

How Mental Accounting And Overconfidence Bias Shape Investment Decisions Through Risk Perception

Yola Yolanda¹⁾, Sambas Ade Kesuma², Iskandar Muda³

^{1,2,3} Faculty of Economics and Business, Universitas Sumatera Utara

Email: yolayolanda@students.usu.ac.id, sambas@usu.ac.id

Abstract

This study examines the effect of mental accounting and overconfidence bias on investment decisions, the mediating role of risk perception, and the moderating role of financial literacy on the relationship between risk perception and investment decisions among Indonesia Stock Exchange investors in North Sumatra Province. Primary data were collected through a five-point Likert questionnaire from 35 purposively selected stock investors and analysed with partial least squares structural equation modelling (PLS-SEM) using 5,000 bootstrap subsamples; the moderating effect was estimated with the two-stage approach. The measurement model met the criteria for reliability, convergent validity and discriminant validity. Mental accounting increased risk perception ($\beta = 0.489$), while overconfidence bias reduced it ($\beta = -0.535$). Risk perception had a positive effect on investment decisions ($\beta = 0.695$), whereas the direct effects of mental accounting and overconfidence bias were not significant. Risk perception fully mediated the effects of both biases on investment decisions, and financial literacy strengthened the effect of risk perception on investment decisions ($\beta = 0.385$). These findings suggest that behavioural biases shape investment decisions through risk perception. Given the small sample, the results should be treated as preliminary evidence.

Keywords: mental accounting, overconfidence bias, risk perception, financial literacy, investment decision

1. INTRODUCTION

The development of the Indonesian capital market shows an encouraging trend. Based on Single Investor Identification (SID) data, the number of capital market investors increased from 12.17 million in 2023 to 14.87 million in 2024 and surpassed 20.13 million in December 2025. This growth is also evident in regional areas, including North Sumatra Province, which recorded 401,723 SIDs as of January 2026 (Nasution, 2026). The majority of new investors are young investors, who, according to various studies, are more susceptible to behavioral biases. Thus, an increase in the number of investors does not necessarily correlate with the quality of the investment decisions made

Traditional financial theory assumes investors to be rational individuals who

objectively process all information to maximize utility. In reality, investment decisions are also influenced by psychological factors, subjective perceptions, and behavioral biases (Barberis & Thaler, 2003). Behavioral finance serves as the primary framework for this study, with Prospect Theory (Kahneman & Tversky, 1979) and Heuristic-Driven Bias Theory (Shefrin, 2000) acting as intermediate theories that explain how investors assess gains and losses and employ cognitive shortcuts under conditions of uncertainty.

Two widely studied biases are mental accounting and overconfidence bias. Mental accounting is the tendency for individuals to categorize and treat money differently based on its source or purpose (Thaler, 1999), so that evaluations of gains, losses, and risk are conducted per category rather than based on total wealth

(Pompian, 2012). Overconfidence bias is an excessive belief in one's own abilities and the accuracy of one's judgments (Budiman, Yodiputra, Candy, & Agustina, 2025), which, according to self-attribution theory, is reinforced by the tendency to attribute past successes to one's own abilities (Daniel, Hirshleifer, & Subrahmanyam, 1998; Gervais & Odean, 2001) and encourages excessive trading (Barber & Odean, 2001).

Empirical findings regarding these two biases have been inconsistent. Budiman et al. (2025) found that mental accounting has a positive effect on investment decisions, whereas Wibowo, Indrawati, and Aisjah (2023) found no such effect. Karki, Bhatia, and Sharma (2024) reported that overconfidence has a positive effect, but Tasman, Lukman, Husni, Rahmi, and Alfarisi (2024) stated that it has no effect. This inconsistency indicates the presence of mediating mechanisms and specific conditions that determine when these biases have an effect.

Risk perception is posited as this mediating mechanism. According to the psychometric paradigm, risk perception is formed through the interaction of cognitive and affective factors, not merely through statistical calculations (Slovic, 2000). Risk perception has been shown to influence investment decisions (Ahmad & Shah, 2021; Anifa & Soegiharto, 2023; Halim & Pamungkas, 2023). Meanwhile, financial literacy which, in human capital theory, is viewed as the knowledge capital needed to rationally evaluate financial information (Lusardi & Mitchell, 2011) is hypothesized to determine how effectively risk perception is translated into investment decisions (Ahmad & Shah, 2021; Malik, Quddus, Barakat, Fahlevi, & Aziz, 2026).

Based on this discussion, this study aims to analyze the influence of mental accounting and overconfidence bias on investment decisions both directly and via a through risk perception as well as to test the role of financial literacy in moderating the influence of risk perception on investment decisions among investors on

the Indonesia Stock Exchange in North Sumatra Province. The novelty of this study lies in the integration of cognitive biases, risk perception, and financial literacy into a single conditional process framework, with moderation testing specifically applied to the risk perception pathway affecting investment decisions.

Hypothesis Development

Investors who use mental accounting evaluate investments based on specific categories or funding objectives. This separate evaluation increases sensitivity to losses in each mental account (Thaler, 1999), thereby heightening the perception of risk. Costa, Carvalho, and Moreira (2023) found that mental accounting has a positive effect on risk perception, although Sukamulya and Muqorobin (2019) did not find such an effect. **H1:** Mental accounting has a positive and significant effect on risk perception.

Overconfident investors believe they can predict the market and control losses, so they tend to underestimate risk. Ahmad and Shah (2021) found that overconfidence has a negative effect on risk perception, whereas Kartika and Iramani (2013) found no such effect. **H2:** Overconfidence bias affects risk perception.

Grouping funds into mental accounts means that investment decisions are not based on comprehensive portfolio considerations (Shefrin & Statman, 2000), so the decisions made tend to be suboptimal. **H3:** Mental accounting has a significant negative effect on investment decisions.

Overconfidence encourages investors to be bolder and more active in making investment decisions (Barber & Odean, 2001; Karki et al., 2024). **H4:** Overconfidence bias has a positive and significant effect on investment decisions.

The greater the perceived risk, the more likely investors are to be cautious when making investment decisions. **H5:** Risk perception has a negative and significant effect on investment decisions.

Since both biases are believed to

shape risk perception and risk perception influences investment decisions, risk perception is hypothesized to serve as a mediating variable (Wibowo et al., 2023; Malik et al., 2026). **H6:** Risk perception mediates the effect of mental accounting on investment decisions. **H7:** Risk perception mediates the effect of overconfidence bias on investment decisions.

Investors with high financial literacy possess the knowledge to evaluate risk more accurately, allowing their risk perceptions to be translated more effectively into investment decisions (Ahmad & Shah, 2021; Malik et al., 2026). **H8:** Financial literacy moderates the effect of risk perception on investment decisions.

2. METHOD

This study employs a quantitative approach with a causal design. The study population consists of stock investors in North Sumatra Province, totaling 401,723 SIDs as of January 2026 (Nasution, 2026). The sample was selected using purposive sampling based on the criteria of being at least 17 years old, having experience investing in stocks, and residing in North Sumatra Province. The data analyzed in this article were collected from 35 respondents who met these criteria.

Primary data were collected via a questionnaire using a 1–5 Likert scale. Investment decisions (ID) were measured using three indicators: expected return, investment risk, and expectations (Wibowo et al., 2023). Risk perception (RP) was measured using four indicators: probability of loss, severity of loss, uncertainty, and financial risk (Ahmad & Shah, 2021). Mental accounting (MA) was measured using five indicators: mental budgeting, mental accounting, income coding, framing, and evaluation frequency (Budiman et al., 2025). Overconfidence bias (OB) is measured using three indicators: overestimation, overplacement, and overprecision (Costa, Soares, Bruno, & Tenelli, 2025). Financial literacy (LF) is measured using five indicators: basic financial knowledge, inflation, interest

rates, risk diversification, and the time value of money (Lusardi & Mitchell, 2011). All constructs are measured reflectively.

The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) (Ghozali, 2024; Hair, Hult, Ringle, & Sarstedt, 2022). Estimation used a path weighting scheme with a stopping criterion of 10^{-7} and a maximum of 300 iterations. Evaluation of the measurement model included outer loadings (≥ 0.70 ; 0.60 – 0.70 is acceptable if AVE is met), Cronbach's alpha, ρ_A , and composite reliability (≥ 0.70), AVE (≥ 0.50), as well as discriminant validity using the Fornell-Larcker criteria (Fornell & Larcker, 1981), cross-loading, and HTMT (< 0.85) (Henseler, Ringle, & Sarstedt, 2015). Structural model evaluation includes VIF (< 3), R^2 , f^2 , Q^2 predict (Shmueli et al., 2019), and SRMR (Hair, Risher, Sarstedt, & Ringle, 2019).

Hypothesis testing was conducted using bootstrapping with 5,000 subsamples, a 95% percentile confidence interval, and a two-tailed test at a 5% significance level. Mediation effects were tested for the significance of the indirect effect, and the type of mediation was determined based on the significance of the direct effect (Zhao, Lynch, & Chen, 2010). Moderation effects were estimated using a two-stage approach (Becker, Ringle, & Sarstedt, 2018), which involved forming an interaction term from the product of the standardized scores of the latent variables "risk perception" and "financial literacy," followed by a simple slope analysis.

3. RESULTS AND DISCUSSION

Respondent Characteristics and Descriptive Statistics

Respondents were predominantly in the 17–25 age group (13 people; 37.1%) and the 26–35 age group (12 people; 34.3%), held a bachelor's degree (17 respondents; 48.6%), and had 1–3 years of investment experience (15 respondents; 42.9%) or less than 1 year (11 respondents; 31.4%). This composition

aligns with the phenomenon of young and new investors dominating the Indonesian capital market (Table 1).

The average indicator scores ranged from 3.63 to 4.03 (Table 2). The average scores per construct were 3.91 for mental accounting, 3.82 for overconfidence bias, 3.77 for risk perception, 3.72 for financial literacy, and 3.71 for investment

decisions. All fall into the “high” category, indicating that respondents tend to agree with the statements for each construct.

At the indicator level, the highest average was found in MA1 (mental budgeting) at 4.03, while the lowest average was found in LF3 (interest rates) at 3.63.

Tabel 1. Respondent Characteristics

Characteristics	Category	Number	%
Age	17–25 years	13	37.1
	26–35 years	12	34.3
	36–45 years	7	20.0
	>45 years	3	8.6
Education	High School/Equivalent	4	11.4
	Diploma	10	28.6
	Bachelor's Degree	17	48.6
	Master's/Doctorate	4	11.4
Investment experience	<1 year	11	31.4
	1–3 years	15	42.9
	3–5 years	5	14.3
	>5 years	4	11.4

Source: Processed primary data (2026).

Evaluation of the Measurement Model (Outer Model)

Table 2 shows that the outer loadings for all indicators fall within the range of 0.637–0.917. A total of 19 out of 20 indicators have loadings above 0.70. Indicator MA5 (evaluation frequency) has a loading of 0.637; this indicator was retained because it falls within the 0.60–0.70 range and the AVE for the mental accounting construct meets the criteria (Hair et al., 2022). The highest VIF value

for the indicator was 3.601 (LF5), which is below the 5 threshold; therefore, there are no multicollinearity issues in the measurement model.

Table 3 shows that all constructs have Cronbach's alpha (0.799–0.896), rho_A (0.869–0.940), and composite reliability (0.873–0.923) above 0.70, as well as AVE (0.614–0.728) above 0.50. Thus, internal consistency reliability and convergent validity are met.

Table 2. Descriptive Statistics, Outer Loadings, and VIF of Indicators

Construct	Indicator	Mean	Standard Deviation	Outer loading	VIF
<i>Mental Accounting</i>	MA1	4.03	0.92	0.868	2.423
	MA2	3.89	0.76	0.798	1.695
	MA3	3.86	0.69	0.813	2.012
	MA4	3.94	0.80	0.783	1.912
	MA5	3.83	0.75	0.637	1,453
<i>Overconfidence Bias</i>	OB1	3.74	0.82	0.860	2.456
	OB2	3.94	0.68	0.872	1.445
	OB3	3.77	0.84	0.769	2,107
<i>Risk Perception</i>	RP1	3.89	0.87	0.904	3.492
	RP2	3.69	0.87	0.888	3.326
	RP3	3.83	0.82	0.844	2,070
	RP4	3.69	0.76	0.771	1.776
Financial Literacy	LF1	3.71	0.86	0.896	2.805
	LF2	3.66	0.94	0.859	2.589
	LF3	3.63	0.77	0.808	2.487
	LF4	3.74	0.92	0.742	1.767
	LF5	3.86	0.85	0.890	3.601
Investment Decision	KI1	3.74	0.89	0.917	2.286
	KI2	3.69	0.90	0.870	1.841
	KI3	3.71	0.67	0.755	1,641

Source: Processed primary data (2026)

Table 3. Reliability and Convergent Validity

Construct	Cronbach's alpha	rho_A	Composite reliability (rho_C)	AVE
<i>Mental Accounting</i>	0.844	0.874	0.887	0.614
<i>Overconfidence Bias</i>	0.799	0.895	0.873	0.697
<i>Risk Perception</i>	0.875	0.883	0.914	0.728
Financial Literacy	0.896	0.940	0.923	0.707
Investment Decisions	0.812	0.869	0.886	0.723

Source: Processed primary data (2026).

Discriminant validity is presented in Table 4. The AVE root for each construct (diagonal) is greater than its correlation with other constructs, thus fulfilling the Fornell-Larcker criteria. The highest HTMT value is 0.770 (between risk

perception and the investment decision, which is below the 0.85 threshold. The cross-loading results also show that each indicator has the highest loading on its own construct. Thus, discriminant validity is met.

Table 4. Discriminant Validity: Fornell-Larcker and HTMT Criteria

Construct	MA	OB	RP	LF	KI
<i>Mental Accounting</i>	0.784	(0.152)	(0.498)	(0.229)	(0.442)
<i>Overconfidence Bias</i>	0.088	0.835	(0.547)	(0.111)	(0.179)
<i>Risk Perception</i>	0.442	-0.492	0.853	(0.380)	(0.770)
Financial Literacy	0.234	-0.128	0.361	0.841	(0.316)
Investment Decision	0.416	-0.170	0.668	0.314	0.850

Source: Processed primary data (2026)

Structural Model Evaluation (Inner Model)

The VIF values across constructs ranged from 1.008 to 2.058, which are below the threshold of 3; therefore, there is no multicollinearity issue in the structural model. Table 5 shows an R^2 for risk perception of 0.480 (adjusted R^2 of 0.447), meaning that mental accounting and overconfidence bias explain 48.0% of the variation in risk perception. The R^2 for investment decisions is 0.610 (adjusted R^2 0.543), meaning that all predictors explain 61.0% of the variation in investment decisions. Both values are classified as

moderate s (Hair et al., 2022).

The Q^2 values for predicting risk perception (0.388) and investment decisions (0.048) are greater than zero, indicating that the model has predictive relevance, although the predictive relevance for investment decisions is relatively small. The saturated SRMR value of 0.118 is above the 0.10 threshold. This result should be interpreted with caution because the SRMR is sensitive to small sample sizes; therefore, the model's fit needs to be reconfirmed using a larger sample.

Table 5. Coefficient of Determination and Predictive Relevance

Endogenous Constructs	R^2	Adjusted R^2	Q^2 predict
Risk Perception	0.480	0.447	0.388
Investment Decision	0.610	0.543	0.048

Source: Processed primary data (2026).

Hypothesis Testing

The results of the hypothesis testing are presented in Figure 2 and Table 6. A hypothesis is accepted if the coefficient is

significant at a 5% significance level ($p < 0.05$; the 95% confidence interval does not include zero) and the direction of the effect is consistent with the hypothesis.

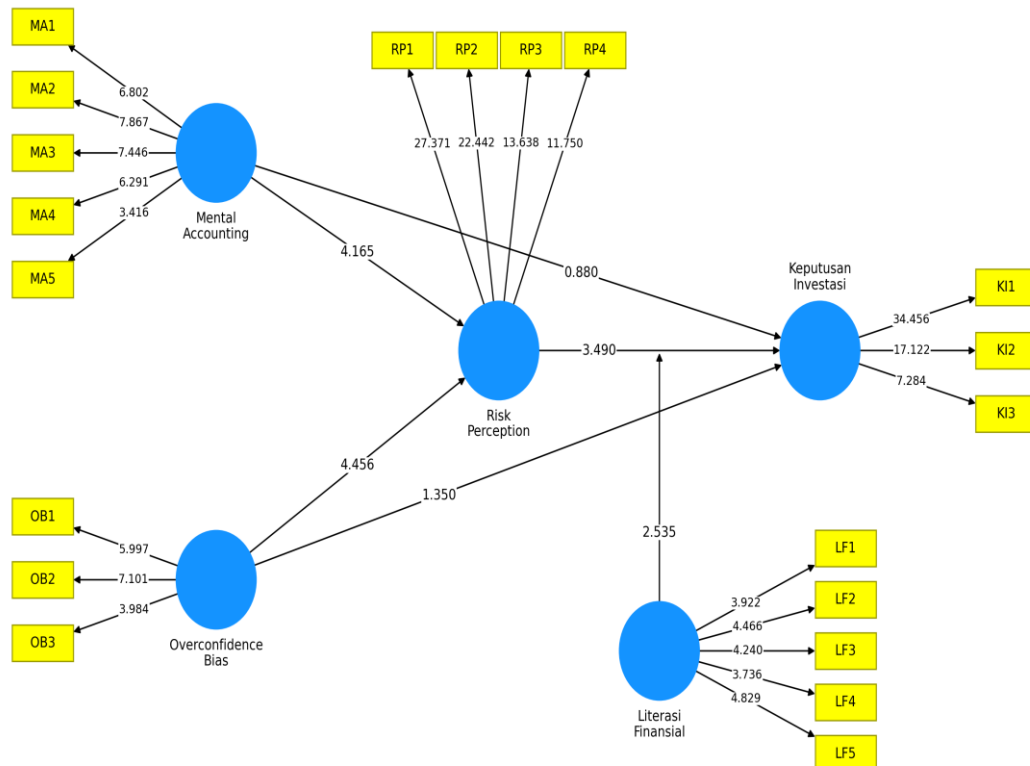


Figure 2. Structural Model Bootstrapping Results (t-statistic)

Table 6. Hypothesis Testing Results

Hyp.	Path	Direction	β	SD	t	p	95% CI	f^2	Decision
H1	MA $\rightarrow$ RP	+	0.489	0.117	4.165	< 0.001	[0.261; 0.687]	0.456	Accepted
H2	OB $\rightarrow$ RP	$\neq 0$	-0.535	0.120	4.456	< 0.001	[-0.731; -0.278]	0.547	Accepted
H3	MA $\rightarrow$ KI	-	0.133	0.151	0.880	0.379	[-0.163; 0.429]	0.031	Rejected
H4	OB $\rightarrow$ KI	+	0.229	0.170	1.350	0.177	[-0.134; 0.534]	0.085	Rejected
H5	RP $\rightarrow$ KI	-	0.695	0.199	3.490	< 0.001	[0.275; 1.058]	0.602	Rejected (opposite direction)
H6	MA $\rightarrow$ RP $\rightarrow$ KI	mediation	0.340	0.135	2.514	0.012	[0.098; 0.617]	-	Accepted
H7	OB $\rightarrow$ RP $\rightarrow$ KI	mediation	-0.372	0.130	2.858	0.004	[-0.634; -0.112]	-	Accepted
H8	RP $\times$ LF $\rightarrow$ KI	moderation	0.385	0.152	2.535	0.011	[0.024; 0.614]	0.343	Accepted
-	LF $\rightarrow$ KI	-	-0.031	0.154	0.202	0.840	[-0.328; 0.282]	0.002	-

Primary data processed (2026).

Table 7. Direct, Indirect, and Total Effects

Path	Direct effect	Indirect Effects	Total Effect	Type of mediation
MA $\rightarrow$ RP $\rightarrow$ KI	0.133 (p = 0.379)	0.340 (p = 0.012)	0.473 (p = 0.002)	Full mediation (<i>indirect-only</i>)
OB $\rightarrow$ RP $\rightarrow$ KI	0.229 (p = 0.177)	-0.372 (p = 0.004)	-0.143 (p = 0.421)	Full mediation (<i>indirect-only</i>)

Source: Processed primary data (2026).

The effect of mental accounting on risk perception (H1). Mental accounting has a positive and significant effect on risk perception ($\beta = 0.489$; $t = 4.165$; $p < 0.001$) with $f^2 = 0.456$ (large effect), so H1 is accepted. Investors who allocate funds into mental accounts evaluate gains and losses on a per-account basis. Because losses in each account are assessed separately, sensitivity to losses increases and risk is perceived as greater. These findings are consistent with mental accounting theory (Thaler, 1999) and prospect theory (Kahneman & Tversky, 1979), and support Costa et al. (2023), but are inconsistent with Sukamulya and Muqorobin (2019).

The effect of overconfidence bias on risk perception (H2). Overconfidence bias has a negative and significant effect on risk perception ($\beta = -0.535$; $t = 4.456$; $p < 0.001$; $f^2 = 0.547$), thus H2 is accepted. The higher an investor's confidence in their ability to predict the market, the lower the perceived risk. These results are consistent with self-attribution and overconfidence theory (Daniel et al.,

1998; Gervais & Odean, 2001) and support the findings of Ahmad and Shah (2021), but differ from those of Kartika and Iramani (2013).

The direct effects of mental accounting and overconfidence bias on investment decisions (H3 and H4). Mental accounting ($\beta = 0.133$; $p = 0.379$) and overconfidence bias ($\beta = 0.229$; $p = 0.177$) do not have a significant direct effect on investment decisions; therefore, H3 and H4 are rejected. These findings are consistent with those of Wibowo et al. (2023) regarding mental accounting and Tasman et al. (2024) regarding the overconfidence “.” The results of the mediation test indicate that these two biases do not operate directly but rather through changes in investors' risk perceptions.

The effect of risk perception on investment decisions (H5). Risk perception has a significant effect on investment decisions ($\beta = 0.695$; $t = 3.490$; $p < 0.001$; $f^2 = 0.602$), but the direction is positive, contrary to the hypothesized negative direction.

Therefore, H5 is rejected. A possible explanation is that the investment decision indicators in this study measure considerations regarding return, risk, and expectations, rather than risk-taking propensity. Investors who are more risk-sensitive tend to weigh these three aspects more carefully, resulting in better-quality investment decisions. This finding is consistent with Ahmad and Shah (2021), Anifa and Soegiharto (2023), and Halim and Pamungkas (2023), who found a positive effect of risk perception on investment decisions.

The mediating role of risk perception (H6 and H7). The indirect effect of mental accounting on investment decisions via risk perception is significant ($\beta = 0.340$; $p = 0.012$; 95% CI [0.098; 0.617]), as is the indirect effect of overconfidence bias ($\beta = -0.372$; $p = 0.004$; 95% CI [-0.634; -0.112]). Thus, H6 and H7 are accepted. Since the direct effects of both are not significant, risk perception acts as a full mediator (indirect-only mediation; Zhao et al., 2010). The directions of the two pathways differ: mental accounting improves the quality of investment decisions by increasing risk vigilance, whereas overconfidence bias reduces the quality of investment decisions by suppressing the effect of risk perception. These findings support the role of risk perception as a link

between behavioral biases and investment decisions (Wibowo et al., 2023; Malik et al., 2026).

The moderating role of financial literacy (H8). The interaction term between risk perception and financial literacy has a positive and significant effect on investment decisions ($\beta = 0.385$; $t = 2.535$; $p = 0.011$; 95% CI [0.024; 0.614]), thus H8 is accepted. The addition of the interaction term increased the R^2 for investment decisions from 0.489 to 0.610 ($f^2 = 0.343$). The simple slope analysis (Figure 3) shows that the effect of risk perception on investment decisions is 0.310 for low financial literacy (-1 SD), 0.695 for average financial literacy, and 1.080 for high financial literacy ($+1$ SD). Financial literacy strengthens the effect of risk perception on investment decisions: investors who understand the concepts of inflation, interest rates, diversification, and the time value of money are better able to translate their risk perceptions into investment decisions. These results are consistent with the human capital theory of financial literacy (Lusardi & Mitchell, 2011) as well as the findings of Ahmad and Shah (2021) and Malik et al. (2026). The main effect of financial literacy on investment decisions is not significant ($\beta = -0.031$; $p = 0.840$), so financial literacy in this model acts as a pure moderator.

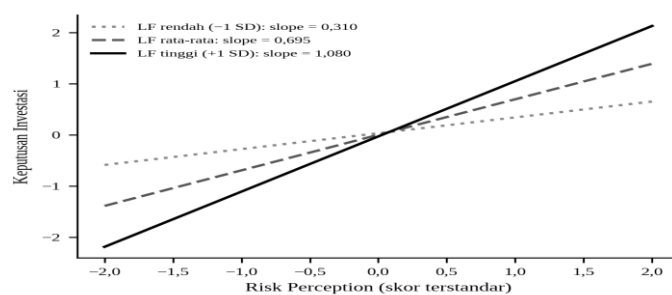


Figure 3. Simple Slope Analysis of Financial Literacy Moderation

4. CONCLUSION

This study concludes that *mental accounting* has a positive effect on *risk perception*, while *overconfidence bias* has a negative effect on *risk perception*. Neither bias has a direct effect on investment decisions but exerts an indirect

effect through *risk perception* as a full mediator. *Risk perception* has a positive effect on investment decisions, contrary to the hypothesized direction, and this effect is amplified by financial literacy. Theoretically, these findings indicate that behavioral biases shape investment

decisions through how investors perceive risk, and financial literacy determines how effectively that perception is translated into decisions.

In practice, the IDX Representative Office in North Sumatra, securities firms, and Investment Galleries need to direct capital market education programs not only toward product familiarization but also toward raising awareness of the *overconfidence* bias which diminishes risk awareness and strengthening financial literacy so that risk perceptions can be translated into more rational decisions.

This study has limitations. The number of respondents (35) is still far below the planned sample size, so the statistical power is limited, the SRMR value does not yet meet the criteria, and the results should be viewed as preliminary findings. Future research is recommended to use a larger and more representative sample, as well as to consider demographic variables such as age and investment experience as control variables.

5. REFERENCES

- Ahmad, M., & Shah, S. Z. A. 2021. Overconfidence Heuristic-Driven Bias in Investment Decision-Making and Performance: Mediating Effects of Risk Perception and Moderating Effects of Financial Literacy. *Journal of Economic and Administrative Sciences*.
- Anifa, S. A., & Soegiharto, S. 2023. Does the Psychology of Investment Decisions Depend on Risk Perception and Financial Literacy? *MAKSIMUM: Accounting Journal of Muhammadiyah University of Semarang*.
- Barber, B. M., & Odean, T. 2001. "Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment." *The Quarterly Journal of Economics*. 116(1): 261–292.
- Barberis, N., & Thaler, R. 2003. A Survey of Behavioral Finance. In G. M. Constantinides, M. Harris, & R. M. Stulz (Eds.), *Handbook of the Economics of Finance*. Vol. 1, Part B: 1053–1128. Elsevier, Amsterdam.
- Becker, J.-M., Ringle, C. M., & Sarstedt, M. 2018. Estimating Moderating Effects in PLS-SEM and PLSc-SEM: Interaction Term Generation $\times$ Data Treatment. *Journal of Applied Structural Equation Modeling*. 2(2): 1–21.
- Budiman, Yodiputra, Candy, & Agustina. 2025. How Do Overconfidence and Mental Accounting Influence Investments? The Moderating Role of Financial Literacy. *Asian Management and Business Review*.
- Costa, D. F., Soares, C. C., Bruno, M. C., & Tenelli, A. O. 2025. Construction, and Validation of an Overconfidence Scale in Investment Decisions. *Future Business Journal*.
- Costa, F. D., Carvalho, M. F., & Moreira, B. M. 2023. Mental Accounting and Decision Making: A Systematic Literature Review. *Journal of Behavioral and Experimental Economics*.
- Daniel, K., Hirshleifer, D., & Subrahmanyam, A. 1998. Investor Psychology and Security Market Under- and Overreactions. *The Journal of Finance*. 53(6): 1839–1885.
- Fornell, C., & Larcker, D. F. 1981. Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*. 18(1): 39–50.
- Gervais, S., & Odean, T. 2001. Learning to Be Overconfident. *The Review of Financial Studies*. 14(1): 1–27.
- Ghozali, I. 2024. *Partial Least Squares: Concepts, Techniques, and Applications Using SmartPLS 4.0*. 2nd ed. Diponegoro University Press, Semarang.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. 2022. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. 3rd ed. Sage, Thousand Oaks.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. 2019. When to Use and How to Report the Results of PLS-SEM. *European Business Review*.

- 31(1): 2–24.
- Halim, R., & Pamungkas, S. A. 2023. The Influence of Risk Perception, Overconfidence, and Herding Behavior on Investment Decisions. *International Journal of Application on Economics and Business*: 521–529.
- Henseler, J., Ringle, C. M., & Sarstedt, M. 2015. A New Criterion for Assessing Discriminant Validity in Variance-Based Structural Equation Modeling. *Journal of the Academy of Marketing Science*. 43(1): 115–135.
- Kahneman, D., & Tversky, A. 1979. Prospect Theory: An Analysis of Decision-Making under Risk. **Econometrica**. 47(2): 263–291.
- Karki, U., Bhatia, V., & Sharma, D. 2024. A Systematic Literature Review on Overconfidence and Related Biases Influencing Investment Decision Making. *Economic and Business Review*.
- Kartika, N., & Iramani, R. 2013. The Effects of Overconfidence, Experience, and Emotion on Risk Perception and Risk Attitude Among Capital Market Investors in Surabaya. *Journal of Business & Banking*.
- Lusardi, A., & Mitchell, O. S. 2011. Financial Literacy Around the World: An Overview. *Journal of Pension Economics & Finance*. 10(4): 497–508.
- Malik, L., Quddus, A., Barakat, A. H., Fahlevi, M., & Aziz, L. A. 2026. Behavioral Biases and Investment Decisions: The Mediating Role of Risk Perception and the Moderating Role of Financial Literacy. *Discover Psychology*.
- Nasution, M. P. 2026. IDX North Sumatra Representative Pintor Nasution: North Sumatra Capital Market Transactions Surpass Rp25.98 Trillion in January 2026. *Ketikberita.com*, March 4, 2026. <https://ketikberita.com/kepala-perwakilan-bei-sumut-pintor-nasution-transaksi-pasar-modal-sumut-tembus-rp2598-triliun-di-januari-2026/>
- Pompian, M. M. 2012. *Behavioral Finance and Investor Types: Managing Behavior to Make Better Investment Decisions*. Wiley, Hoboken, NJ.
- Shefrin, H. 2000. **Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing**. Harvard Business School Press, Boston.
- Shefrin, H., & Statman, M. 2000. “ ” Behavioral Portfolio Theory. *Journal of Financial and Quantitative Analysis*. 35(2): 127–151.
- Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J.-H., Ting, H., Vaithilingam, S., & Ringle, C. M. 2019. “Predictive Model Assessment in PLS-SEM: Guidelines for Using PLSpredict.” *European Journal of Marketing*. 53(11): 2322–2347.
- Slovic, P. 2000. *The Perception of Risk*. Earthscan, London.
- Sukamulya, S., & Muqorobin, M. 2019. Regret Aversion Bias, Mental Accounting, Overconfidence, and Risk Perception in Investment Decision Making Among Generation Y Workers in Yogyakarta. *International Journal of Economics*.
- Tasman, A., Lukman, S., Husni, T., Rahmi, R., & Alfari, F. M. 2024. An Analysis of Investment Decisions among Gen Z: Examining the Influence of Risk Perception, Religiosity, and Overconfidence. *Journal of Economics and Business (JEBS)*.
- Thaler, R. H. 1999. Mental Accounting Matters. *Journal of Behavioral Decision Making*. 12(3): 183–206.
- Wibowo, Indrawati, & Aisjah. 2023. The Impact of Overconfidence and Herding Bias on Stock Investment Decisions Mediated by Risk Perception. *International Journal of Research in Business and Social Science*.
- Zhao, X., Lynch, J. G., & Chen, Q. 2010. Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis. *Journal of Consumer Research*. 37(2): 197–206.