect was also found, where shares of companies with small market capitalization tended to produce higher returns compared to shares of large companies. Research by Prabowo et al. (2015) shows that the size effect is still relevant in the Indonesian stock market.

The experimental methodology used in this research includes laboratory experiments and field experiments. Laboratory experiments are used to simulate investment decisions in controlled situations. For example, a study by Utami and Nugraha (2019) used an experiment to test the effect of asymmetric information on investment decisions among students. Field experiments are conducted to observe investor behavior in a real market environment. For example, research by Susanti (2017) utilized trading data from brokers to analyze how investors react to economic news.

These findings about investor bias and market anomalies have several important implications. First, increasing financial literacy and awareness of behavioral biases can help investors make more rational decisions. Second, market regulators can consider implementing rules that reduce volatility due to herding behavior and overconfidence. Third, investors and

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portfolio managers can use knowledge of market anomalies to develop more profitable investment strategies. Despite advances in understanding market behavior, there are still many aspects of investor behavior that need further research to create more efficient and stable markets.

By understanding investor bias and market anomalies, this research is expected to provide better insight into investor behavior in the Indonesian stock market. The results of this research can be used by investment managers, market regulators and individual investors to improve their investment strategies and reduce the negative impact of such biases and anomalies. Apart from that, this research also contributes to academic literature in the field of behavioral finance, especially in the context of developing markets such as Indonesia.

METHODS

This research uses an experimental approach to test hypotheses about the influence of cognitive biases on investment decisions. The research sample consisted of 100 individual investors who participated in investment simulations. Data was collected through questionnaires and observations during the simulation, and analyzed using regression and analysis of variance (ANOVA) techniques. (Montgomery, DC, & Runger, GC 2014)

This research uses an experimental approach to test hypotheses about the influence of cognitive biases on investment decisions. The research involved investment simulations designed to trigger certain cognitive biases in participants. These simulations allow researchers to control variables and create conditions similar to real stock markets. The hypothesis of this research is that cognitive biases (such as overconfidence bias, anchoring bias, herding behavior, and loss aversion) have a significant influence on investment decisions. (Tabachnick, B.G., & Fidell, L.S. 2019)

Linear regression is used to test the influence of each cognitive bias on investment decisions. Basic regression equation:

$Y= \beta0+\beta1X1+\beta2X2+\beta3X3+\beta4X4+€$

Y = Investment Decision (measured as proportion of assets traded, portfolio return, etc.)
X1 = Overconfidence Bias Score
X2 = Anchoring Bias Score
X3 = Herding Behavior Score
X4 = Loss Aversion Score
β0= Intercept
β1,β2,β3,β4 = Regression Coefficients
€= Error term

ANOVA is used to test differences in mean investment decisions between groups of investors with different levels of cognitive bias. (Sekaran, U., & Bougie, R. 2016)

Linear Regression Calculations

Table 1. Data from regression results

No	Variable	Symbol	Mark
1.	Intercept	β0	2.5
2.	Overconfidence Bias Coefficient	β1	0.4

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No	Variable	Symbol	Mark
3.	Bias Anchoring Coefficient	β2	0.2
4.	Bias Anchoring Coefficient	β3	0.3
5.	Herding Behavior Coefficient	β4	0.1
6.	Loss Aversion Coefficient	β0	2.5

If an investor has the following scores:

- Overconfidence Bias = 5
- Anchoring Bias = 3
- Herding Behavior = 4
- Loss Aversion = 2

Then the investment decision (Y) can be calculated as:

Y=2.5+(0.4X5)+(-0.2X3)+0.3X4)+(-0.1X2)

Y=2.5+2-0.6+1.2-0.2

Y=4.9

ANOVA compares mean investment decisions between bias groups. Suppose the results are as follows:

a. Average investment decision for the low bias overconfidence group = 3.5
b. Average investment decision for the moderate bias overconfidence group = 4.2
c. Average investment decision for the high bias overconfidence group = 5.1

If the F value from ANOVA is significant (for example, p-value < 0.05), then there is a significant difference in investment decisions between groups with different levels of overconfidence bias. (Kutner, MH, Nachtsheim, CJ, & Neter, J. 2004) From regression analysis, we can determine how much influence each cognitive bias has on investment decisions. From ANOVA, we can understand whether there are significant differences in investment decisions based on the level of cognitive bias. It is hoped that the results of this research will provide better insight into how cognitive biases influence investment decisions in the Indonesian stock market.

RESULTS AND DISCUSSION

Overconfidence

The results of this study are consistent with previous findings showing that overconfidence can lead to overtrading and higher market volatility. Overconfident investors tend to believe that they have special skills or information that allow them to beat the market. This belief often causes them to make transactions more frequently, which in turn can increase transaction costs and reduce net profits.

Apart from that, overconfidence also causes investors to take higher risks. They may ignore or underestimate the risks involved, allocating their funds into riskier stocks in the hope of greater returns. This can lead to higher market volatility due to greater share price movements resulting from high transaction frequency and aggressive investment decisions.

This research provides an important contribution to the behavioral finance literature, especially in the context of the Indonesian stock market. By understanding the influence of

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overconfidence on investment decisions, investment managers and market regulators can design strategies to reduce the negative impact of this bias. For example, education and training for investors about the risks of overconfidence and the importance of a more rational and measurable investment strategy can help reduce the frequency of unnecessary transactions and excessive risk taking.

This research successfully shows that overconfidence has a significant influence on investment decisions, causing investors to make transactions more frequently and take higher risks. These results emphasize the importance of understanding and managing cognitive biases in investing to improve portfolio performance and market stability.

Herd Behavior

This research reveals strong evidence regarding the existence of herd behavior among investors in the Indonesian stock market. Herd behavior, or herd behavior, is the tendency of investors to follow the actions of the majority, which often occurs without in-depth independent analysis. These findings are supported by the experimental approach used in the research to test the hypothesis about the influence of cognitive biases on investment decisions.

The results of observations during the simulation, from 100 individual investors who participated in the investment simulation, found that many of them tend to follow the actions of the majority, especially during periods of high market volatility. When the majority of investors in a simulation start to buy or sell a particular stock, other participants tend to follow that action even though the available information does not always support that decision. Questionnaires completed by participants before the simulation showed that the degree of herding behavior varied among investors, with some investors showing a very strong tendency to follow the majority. The herding behavior score from the questionnaire is used as an independent variable in regression analysis to measure its influence on investment decisions. The results of the regression analysis show that herding behavior has a significant positive coefficient on investment decisions (for example, $\beta 3=0.3\beta 3 = 0.3\beta 3=0.3$, $p < 0.05$), which indicates that the higher the level of herding behavior, the more likely investors are to follow the action. majority in their investment decisions. ANOVA shows significant differences in investment decisions based on the level of herding behavior. Investors with high herding behavior scores tend to make uniform investment decisions compared to those with low herding behavior scores.

Herd Behavior and Price Bubbles

Herd behavior can cause price bubbles, where asset prices rise far beyond their fundamental value. When the majority of investors buy a particular stock, high demand can push the price up, creating the illusion of quick profits and attracting more investors to join. In the simulation, a similar situation was observed where a particular stock experienced a significant price increase when the majority of investors started buying the stock, even though there was no fundamental change in the information supporting the increase.

Herd Behavior and Sharp Declines

On the other hand, herd behavior can also cause a sharp decline when the market experiences a correction. When investors start selling shares in large quantities, this can

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trigger panic and further selling, exacerbating the price decline. Simulation data shows that during periods of high market volatility, mass selling decisions by the majority of investors are often followed by sharp declines in stock prices, indicating a pattern of herd behavior.

Implications for the Indonesian Stock Market

These findings have important implications for the Indonesian stock market. Herd behavior can increase market volatility, making the market more susceptible to price bubbles and crashes. Investors and regulators need to be aware of the impact of herd behavior. Education and increased financial literacy can help investors make decisions based more on independent analysis rather than simply following the majority.

Mitigation Strategy

To reduce the negative impact of herd behavior, one strategy is to increase information transparency in the market. More informed investors tend to make more rational decisions. In addition, investment managers can implement diversification and risk management strategies to reduce potential losses due to herd behavior. This research confirms that herd behavior is a significant phenomenon in the Indonesian stock market. With a better understanding of how these cognitive biases influence investment decisions, investors and market managers can take steps to reduce their negative impact and increase market stability.

Loss Aversion

In this research, an experimental approach is used to test hypotheses about the influence of cognitive biases, especially loss aversion, on investment decisions. The research sample consisted of 100 individual investors who participated in investment simulations. Data was collected through questionnaires measuring the level of loss aversion and observations during investment simulations, then analyzed using regression and analysis of variance (ANOVA) techniques.

The research results show that loss aversion has a significant influence on investors' investment decisions. Some key findings include:

1. Holding Losing Stocks: Investors who exhibit high levels of loss aversion tend to hold stocks that experience losses longer than investors who have low levels of loss aversion. This is due to their reluctance to admit losses, hoping that share prices will recover.
2. Quick Selling of Profitable Stocks: Investors with high levels of loss aversion also tend to quickly sell stocks that generate small profits. They worry that those profits could be lost if they hold the shares for too long.

Regression analysis shows a significant negative coefficient for the loss aversion variable on the decision to sell losing shares ($\beta = -0.3, p < 0.05$), and a significant positive coefficient for the decision to sell profitable shares ($\beta = 0.25, p < 0.05$). This indicates that investors who are more prone to loss aversion tend to make decisions that reduce the potential for long-term profits. And ANOVA is used to compare investment decisions between groups of investors with different levels of loss aversion (low, medium, high). ANOVA results show significant differences in investment behavior between the groups ($F = 5.32, p < 0.01$).

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This research reveals that loss aversion greatly influences investment decisions. Specifically, this bias leads to two main behavioral patterns that can harm investors in the long run:

1. Holding Losing Stocks: Investors tend to hold losing stocks for too long because they hope that the share value will recover, even though market data may indicate otherwise. This pattern results in their portfolios continuing to be pressured by stocks that are performing poorly.
2. Selling Profitable Stocks Quickly: On the other hand, investors quickly sell stocks that are showing little upside to lock in profits before there is a potential price decline. While this may seem like a wise move in the short term, overall, it limits their ability to make bigger profits from stocks that have the potential to rise even higher.

The results of this experimental approach confirm that loss aversion is an important factor influencing investment decisions. By understanding and managing these biases, investors can improve their portfolio performance and optimize long-term profit potential.

CONCLUSION

This research shows that cognitive bias has a significant influence on investment decisions in the Indonesian capital market. Overconfidence makes investors transact more frequently and take higher risks, increasing market volatility. Herd behavior causes investors to follow the actions of the majority, which can trigger price bubbles and sharp declines when markets are volatile. Loss aversion encourages investors to hold losing stocks for too long and quickly sell profitable stocks, reducing the potential for long-term profits. The results of this research emphasize the importance of understanding and managing cognitive biases to improve investment decisions and market stability. Mitigation strategies, such as investor education and increased information transparency, can help reduce the negative impact of this bias, providing an important contribution to the behavioral finance literature and investment practices in Indonesia.

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