

# Behavioral Bias, Robo-Advisory, and Trading Decisions on Millennial Investors (Generation and Z) in Surabaya, Indonesia

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## ABSTRACT

This study aims to examine the effect of behavioral bias, namely overconfidence, and herding effect on trading decisions and examine the moderating effect of Robo-advisory on behavioral bias and trading decisions on young Millennial investors in Surabaya. This research is quantitative with primary data through a survey by distributing questionnaires to 100 respondents of young Millennial investors in Surabaya. The sampling technique used purposive sampling. Data does obtain through distributing questionnaires both online and offline—data analysis method using OLS (Ordinary Least Square) with SPSS application. The results of H1 and H2 are supported, while H3 is rejected. Overconfidence and the herding effect affect the stock trading decisions of young millennial investors in Surabaya. Meanwhile, Robo-advisory does not moderate the relationship between behavioral bias and investors' stock trading decisions.

**Keywords:** Behavioral bias, overconfidence, herding effect, Robo-advisory, trading decision.

## 1. INTRODUCTION

Capital market investors experienced extraordinary growth even during the Covid-19 period. According to data obtained from KSEI, the number of capital market investors in August 2021 totaled 6,100,525 accounts, as seen through the SID growth indicator. The number of SIDs increased by 57.20% compared to the previous year, namely, 2020. The increase in the number of retail investors (especially stock investors) during the Covid-19 pandemic does contribute mainly to the millennial generation compared to the previous generation (Fajrian, 2021). Young investors flooded the Indonesian capital market even though the value of their assets was still relatively low compared to older investors. The Indonesia Stock Exchange (IDX) stated that the millennial generation (Y and Z) controlled the majority of trading transactions in the Indonesian capital market, reaching 81%. East Java occupies the second position, with an increase of 62% after West Java. The Katadata Insight Center (KIC) survey entitled "Young Generation's Choice Investment" shows that as many as 66.1% of the 1,939 respondents consider investing in stocks today the most practical. Millennial generation investors, as the most significant contributors, show that they prefer to carry out stock trading activities compared to long-term stock investment activities.

Technological developments have led to innovations in the financial sector known as fintech. Technological innovations in financial industry services have paved the way for automated financial advisors, namely Robo-advisory. The use of Robo-advisory as a financial advisor began to enter Indonesia in mid-2019, such as Bibit, Bareksa, and Bambu. Robo advisors can provide risk adjustment preferences and consistent solutions (Tao et al., 2021). The emergence of the Covid-19 pandemic phenomenon has made the situation of uncertainty higher and created fear or anxiety in the capital market. Traditional finance cannot fully explain excessive price fluctuations and stock indexes (Aslam et al., 2020) (Bansal et al., 2020).

Irrational behavior emerges in uncertain situations, suggesting that people do not always follow the logic and make decisions systematically (Statman et al., 2006). Investors' investment decisions are sometimes not in line with classical financial theory. Robo-advisory consulting services get attention in investment decision-making (Abraham Facundo et al., 2019). Decision-making can be affected by all kinds of biases when processing information. The robot-advisory consulting service emerged as an online investment advice platform along with several investment management services with activities in the form of risk profiling (Fein, 2015) (Bhatia et al., 2020). Risk profiling aims to understand investors' investment objectives, financial situation, attitudes, and risk tolerance to assess risk appetite and conduct risk analysis. Risk profiling is the basis for suggesting the best investment placement for investors and is expected to

minimize behavioral biases (Bhatia et al., 2020)(Uhl & Rohner, 2018). Robo-advisory helps Investors make better decisions and enrich investment behavior(Bhatia et al., 2020)(Bhatia et al., 2021).

Millennial generation stock investors have profit-oriented characteristics and are a goal and achievement-oriented group. Besides that, he is also a type of Investor who has more trading activities, such as buying and selling quickly when there is sentiment, not based on the issuer's fundamental analysis. Emerging phenomena such as stock influencers and pom-poms have increasingly shown a behavioral bias in decision-making. Behavioral bias for the millennial generation of novice investors in Indonesia adapting research(Rahman & Gan, 2020): overconfidence and herding effect.

There has not been much research on the effect of behavioral bias, especially among young millennial investors, on trading decisions using Robo-advisory as a moderating variable in Indonesia. Based on this background, there is a problem formulation: first, does behavioral bias significantly affect trading decisions for young Millennial investors in Surabaya? Second, does Robo-advisory moderated behavior bias significantly affect young Millennial investors' stock trading decisions in Surabaya?

This study explores Robo-advisory services in East Java, Indonesia, especially Surabaya, and the role of Robo-advisory in reducing behavioral bias, thereby promoting better trading decisions. Motivates researchers to research Robo-advisory, behavioral bias, and trading decisions on young millennial investors in Surabaya.

There are two main finance branches: the established traditional finance, also called standard finance, and the newer behavioral finance. Traditional finance does base on the premise of a rational Investor who makes biased judgments and maximizes the Investor's self-interest. In contrast, behavioral finance studies the psychological effects of the decision-making process for individuals, groups, organizations, and markets. Both schools of thought play an essential role in understanding Investor behavior and the market.

This financial behavior began to be known by various parties, especially academics. Slovic put forward the psychological aspects of investing and stockbrokers (Slovic, 1969). Prospect theory conveys judgments under conditions of uncertainty that could result in heuristics or bias (Kahneman & Tversky, 1979). Thaler said about mental accounting and Greed writing behavioral financial development (Thaler, 1985) (Hersh, 2000). Behavioral finance is generally defined as applying psychology to finance(Ising, 2007). Financial behavior studies how psychological phenomena affect financial behavior (Alsedrah, 2018). Financial behavior, namely studying how humans behave in a financial setting (Mittal, 2019). In particular, study how psychology affects financial decisions, companies, and financial markets. The two concepts described clearly state that behavioral finance is an approach that explains how humans invest or relate to finances influenced by psychological factors.

Behavioral bias does define in the same way as a systematic error in judgment. The bias that causes irrational financial decisions does cause by (1) faulty cognitive reasoning, (2) reasoning influenced by emotions or feelings, or (3) both(Ising, 2007). Some biases consider heuristics (rules of thumb), beliefs, judgments, or references. Psychologists define bias as a shortcut to cognitive information processing, heuristics, and memory errors like emotional, motivational factors, and social influences such as family education or community culture. Psychologists also identified some biases in understanding relationships related to human labor, as identified by Maslow. Bias can help avoid pain and instead produce pleasure can be classified as emotional. Another bias does associate by psychologists with specific ways the brain perceives, forms memories, and makes judgments; the inability to perform complex mathematical calculations, such as updating probabilities; and processing and filtering of information.

Bias does categorize into simple forms. Namely, a cognitive bias is based on cognitive errors, while emotional bias is based on reasoning influenced by feelings or emotions(Pompian, 2012). Cognitive bias is categorized into two. First is the persistence of belief bias, consisting of cognitive dissonance (cognitive dissonance or heuristic), conservatism, confirmation, representativeness, herding, the illusion of control, and hindsight). Second, information processing bias consists of anchoring and adjustment, mental accounting, framing, availability, self-attribution, and outcome bias. And the recency bias.

In contrast, emotional bias is more difficult to correct than cognitive errors because it stems from impulses or intuition rather than conscious calculations. Emotional bias stems from impulses, intuition, and feelings and can lead to personal and unwarranted decisions. Emotional biases include loss aversion, overconfidence, self-control, status quo, endowment, and regret. Behavioral bias for the millennial generation of novice investors in Indonesia adapting research(Rahman & Gan, 2020), namely overconfidence and herding effect.

In general, people tend to overestimate the accuracy of their beliefs or forecasts, and they tend to overestimate their abilities. Studies in behavioral finance show that people overestimate their chances of success and underestimate their chances of failure or risk(Hirshleifer et al., 2012). Based on(Simon et al., 2000), overconfidence arises because

individual investors think their valuations are specific and do not adequately revise their initial valuations after receiving new information. Therefore, investors do not realize their mistakes.

The herding effect is a financial behavior that describes investors following other investors when making investments (Lao & Singh, 2011). Following other investors is carried out without hesitation in making stock investment decisions with minimal risk. Imitation decisions from other investors are better than following their beliefs and information (Hwang & Salmon, 2004).

Trading is a concept of basic economics in which there are buying and selling activities of goods or services. In the concept of finance, trading activities refer to the activity of buying and selling securities such as stocks. Trading is buying and selling securities within a specific and relatively short period. In contrast, investment is an activity of saving to later benefit from purchasing securities over a long period. Trading is often also called short-term investment. There are buying and selling activities in trading with erratic price fluctuations (Lao & Singh, 2011). It would help make the right decisions to get profits or capital gains, especially when stock prices are high. Trading decisions can be considered when buying and selling securities within a specific and relatively short period.

Robo-advisory, this digital consulting service, can serve underserved segments by offering affordable products, helping investors understand complex financial products, providing 24/7 services, and much more (Bhatia et al., 2021). The Sovereign Wealth Fund Institute defines Robo-advisors as a type of financial advisor that provides web-based portfolio management with almost no human intervention (Hirshleifer et al., 2012). Investopedia also defines Robo-advisors as digital platforms that provide algorithm-driven automated financial planning services with little or no human supervision.

Trading is the purchase of shares by investors significantly influenced by conservatism, availability, and overconfidence (Simon et al., 2000). The overconfidence heuristic factor in exploration negatively influences investment performance. Research conducted by (Bakar & Yi, 2016) also found that overconfidence bias negatively impacts investor decision-making. Overconfidence bias significantly influences investors' investment decisions. Overconfidence and over-optimism are personality traits that influence an individual's decision-making. Several studies also support the relationship between overconfidence and investment decision-making (Lao & Singh, 2011). H1: Overconfidence has a significant effect on stock trading decisions of young Millennial investors in Surabaya.

Herding behavior is identified as the tendency of behavioral investors to follow other investors in decision-making (Dar & Hakeem, 2015). Meanwhile, according to (Liem & Sukamulja, 2017), Herding behavior is a follow-up behavior carried out by one investor following another investor for various reasons and conditions. The effect of herding behavior has a positive effect on investment decisions (Adielyani & Mawardi, 2020). Herding has a significant influence on investment decision-making (Putri & Isbanah, 2020). H2: Herding effect bias significantly affects stock trading decisions for young Millennial investors in Surabaya.

Robo-advisors are a platform that works automatically to assist investors in the decision-making process. Machine learning mechanisms can be used for calculations that tend to be complex, allow for extensive information searches, and are cost-effective (Sedal et al., 2021). Investors can keep excess trades through the Robo-advisory platform (Hildebrand & Bergner, 2021). Therefore, using Robo-advisory services will allow investors to rethink the investment decisions of user groups and make investment decisions more rational. The robot-advisory that investors can use is a licensed and licensed Robo-advisory. Robo-advisory can be beneficial and not detrimental to investors. There are 6 recommended Robo-advisory platforms, namely Bibit, Stockbit, Bareksa, Bambu, Reliance, and Holovina (Burhan, 2021).

Advisors play a significant role in investment decision-making. An online platform that helps manage investor portfolios without human intervention. Robot advisors (robot-advisory) can be seen as a substitute for financial advisors that allow individual investors to choose their investments, are more cost-effective and more transparent and have the facility of rebalancing the funds invested by investors (Bhatia et al., 2021). Robo consulting services can overcome the behavioral bias of individual investors when making investment decisions (Jung et al., 2018). H3: Robo-advisory significantly moderates the relationship between behavioral bias and stock trading decisions of young millennial investors in Surabaya.

## 2. RESEARCH METHODS

This research is classified as causal research. The research method is quantitative, using primary data through a questionnaire. This research uses research locations in Surabaya, East Java, Indonesia. The research population is all young millennial investors in Surabaya, East Java, who carry out trading activities in the Indonesian capital market. Data shows that investors with SID 2021 in Surabaya are 98,142 million (Fajrian, 2021). The definition of the

Millennial generation is a generation born from 1980-1995 with an age range of 25-40 years (Budiati et al., 2018). The definition of youth based on the Big Indonesian Dictionary is youth. According to the RI Law No. 40 of 2009, youth is an Indonesian citizen who enters a significant period of growth and development aged 16 (sixteen) to 30 (thirty) years. The data collection technique uses non-probability sampling, namely investors aged 17-30 years, categorized as short-term investors and actively trading within one month at least 2x trading transactions, have securities accounts and are domiciled in Surabaya. Surabaya.

The variables used to consist of two independent variables, one dependent variable, and one moderating variable. The independent variables are overconfidence bias and herding effect bias. Overconfidence refers to a biased view of a situation. This is observed when people's subjective belief in their abilities is more significant than their actual performance. Overconfidence is measured using seven questions that adapt from Mumaraki and Nasieku (Rahman & Gan, 2020). At the same time, the herding effect is defined as individual behavior in following directions or actions. The herding effect was measured using seven questions adapted from Kenatharan and Kenatharan (Rahman & Gan, 2020) and (Ahmed et al., 2022). While the dependent variable used is trading decisions. Stock trading decisions refer to the activity of buying and selling stock securities. Stock trading decisions are measured by five questions adapting research (Hassan Al-Tamimi & Anood Bin Kalli, 2009). Finally, the moderating variable, namely Robo-advisory, is measured nominally using the construct: and the answer is a dichotomy between "Yes" and "No."

The variable measurement technique uses a questionnaire with a 5-point Likert scale, namely: 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 5 = Agree; 7 = Strongly Agree. Distribute questionnaires to respondents online (google form) or offline. Questionnaires were distributed to young investor communities (investment galleries in Surabaya, the young investor community in Surabaya, National ISPs, etc.) and on social media. They tested the hypothesis using OLS (Ordinary Least Square) with SPSS software.

### 3. RESULTS AND DISCUSSION

The validity and reliability testing results showed that the herding questions numbers 2 and 3 were invalid and discarded. Likewise, stock trading decision questions 4 and 5 are invalid and discarded. After the invalid questions are discarded and retested, the results appear valid (Appendix 1). Furthermore, reliability testing was carried out with Cronbach Alpha, and the results were all reliable questions. Hypothesis testing is done by regression analysis. The regression results are as follows:

**Table 1.** Regression Result

		B	t	Sig
1	(Constant)	1.015	2.706	.008***
	mob	.504	5.371	.000***
	mhb	.212	3.243	.002***

which: \*\*\* sig  $\alpha = 1\%$ , mob = overconfidence bias, mhb = herding bias

Table 1 shows that overconfidence bias and herding bias or significant effect of 1%. This means that overconfidence bias and the herding effect significantly affect the stock trading decisions of young millennial investors in Surabaya. So hypotheses 1 and 2 are supported. This is in line with previous research (Simon et al., 2000)(Lao & Singh, 2011)(Bakar & Yi, 2016). Young millennial investors in Surabaya have biased behavior that affects stock trading decisions. With the ease of information obtained from internet technology, IDX capital market school education, and analyst recommendations, investors' financial literacy improves, and they become confident in making stock trading decisions. In addition, investors tend to follow the choice of investors with large assets during stock transactions. Table 2 shows the results of testing hypothesis 3 with a moderating variable, Robo-advisory.

**Table 2.** Regression Result of moderating variable

Model		Standardized Coefficients		Sig.
		Beta	t	
1	(Constant)		2.993	.003***
	mob	.367	3.817	.000***
	mhb	.251	2.998	.003***
	bxr	.160	1.653	.101

which: \*\*\* sig  $\alpha = 1\%$ , mob = overconfidence bias, mhb = herding bias, bxr = moderating variable (Robo-advisory)

The results also show a significance value of 0.101 which is more significant than  $\alpha = 1\%$ . Robo-advisory does not significantly moderate the relationship between behavioral bias and stock trading decisions. H3 is rejected. This is not in line with previous research (Bhatia et al., 2021)(Jung et al., 2018). Robo-advisory in Indonesia is a platform that only provides recommendations regarding risk profiling, not advice related to investment or trading decision-making. This is unlike the development of Robo-advisory in other countries, which have developed online platforms to help investors manage their portfolios and are a substitute for human, financial advisors (Bhatia et al., 2021).

#### 4. CONCLUSION

This study shows that behavioral bias affects stock trading decisions of young millennial investors (generations Y and Z) in Surabaya, Indonesia. The behavior of overconfidence and herding bias is one of the factors that influence when making trading decisions. Robo-advisory development in Indonesia, such as on the Bareksa platform, Bibit, and so on, has not influenced investor behavior bias in making stock trading decisions.

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## APPENDIX 1. Result of Validity and Reliability Test

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ob1	54.63	61.399	.650	.653	.814
ob2	54.24	61.854	.507	.547	.821
ob3	54.49	65.903	.255	.548	.836
ob4	54.30	62.813	.619	.611	.817
ob5	54.10	65.214	.417	.585	.827
ob6	54.60	61.796	.584	.562	.817
ob7	54.92	63.528	.418	.581	.826

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ob8	54.68	60.374	.596	.707	.816
ob9	54.88	64.965	.281	.540	.835
ob10	54.50	61.728	.582	.530	.817
ob11	54.66	60.303	.672	.567	.812
hb1	54.27	66.626	.268	.517	.834
hb4	54.51	65.728	.205	.469	.842
kts1	54.78	63.320	.452	.511	.824
kts2	54.13	66.021	.329	.415	.831
kts3	54.58	62.984	.478	.513	.823
robo	56.65	69.355	.200	.178	.835