

## UNVEILING THE INVESTORS MIND: AN ANALYSIS OF BEHAVIORAL BIASES IN STOCK INVESTMENTS ACROSS AGE, SEX, INCOME, EXPERIENCE, EDUCATION, AND MARITAL STATUS

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### ABSTRACT

This research examines how investor personal characteristics namely age, gender, income, education level, stock investing experience, and marital status are related to investor propensity to experience behavioral biases. Four types of behavioral bias investigated in this research are overconfidence, herding behavior, disposition effect, and sentiment bias. The object of the research is active Indonesian stock investors with minimal 1 year experience. It is found that female investors are more prone to herding behavior compared to male. Longer investing experience is related to lower disposition bias, but higher overconfidence. No other association between other personal characteristics and those four behavioral biases.

**Keywords:** Behavioral Biases, Overconfidence, Herding Behavior, Disposition Effect, Sentiment Bias,

### INTRODUCTION

The Efficient Market Hypothesis (EMH) assumed that investors are making investment decisions entirely in a rational way. However, EMH has been unable to explain various market anomalies observed in financial markets (Jensen, 2002). The explanation for those market anomalies is that investors are influenced by psychological factors (Çömlekçi & Özer, 2018). Investors are assumed to be influenced by various behavioral biases during decision making process. These biases can cause suboptimal decisions by investors, for example not enough portfolio diversification, excessive risk taking, greed, fear, and ultimately will lower investment returns (Malkiel, 2003).

The more investors are susceptible to behavioral biases, the more investors are prone to suboptimal decisions that result in lower returns. Several behavioral biases such as the disposition effect, overconfidence, herding behavior, and sentiment can influence investment decisions and cause lower investor return (Shukla et al., 2020). By avoiding or reducing these biases, investors can make better investment decisions.

Various characteristics might be associated with propensity to behavioral bias. For example, age, gender, income, investment experience, education level, and marital status may affect the investment decision making process among investors. Higher risk-taking behavior is more common among younger investors compared to older investors (Nosita et al., 2020). Women are also shown to be more risk averse and make more cautious investment decision compared to men (Fisher & Yao, 2017). Regarding income level, it is shown that higher income individuals are more likely to take on greater investment risks compared to individuals with lower income (Bunyamin & Wahab, 2021). Mubaraq et al., (2021) shows that investors with higher income and more investing experience make more rational investment decision making.

This is usually due to higher financial literacy among people with higher income and investing experience. In terms of marital status, Mandal and Brady (2019) shows that married people have tendency to be more cautious and prudent in making investment decision.

This research paper investigates association between personal characteristics like age, sex, income, education, stock investing experience, and marital status, on the tendency of Indonesian stock investors to exhibit investing behavioral biases, that are: overconfidence, herding behavior, disposition effect, and sentiment bias. The study is important for the stock investors to understand whether they are prone to a behavioral bias or not.

## LITERATURE REVIEW

There are two schools of thoughts in financial literacy. One school of thought sees that the market is efficient, known as Efficient Market Hypothesis (EMH). EMH assumes that investors are fully rational in making investment decisions. However, other literatures argue that investors are affected by psychological factors in making investment decisions, in the form of various behavioral bias. (Sun, 2022; Jain and Gupta, 2019). These behavioral biases shape the way individuals analyze and interpret various information and thus affect investor's investment decision.

Various investor's characteristics such as age, gender, education level, investing experience, income, and marital status, can affect investor's tendency or proneness to various behavioral biases. These characteristics can influence how individuals are making investment decisions, thus showing that those decisions are not entirely rational but are affected by other factors. For example, male are prone to be more overconfident compared to female, and older investors are more cautious in investment decisions compared to younger ones (Hassan, Khalid, and Habib, 2014). However, Babu and Kurthukoti (2023) found that not all behavioral biases are affected by investor's characteristics. Representativeness Bias, Hindsight Bias, Illusion of Control Bias, Anchoring Bias, Mental Accounting Bias, Availability Bias, and Conservatism Bias, there is no effect of gender, age, occupation, and income on the propensity of those biases. In the contrary, investing experience, marital status, and education are shown to affect investor propensity to the biases.

Some of the most common behavioral biases are overconfidence bias, herding behavior, disposition bias, and sentiment bias. Overconfidence bias is the tendency to overestimate one's abilities and knowledge and see himself or herself as a better investor than average. Overconfidence may lead to excessive risk-taking during the investment process. Herding behavior is the tendency to follow the decision of majority investors, although it is recognized that majority of investors is not necessarily making correct decision. Disposition is the tendency of investors to sell winning investments too soon but selling losing investment too late. This is caused by the desire to avoid regret of not realizing profit and pain of realizing loss. Sentiment bias is the tendency of investors to be affected by emotional state during decision making. For example. The feeling of optimism or happiness can make investors tend to buy a stock, while feeling of tiredness or sadness can make investors let go of a good opportunity.

It is important for investors to recognize whether they are susceptible to behavioral bias, as these biases can negatively affect investment performance (Lee et. al. (2013); Verma (2016)).

Biased decisions can cause wrong judgement of risk, inappropriate diversification, use of excessive leverage, and various other behavior that ultimately lead to suboptimal investment return.

## RESEARCH METHOD

This research examines the association between stock investor characteristics (age, monthly income, education level, experience in stock investment, marital status) and propensity to behavioral bias in investing. Behavioral biases examined in this research are overconfidence bias, herding behavior, disposition bias, and sentiment. Each of those biases are measured using four questions questionnaire, with five likert scale answer ranging from totally disagree, disagree, neutral, agree, and totally agree. Instrument to measure the biases follows Kapoor and Sengupta (2015) and Metawa et. al. (2019). The Chi-square test is then used to determine if there is association between each of the stock investor characteristics and each of the propensity to behavioral bias.

Totally disagree answers are assigned 1 point, disagree is 2 points, neutral is 3 points, agree is 4 points, and totally agree is 5 points. The points from the four questions are added to the total point. The higher the total point, the higher the propensity of a respondent to a particular bias. Total points above median are considered high propensity, while total points equal and below median is considered low propensity. The questions asked for each of the bias measured are as follow:

Questions for overconfidence:

1. I have a deep understanding of the Indonesian stock market.
2. My ability to select good stocks surpasses that of the average investor.
3. The increase or decrease in my portfolio value depends entirely on my investment skills.
4. Almost all my decisions in stock investment turn out to be correct.

Questions for herding behavior:

1. Discussing my investment decisions can reduce stress.
2. The disappointment I experience when facing losses in investments diminishes when I know others are also experiencing losses.
3. I make investment decisions based on the decisions of most other investors.
4. I lack confidence when it comes to making investment decisions that contradict most other investors.

Questions for disposition:

1. I tend to sell stocks as soon as their prices rise.
2. I feel hesitant to sell stocks experiencing floating losses.
3. I feel that stocks experiencing floating profits will decrease in value if not sold quickly.
4. I feel that stocks experiencing floating losses will increase in value if not sold.

Questions for sentiments:

1. Optimism/pessimism can influence my investment decisions.

2. I tend to avoid stocks of companies whose names I rarely hear.
3. I tend to buy stocks that are frequently mentioned by my friends.
4. My emotions can influence my investment decisions.

The stock investor characteristics were classified using the same methodology. Respondents with monthly income same or higher than median are categorized as investor with higher income, while respondents with lower monthly income than median are categorized as investor with lower income. Respondents with age higher or same as the median age were categorized as older, while those below the median are categorized as younger. Educational level is categorized as lower for those not having undergraduate degree and categorized as having higher education for undergraduate degree and above. Experience in stock investment was categorized by the number of years an investor had been active in the stock market, with respondents above the median years of experience categorized as more experienced and those below median are categorized as less experienced. Lastly, marital status was categorized as either single or married.

Respondents in this research is limited to stock investors in the Indonesian stock market with a minimum of one year of investment experience and holding at least one stock at the time of the survey. Minimum must possess a high school certificate. Altogether, there are 153 respondents. The association between stock investor characteristics and susceptibility to behavioral biases is assessed using the chi-square test. Six characteristics (age, gender, monthly income, education level, stock investment experience, and marital status) are analyzed alongside four types of biases (overconfidence bias, herding behavior, disposition bias, and sentiment bias), resulting in a total of 24 tests. Data analysis is conducted using SPSS 22.0.

## RESULT AND DISCUSSION

Data was collected from 153 respondents across ten variables, encompassing six investor characteristics variables (age, sex, income, education level, stock investing experience, and marital status) and four bias variables (overconfidence, herding behavior, disposition, and sentiment). The descriptive statistics of these variables reveal noteworthy insights.

	Age (years)	Monthly Income (Mills Rupiahs)	Stock Investing Experience (years)
<b>Average</b>	35.6	17.1	3.8
<b>Max</b>	59	55	20
<b>Min</b>	18	5	1

Table 1: descriptive statistic of respondent caharcteristics

There are 143 male respondents (93.5%) and only 10 female respondents (6.5%). Regarding marital status, 43 respondents (28.1%) are single, and 110 respondents (71.9%) are married. For educational attainment, 26 participants (17%) holding a high school diploma, 104 (68%) have an undergraduate degree, 22 (14.4%) have a graduate degree, and 1 respondent (0.6%) have a postgraduate degree.

Among the four biases measured, highest average total points is shown by overconfidence at 12.5, then followed by sentiment (11.7 points), disposition (11.0 points), and herding behavior (9.9 points). As the points indicate the investor level of propensity toward the bias, respondents are most likely affected by overconfidence bias, followed by sentiment, disposition, and herding behavior as the least likely bias that investors are prone of.

Chi-square test results between six investor characteristics and four behavioral bias are as follow

Pearson Chi-Square Significance				
	Overconfidence	Herding Behavior	Disposition	Sentiment
Age	0.473	0.425	0.101	0.667
Sex	0.170	0.001 <sup>(1)</sup>	0.682	0.363
Income	0.653	0.722	0.326	0.628
Education	0.237	0.839	0.117	0.261
Investing Experience	0.027 <sup>(2)</sup>	0.731	0.000 <sup>(3)</sup>	0.207
Marital Status	0.977	0.833	0.131	0.112

Table 2: chi-square test results. Being female is associated with higher propensity to herding behavior (1). Higher investing experience is associated with higher propensity to overconfidence (2). Lower investing experience is associated with higher propensity to disposition (3)

The analysis revealed three instances where investor characteristics were associated with investing behavioral biases. Female was associated with a higher propensity for herding behavior. The result agrees with findings from Salem (2019) and Adil et al. (2021). Salem (2019) and Adil et al. (2021) argued that this is due to generally lower financial literacy and risk tolerance among women, leading them to follow the majority's decisions to avoid the pain of taking risky decision. Higher investing experience is associated with greater propensity for overconfidence. The result agrees with Mishra and Metilda's (2015). Dananjaya (incoming) found that higher overconfidence is positively related to better investment result. It is thus can be suggested that overconfidence among experienced investors may not necessarily be overconfidence but rather a justified confidence stemming from their extensive investment experience, resulting in better investment outcome. Lastly, lower investing experience was associated with a higher tendency for disposition bias. The result agrees with Dhar and Zhu (2006) and Choe and Eom (2009).

## CONCLUSION

This study provides insight into the relationship between investor characteristics and behavioral biases in the field of stock investing. Female respondents were found to have a higher tendency for herding behavior. It is also found that investment experience can reduce the propensity for disposition bias. In contrast, investment experience increases the propensity to overconfidence bias. The result is interesting as it is expected that experience will immunize investors against psychological biases. It is possible that the overconfidence shown by more experienced investors is a real confidence resulted from higher experience.

The next study will focus on the relation among investor characteristics, propensity to biases, and investment performance.

## APPENDIX

Age => Overconfidence

### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.515 <sup>a</sup>	1	.473		
Continuity Correction <sup>b</sup>	.309	1	.579		
Likelihood Ratio	.515	1	.473		
Fisher's Exact Test				.519	.289
N of Valid Cases	153				

Age => Herding

### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.636 <sup>a</sup>	1	.425		
Continuity Correction <sup>b</sup>	.400	1	.527		
Likelihood Ratio	.636	1	.425		
Fisher's Exact Test				.510	.264
N of Valid Cases	153				

Age => Disposition

### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.696 <sup>a</sup>	1	.101		
Continuity Correction <sup>b</sup>	2.187	1	.139		
Likelihood Ratio	2.702	1	.100		
Fisher's Exact Test				.107	.070
N of Valid Cases	153				

Age =&gt; Sentiment

## Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.185 <sup>a</sup>	1	.667		
Continuity Correction <sup>b</sup>	.069	1	.793		
Likelihood Ratio	.185	1	.667		
Fisher's Exact Test				.738	.396
N of Valid Cases	153				

Sex =&gt; Overconfidence

## Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.885 <sup>a</sup>	1	.170		
Continuity Correction <sup>b</sup>	1.093	1	.296		
Likelihood Ratio	1.930	1	.165		
Fisher's Exact Test				.204	.148
N of Valid Cases	153				

Sex =&gt; herding

## Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.867 <sup>a</sup>	1	.001		
Continuity Correction <sup>b</sup>	8.782	1	.003		
Likelihood Ratio	11.514	1	.001		
Fisher's Exact Test				.001	.001
N of Valid Cases	153				

Sex = Disposition

## Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.168 <sup>a</sup>	1	.682		
Continuity Correction <sup>b</sup>	.006	1	.936		
Likelihood Ratio	.166	1	.683		
Fisher's Exact Test				.749	.464
N of Valid Cases	153				

Sex =&gt; sentiment

## Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.828 <sup>a</sup>	1	.363		
Continuity Correction <sup>b</sup>	.325	1	.568		
Likelihood Ratio	.799	1	.371		
Fisher's Exact Test				.499	.279
N of Valid Cases	153				

Income =&gt; Overconfidence

## Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.202 <sup>a</sup>	1	.653		
Continuity Correction <sup>b</sup>	.082	1	.775		
Likelihood Ratio	.203	1	.653		
Fisher's Exact Test				.743	.388
N of Valid Cases	153				



Income =&gt; Herding

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.126 <sup>a</sup>	1	.722		
Continuity Correction <sup>b</sup>	.036	1	.850		
Likelihood Ratio	.126	1	.722		
Fisher's Exact Test				.741	.425
N of Valid Cases	153				

Income =&gt; Disposition

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.965 <sup>a</sup>	1	.326		
Continuity Correction <sup>b</sup>	.668	1	.414		
Likelihood Ratio	.964	1	.326		
Fisher's Exact Test				.409	.207
N of Valid Cases	153				

Income =&gt; Sentiment

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.235 <sup>a</sup>	1	.628		
Continuity Correction <sup>b</sup>	.099	1	.753		
Likelihood Ratio	.236	1	.627		
Fisher's Exact Test				.734	.377
N of Valid Cases	153				

**Education \* Overconfidence****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.397 <sup>a</sup>	1	.237		
Continuity Correction <sup>b</sup>	.935	1	.334		
Likelihood Ratio	1.409	1	.235		
Fisher's Exact Test				.285	.167
N of Valid Cases	153				

**Education \* Herding Behavior****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.041 <sup>a</sup>	1	.839		
Continuity Correction <sup>b</sup>	.000	1	1.000		
Likelihood Ratio	.041	1	.839		
Fisher's Exact Test				.830	.503
N of Valid Cases	153				

**Education \* Dsipation****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.459 <sup>a</sup>	1	.117		
Continuity Correction <sup>b</sup>	1.826	1	.177		
Likelihood Ratio	2.441	1	.118		
Fisher's Exact Test				.133	.089
N of Valid Cases	153				

**Education \* Sentiment****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.264 <sup>a</sup>	1	.261		
Continuity Correction <sup>b</sup>	.812	1	.368		
Likelihood Ratio	1.313	1	.252		
Fisher's Exact Test				.372	.185
N of Valid Cases	153				

**Stock Investing Experience Level \* Overconfidence****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.918 <sup>a</sup>	1	.027		
Continuity Correction <sup>b</sup>	4.224	1	.040		
Likelihood Ratio	4.948	1	.026		
Fisher's Exact Test				.035	.020
N of Valid Cases	153				

**Stock Investing Experience Level \* Herding Behavior****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.118 <sup>a</sup>	1	.731		
Continuity Correction <sup>b</sup>	.032	1	.858		
Likelihood Ratio	.118	1	.731		
Fisher's Exact Test				.744	.429
N of Valid Cases	153				

**Stock Investing Experience Level \* Dsposition****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	17.528 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	16.184	1	.000		
Likelihood Ratio	17.806	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	153				

**Stock Investing Experience Level \* Sentiment****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.596 <sup>a</sup>	1	.207		
Continuity Correction <sup>b</sup>	1.198	1	.274		
Likelihood Ratio	1.593	1	.207		
Fisher's Exact Test				.239	.137
N of Valid Cases	153				

**Marital Status \* Overconfidence****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.001 <sup>a</sup>	1	.977		
Continuity Correction <sup>b</sup>	.000	1	1.000		
Likelihood Ratio	.001	1	.977		
Fisher's Exact Test				1.000	.560
N of Valid Cases	153				

**Marital Status \* Herding Behavior****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.044 <sup>a</sup>	1	.833		
Continuity Correction <sup>b</sup>	.001	1	.978		
Likelihood Ratio	.044	1	.833		
Fisher's Exact Test				.856	.487
N of Valid Cases	153				

**Marital Status \* Dsposition****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.285 <sup>a</sup>	1	.131		
Continuity Correction <sup>b</sup>	1.770	1	.183		
Likelihood Ratio	2.274	1	.132		
Fisher's Exact Test				.149	.092
N of Valid Cases	153				

**Marital Status \* Sentiment****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.531 <sup>a</sup>	1	.112		
Continuity Correction <sup>b</sup>	1.972	1	.160		
Likelihood Ratio	2.489	1	.115		
Fisher's Exact Test				.136	.081
N of Valid Cases	153				

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