



## **Financial Literacy and Cognitive Biases: Key Determinants of Gen Z Investment Choices**

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### **Abstract**

This study investigates the influence of financial literacy and cognitive biases on investment decisions among Gen Z investors in Indonesia. A cross-sectional descriptive survey design was employed, guided by a positivist epistemology. Data were collected from 229 respondents through an online questionnaire and analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS) to test the hypotheses. The results reveal that financial literacy and cognitive biases significantly impact investment decisions. Higher financial literacy is associated with more rational and informed investment choices. Conversely, cognitive biases, including hindsight bias and the illusion of control, strongly influence decision-making processes. These findings highlight the importance of targeted financial education programs to enhance financial literacy and reduce the effects of cognitive biases, enabling Gen Z investors to make better financial decisions. This study provides valuable insights for policymakers and educators to support the financial well-being of the younger generation.

**Keywords:** Investment Decisions, Financial Literacy, Cognitive Biases, Gen Z.

## Introduction

The capital market in Indonesia showed positive performance in 2023. As of December 28th, 2023, the JCI was at 7,303.89 points or managed to grow by 6.62% year-to-date. Along with the growth of the JCI, market capitalization also rose by 23.82% year-to-date, namely IDR 11,762 trillion. These trading activities contribute to the stability and growth of the capital market in Indonesia. This is supported by strong collaboration between stakeholders in the capital markets industry. In terms of the number of investors, it has increased to 11.5 million (OJK, 2023). Based on KSEI data as of August 2023, most investors are under 30 (57.04%), with wealth reaching 34.09 trillion. This good performance cannot be separated from the participation of the younger generation or Gen Z (KSEI, 2023). As the number grows rapidly, it's important to understand how Gen Z's decision.

Investment decisions are the final result of several interacting factors, including financial literacy (Al-Tamimi, 2009; Awais et al., 2016; Hasan et al., 2022; Hayat, 2016) and cognitive biases (Armansyah et al., 2023; Kariofyllas et al., 2017; Kartini & Nahda, 2021). Financial literacy is knowledge and understanding of financial concepts and risks. Meanwhile, cognitive bias is a psychological tendency that can influence an investor's thinking process and decision-making. This often causes deviations from rational economic behavior. Traditional economic theory states that investors are rational individuals and always consider every decision well. However, that theory is argued by Kahnemann & Tversky (1979) where investors often use their emotions in making decisions so they tend to be irrational. In this theory, investor bias is divided into two parts: emotional and cognitive.

Several previous studies have shown that low financial literacy can result in less-than-optimal investment decisions, such as asset allocation that does not match the risk profile or an inability to understand and evaluate complex financial products (Lusardi & Mitchell, 2014). In addition, the biases experienced by individuals often cause investors to make decisions filled with emotions and misperceptions (Kahnemann & Tversky, 1979). Sahi et al. (2013) stated that investors often rely on past investment performance and the opinions of people around them as factors in their investment decision-making. Investors who experience emotional biases such as overconfidence will make them overconfident in choosing profitable investments. Meanwhile, herding behavior will lead to following market trends without conducting an in-depth analysis (Kartini & Nahda, 2021).

Furthermore, global research findings showed that most investors in Oman experienced cognitive biases. It was found that Confirmation, Conservatism, Dissonance, and Self Attribution are the most influencing biases for male investors, whereas Confirmation, Conservatism, Dissonance, Self-Attribution and Anchoring are the most influencing biases for female investors (Sha & Ismail, 2021). A study from Indonesia suggested that anchoring bias, representativeness bias, loss aversion, overconfidence bias, optimism bias, and herding behavior affect significantly the investor's decisions (Kartini & Nahda, 2021). Cognitive and emotional biases aren't only experienced by investors, several studies also examine other subjects like managers and so on. Study from (Biais & Weber, 2009) showed that investment bankers in London and Frankfurt who experienced more biased have lower performance. Hussain et al. (2013) found a strong evidence of hindsight bias in all their respondents. The bank financial managers were found less exposed to hindsight bias in comparison to stock market investors in asset selection effect.

This research focuses on Generation Z investors born between 1997-2012. This generation faces unique challenges in the investment world. In the current era, social media plays a very important role in all lifelines, including investment. All information on social media can be accessed easily by anyone. This information will more or less shape investors' perception of something. Sha & Ismail (2021) explain that investors make decisions based on the information they receive. The problem is whether the information is correct and how investors build their perceptions of that information. This perception will distort the rationality of investors when making decisions. Furthermore, researchers focus more on cognitive bias, which consists of anchoring bias, cognitive dissonance, hindsight, the illusion of control, recency, and self-attribution.

## **Method**

The underlying epistemology of this research was positivist, focusing on examining earlier established theories under the assumption that reality is objectively given and can be described by the observer and the instruments. We selected the positivist approach because we need to quantitatively assess the objectively measurable impact of financial literacy and cognitive biases on investment decisions, as this paradigm allows for hypothesis testing in structured settings. The study used a cross-sectional descriptive survey research design to assess and establish the effect of financial literacy and cognitive bias on investment decisions.

We will use SEM-PLS analysis to prove our hypothesis. In SEM PLS, we need to do the outer model to ensure that all items are valid and reliable. Items with outer loading  $> 0.6$  and AVE  $> 0.5$  are considered valid. Latent variables with Cronbach alpha  $< 0.6$  and composite reliability  $> 0.7$  are considered reliable. Then, we need to examine the inner model to test whether there is an impact between latent variables.

Based on Hair et al. (2017), the beneficial suggestion is that the sample size should be 5-10 times the number of indicators/items. This number is needed to ensure adequate statistical power, allowing for robust hypothesis testing. Our total items are 20, so we need 200 respondents to complete our questionnaire. We used an online questionnaire (Google Forms) to collect data. Our respondents are investors in the Indonesia Stock Exchange (IDX), which is also a Gen Z (born in 1997-2012). But at last, we can collect around 229 respondents.

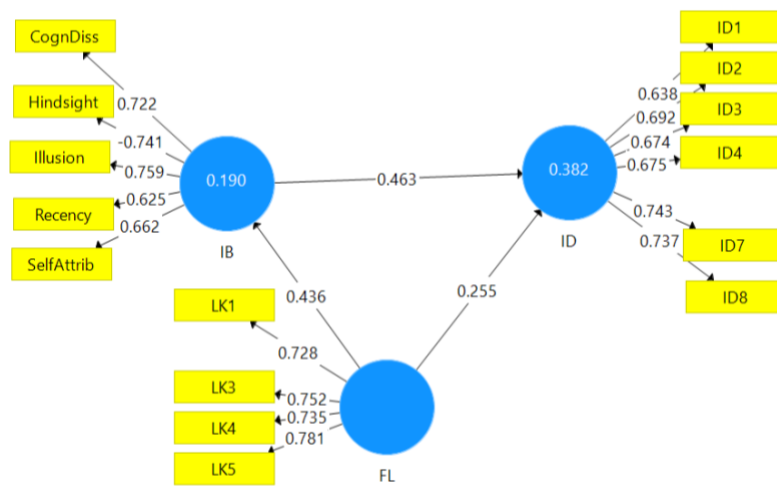
The items of Financial Literacy are adapted from Chen & Volpe (1998). Our adapted questions were designed to gauge understanding of financial management practices and Gen Z's ability to make informed financial decisions. Our subject of study is the same as the Masrurun & Yanto (2015), so the Investment Decision items are adapted from his study. Our Cognitive Bias items are adapted from Ashfaq et al. (2024). Several prior research uses a self-assessment measure like "I tend to have an anchoring bias when buying or selling stock", but this is too biased, so instead of that, we are using explicit sentences like those in Table 1 below. Since we use a subjective measurement, all items are on the 1-5 Likert scale. From 1 Extremely Disagree to 5 Strongly Disagree. In our research, the exogenous variables are Financial Literacy and Cognitive Biases. The endogenous variable is Investment Decision.

## **Result and Discussion**

Since we use an SEM-PLS analysis to examine the outer and inner models. The outer model ensures that all items are valid and reliable. Hair et al (2017) stated that items are valid if they have loadings factor above 0,7. But Latan & Ghazali (2012) also noted that loading factors between 0,5-0,7 are accepted if the AVE is above 0,5. Figure 2 below shows that our items are valid after we deleted some items (LK2, LK6 & ID5). The AVE or Average Variance Extracted is considered valid. The reliability is shown in Cronbach Alpha and Composite Reliability. The minimum required is 0,6 for both indicators. Table 2 below indicates that all our measurements is reliable.

**Table 2.** Construct Reliability and Validity

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Financial Literacy	0,740	0,836	0,561
Investor Biases	0,694	0,619	0,595
Investment Decision	0,784	0,848	0,582

**Figure 2:** Loadings Factor

We also consider the coefficient of determination (R-Square) to determine the proportion of variance in the dependent variable that the independent variable can explain. Table 3 below indicates that investor biases as an endogenous variable has an  $R^2$  of 0.187. This means that the model explains 18,7% of the variance in that variable, while the remaining is due to factors not included in the model or random error. Also, the Investment Decision as an endogenous variable has an  $R^2$  of 0,376 this means that the model or random error explains 37,6% of the variance in that variable.

**Table 3.** Coefficient of Determination

	R Square	R Square Adjusted
Investor Biases	0,190	0,187
Investment Decision	0,382	0,376

Source: Smart-PLS Output (2024)

The results of this study are compiled in terms of hypothesis. Hypothesis 1 focuses on how financial literacy affects investment decisions. Hypothesis 2 focuses on how cognitive biases affect investment decisions. Before testing the hypothesis, we examine the statistics descriptive of three latent variables. First, the average score of financial literacy essentially comprises the respondent's score of budgeting, time value of money, compound interest, diversification, and saving. Table 2 below describes that most respondents answered 'neutral' for all the items in financial literacy. We conclude that our respondents are not sure enough with their financial knowledge, Furthermore, the item of saving has the higher score. It indicates that most of the respondents answered yes, they believe they can save money in the future.

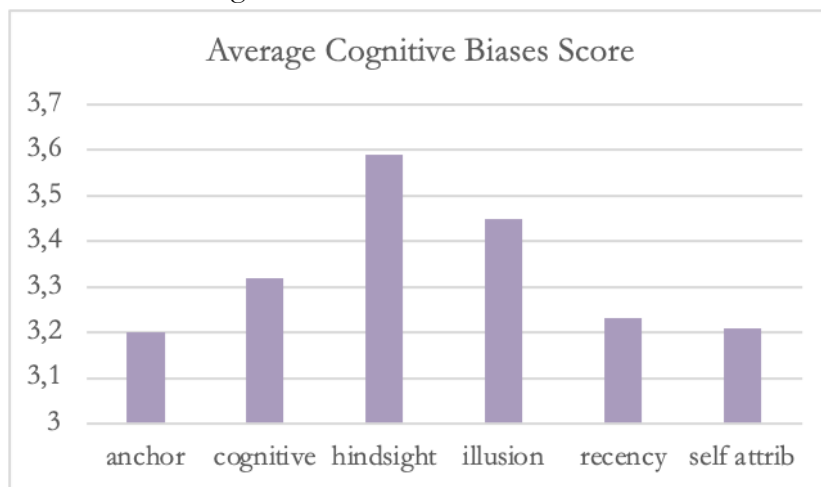
Then we also examine the cognitive biases score. The 5-point Likert scale we use from 1 strongly disagree to 5 strongly agree. The highest score (5 points) means the investors are rational, and vice versa. Figure 2 below shows that most of the respondents experienced hindsight bias. This bias is also known as 'knew-it-all-along' when people believe after an event has occurred, that they had predicted or could have predicted the outcome. We use a reverse statement, "I have invested in a stock for a year and the rate of return is quite large. If I want to put together a new portfolio, my strategy will be to look for other investment options and dedicate my time to analyzing other equally profitable stocks". Since it is a reversed statement, we change the 5 score into the 1 score. If the investor experiences hindsight bias then they tend to be overconfident in their judgment and decision-making abilities. They might become more certain about their prediction and less consider alternative outcomes. And they are too lazy to find another alternative. But otherwise, the rational investor will try the other alternative by finding the other profitable stocks.

**Table 4.** Financial Literacy

	N	Minimum	Maximum	Mean	Std. Deviation
Budgeting	229	1.00	5.00	3.4891	1.06627
Time Value of Money	229	1.00	5.00	3.4978	1.10670
Compound Interest	229	1.00	5.00	3.0611	1.16819
Diversification	229	1.00	5.00	3.2183	1.25496
Saving	229	1.00	5.00	4.1223	.92380
Valid N (listwise)	229				

Source: Descriptive Statistics by SPSS 23 (2024)

Furthermore, the second high cognitive bias score is the illusion of control, where individuals overestimate their ability to control events that are determined by chance beyond their influence. “When making a portfolio, I will think about investing in shares of companies where I work that are currently in the process of important product development. For the reason that I have additional private information regarding the company and I am sure my choice will provide a high level of profit”. This statement shows that the investors believe that the company’s product development will be a great success. Due to the belief in control, investors might take greater risks, thinking they can mitigate negative outcomes through their actions.



**Figure 3:** Average Cognitive Biases Score

The Investment Decision consists of 8 items, such as 1) stock profit; 2) corporate news; 3) trading frequency and trading volume; 4) corporate past performance; 5) feeling; 6) corporate action; 7) exchange rate news; and 8) interest rate news. Figure 3 below shows that ID4 and ID7 have the highest score. It means that most respondents pay attention to exchange rate news and corporate past performance. With those two pieces of information, investors are confident in their investment decisions.



**Figure 4:** Average Investment Decision Score

For hypothesis testing, we use the inner model in SEM-PLS. The result is as in the table 5 below.

**Table 5.** Hypothesis Testing

			T-Statistics	P-value	Result
Financial Literacy	→	Investment Decision	4.489	0.000***	Supported
Cognitive Biases	→	Investment Decision	8.084	0.000***	Rejected

Source: SmartPLS Output (2024)

The next step is the bootstrapping process to test our hypothesis. From Table 5 above, hypothesis 1 is supported but hypothesis 2 is rejected. Financial literacy has a strong positive relationship with investment decisions. The value of t-statistics is more than 1,96 and the p-value is significant at level 1%. It means that financial literacy in investment decisions is statistically significant. An increase in Financial Literacy will be followed by an increase in Investment Decisions. Then, Cognitive biases also have a strong positive relationship with investment decisions. The value of t-statistics is more than 1,96 and the p-value is significant at level 1%. However, our hypothesis states that Cognitive Biases should have a negative relationship with Investment Decisions, so we conclude that hypothesis 2 is rejected.



## Discussion

Based on our survey, the investors who belong to Generation Z also have unique characteristics. Compared to other generations, Gen Z are digital natives accustomed to instant access to information and innovative financial technologies. Despite this, some studies indicate that many members of Gen Z lack comprehensive financial knowledge (Muslimawati, 2024) which can profoundly impact their investment decisions. According to a survey by the National Endowment for Financial Education (NEFE), a substantial portion of Gen Z feels unprepared to manage their finances, highlighting the need for targeted financial education initiatives.

Case in Indonesia from the National Survey of Financial Literacy and Inclusion by Otoritas Jasa Keuangan (OJK), many Gen Z are blacklisted in the Financial Information Services System (SLIK) due to failure to pay. Based on OJK, the financial literacy index for Gen Z is quite low, 44,04% or 3,94% lower than Millennials. Financial literacy will give them the understanding that the need to borrow money or credit should be for productive activities, not consumptive ones. Apart from that, it is very important to educate students only to use services from financial services that are legally registered with the OJK, including fintech P2P lending. With good financial literacy, it will give knowledge about the financial services that are legal and registered in OJK.

Financial literacy has been widely recognized as a crucial determinant of investment decisions. It encompasses the knowledge and skills required to understand financial concepts and products, enabling individuals to make informed and effective choices. Lusardi & Mitchell (2014) stated that financial literacy significantly impacts the ability to plan for retirement and manage investment portfolios efficiently. This study suggests that those with higher financial literacy are better at avoiding high-cost financial products and making more cost-efficient investment decisions, thereby maximizing their investment returns.

Financial literacy enables better risk assessment and management. Investors with higher financial literacy are more adept at understanding the risk associated with different investment options and are therefore less likely to make impulsive decisions based on market fluctuations (Rooij, 2011). This study suggests that investors' ability to comprehend and interpret financial information leads to more rational and strategic investment behavior, reducing the likelihood of significant financial losses. Additionally, financial literacy empowers investors to evaluate financial advice and make independent decisions critically. Yoong

(2011) highlights that financial literacy enhances individuals' confidence in their investment choices and it reduces the reliance on potentially biased financial advisors or herd behavior.

This independence is crucial in avoiding common cognitive biases such as overconfidence and herding, which can lead to suboptimal investment decisions. By equipping individuals with the necessary tools to analyze and interpret financial data, financial literacy fosters a more informed and disciplined approach to investing, ultimately contributing to better financial outcomes and long-term financial stability. Moreover, Al-Tamimi (2009) mentioned that the financial literacy of UAE investors is far from needed. Specifically, women have a lower level of financial literacy than men. There is a significant relationship between financial literacy and investment decisions. This result supported our hypothesis along with the results of Ashfaq et al. (2024); Awais et al. (2016).

The second hypothesis is rejected, it means that cognitive biases can affect the investment decision among Gen Z in Indonesia. But our results show it has a positive relationship while it should have a negative relationship. It means the higher the cognitive biases Gen Z perceives, the more often it makes investment decisions. This usually leads to suboptimal financial outcomes. One prominent bias in this study is hindsight bias. Investors with this bias tend to be overconfident in their judgment and decision-making abilities. They might become more certain about their prediction and less consider alternative outcomes. And they are too lazy to find another alternative. This bias is particularly prevalent in Gen Z due to their familiarity with technology, especially social media and access to online trading platforms, which can create a false sense of expertise. In social media, they can access all information about the market and sometimes about other's opinions. Surprisingly, that will lead to their certain investment decision.

Our study suggests that this cognitive bias leads Gen Z to make an informed decision. Our results are different with Biais & Weber (2009) and Hussain et al. (2013). Biais & Weber (2009) reported that hindsight bias can lead to overconfident trading, resulting in higher transaction costs and potentially lower returns due to excessive trading. Hussain et al. (2013) supported this result, they found strong evidence of hindsight bias in all respondent groups and its worst consequence on investment decision-making. The bank financial managers were found to be less exposed to hindsight bias than stock market investors in the asset selection effect.

Another cognitive bias found in this study is the illusion of control. This bias refers to the tendency of individuals to overestimate their ability to control events that are, in reality, subject to change. This can manifest as overestimating one's ability to influence market outcomes and, surprisingly, leading to informed investment behavior. But our result is different with Qadri & Shabbir (2014). They were found in investors at the Islamabad Stock Exchange. Barber & Odean (2006) also declared that investors who exhibit the illusion of control tend to trade more frequently, often to their detriment, as frequent trading is typically associated with lower net returns due to transaction costs and timing errors. Since we used self-assessment in measuring Investment Decisions then there is a possibility that they will answer things that are not true. Such as, they have suffered a loss but they deny it and consider it as profit.

## **Conclusion**

This study aims to understand the investment decisions of Gen Z investors in Indonesia through the role of financial literacy and cognitive biases. Our main result is financial literacy and cognitive biases positively affect the investment decision. Higher financial literacy correlates with more rational and informed investment choices. Financial literacy has been widely recognized as a crucial determinant of investment decisions. It encompasses the knowledge and skills required to understand financial concepts and products, enabling individuals to make informed and effective choices. Furthermore, cognitive biases, particularly hindsight bias and the illusion of control, have a negatively affect the investment decisions. Those leading to potentially suboptimal outcomes. These biases can cause investors to overestimate their predictive abilities and control over market events, resulting in riskier investment behaviors and frequent trading.

The practical implications are significant for policymakers, financial educators, education institutions, and industry stakeholders. By enhancing financial literacy and addressing cognitive biases through targeted education and training programs. Gen Z investors are better equipped to make informed and rational investment decisions. This, in turn, can contribute to greater financial stability and growth in emerging markets like Indonesia. Future research should explore additional cognitive biases and their interaction with financial literacy to provide a more comprehensive understanding of Gen Z investment decisions. Furthermore, longitudinal studies could offer deeper insights into how financial literacy and cognitive biases evolve and influence long-term investment decisions.

Future research also needs to use a more objective measurement to assess the variables better.

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