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Overconfidence and Investment Loss Tolerance: A Large-Scale Survey Analysis of Japanese Investors

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Abstract

Accepting a certain degree of investment loss risk is essential for long-term portfolio management. However, overconfidence bias within financial literacy can prompt excessively risky behavior and amplify susceptibility to other cognitive biases. These tendencies can undermine investment loss tolerance beyond the baseline level shaped by sociodemographic, economic, psychological, and cultural factors. This study empirically examines the association between overconfidence and investment loss tolerance, which is measured by the point at which respondents indicate they would sell their investments in a hypothetical loss scenario. Using a large-scale dataset of 161,765 active investors from one of Japan's largest online securities firms, we conduct ordered probit and ordered logit regression analyses, controlling for a range of sociodemographic, economic, and psychological variables. Our findings reveal that overconfidence is statistically significantly and negatively associated with investment loss tolerance, indicating that overconfident investors are more prone to prematurely liquidating assets during market downturns. This behavior reflects an impulse to avoid even modest losses. The findings suggest several possible practical strategies to mitigate the detrimental effects of overconfidence on long-term investment behavior.

Keywords: overconfidence bias; investment loss tolerance; financial risk behavior; behavioral finance; investor psychology; financial literacy; cognitive bias; ordered probit regression; ordered logit regression

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1. Introduction

Allowing some risk of investment loss is critical for individual investors in managing their investments over the long term (Siegel 1998). Markets constantly fluctuate, and short-term changes in the prices of financial instruments are inevitable (Beers 2022). Deteriorating economic conditions and political shocks can cause prices to fall. For example, the S&P 500 Index fell by 56.8% during the Global Financial Crisis from October 2007 to March 2009 (The Investopedia Team 2023) and by 33.9% during the COVID-19 pandemic from February 2020 to March 2020 (Statista Research Department 2022). However, as historical data for many stock indices, including the S&P 500, show, the market has grown steadily over the long term (Siegel 1998). If investors are dismayed by short-term losses and sell their holdings, they miss the market recovery and lock in their losses. Conversely, if they continue to hold investments over the long term, significant returns can be expected due to the effects of compound interest. Thus, tolerating investment losses is necessary for generating long-term profits.

Psychological biases, such as emotions and unconscious cognitive patterns, strongly influence investment decision-making (Shefrin and Statman 1985; Statman 1999; Madaan and Singh 2019; Bihari et al. 2025; Paul and Sundaram 2023; Bawalle et al. 2025; Khan et al. 2024; Kuramoto et al. 2024; Lal et al. 2024). In particular, overconfidence in financial literacy has been shown to impair investment decisions in numerous previous studies (Madaan and Singh 2019; Bihari et al. 2025; Bawalle et al. 2025). This bias reflects the tendency to overestimate one's financial knowledge and predictive ability (Kafayat 2014) and is often reinforced by self-attribution bias, a cognitive pattern in which individuals attribute successful outcome to personal skill and failures to external circumstances (Czaja and Röder 2020). As a result, overconfident investors frequently overestimate their ability to accurately predict market trends and trading timing, leading them to trade excessively and purchase riskier instruments (Deaves et al. 2009; Barber and Odean 2001; Pompian 2012; Chaudhary 2025). Furthermore, they may overreact to negative news during market declines (Daniel et al. 1998), selling their investments impulsively to avoid losses. This behavior is grounded in several theories of behavioral finance. One is the overreaction hypothesis, which suggests that investors overreact to unexpected and dramatic news events (De Bondt and Thaler 1985). Prospect theory also contributes to this framework, indicating that investors potentially prioritize loss avoidance over the pursuit of profit (Kahneman and Tversky 1979). Additionally, the dual-process model of decision-making (Kahneman 2011) posits that individuals often rely on System 1—a fast, automatic, and heuristic-dependent mode of thinking—when confronted with emotionally charged or high-stress situations, such as market downturns, which can lead to impulsive selling behavior. Based on these insights, we hypothesize that overconfidence may impair investors' ability to tolerate losses, as it not only promotes riskier investment behavior, but also exacerbates susceptibility to cognitive and emotional biases during market stress.

Tolerance for investment loss naturally depends on demographic status, financial capacity, and psychological perceptions. Key determinants of financial risk tolerance include age, gender, education, and income level (Bayar et al. 2020). Furthermore, marital status, family size, and economic responsibilities significantly influence financial risk tolerance among capital market investors (Muktadir-Al-Mukit 2022). Perceptions of the current and future state of the national economy have also been found to be positively associated with investors' willingness to accept risk (Restana and Komalasari 2023). Beyond these individual and economic variables, cultural norms and values may shape individuals' tolerance for investment losses. For example, in countries like Japan, high levels of uncertainty avoidance and a prevailing culture of financial conservatism tend to foster stronger loss avoidance (Nakagawa and Shimizu 2000; Rieger et al. 2015). However, misperceptions of one's financial literacy can result in excessive risk-taking and, paradoxically, reduced tolerance for investment loss, lower than would be expected based on sociodemographic, economic, psychological, and cultural predictors.

Although many previous studies have investigated the negative impacts of overconfidence bias on investor behavior, there is a lack of studies directly examining whether overconfidence undermines investment loss tolerance. Most existing research has focused on how overconfidence influences the purchasing behavior of investment instruments. For example, Beak and Cho (2022) report that U.S. investors who are overconfident in their investment knowledge are more likely to purchase securities on margin and invest in microcap stocks, derivatives, and cryptocurrencies. Glaser and Weber (2007) demonstrate that investors who believe they are above average in investment skills or past performance trade more frequently. Dewi et al. (2024) show that overconfident investors tend to have portfolios with lower returns and higher risks than those of non-overconfident investors. Conversely, few studies have shed light on selling behavior when investment losses occur.

Bawalle et al. (2025) found that investors who were overconfident in their financial literacy tended to sell part or all of their stocks and mutual funds during the March 2020 market downturn caused by the COVID-19 pandemic. However, Bawalle et al. (2025) used a binary indicator of whether investors sold during losses and, thus, could not capture the gradient of selling criteria, that is, the extent of loss investors were willing to tolerate before deciding to sell. Additionally, because their study focused on behavior in the specific context of the COVID-19 pandemic, the generalizability of their findings is limited. To address these gaps, the present study quantifies the loss tolerance index by assessing the point at which respondents would be tempted to sell using a generalized scenario, directly examining the impact of overconfidence on investment loss tolerance.

This study investigates the relationship between overconfidence and tolerance for investment loss using a large-scale and robust dataset of 161,765 active investors in one of the largest online securities in Japan, controlling for sociodemographic, economic, and psychological factors. It makes three contributions to behavioral finance. First, it quantifies the level of investment loss an investor can tolerate by deriving a generalized loss-tolerance index based on a realistic loss scenario. Second, it is the first study to demonstrate that overconfidence is negatively associated with investment loss tolerance, supporting the theory that overconfidence bias impairs investment decision-making. Third, it offers practical and policy implications for improving individual investors' decision-making.

2. Data and Methods

2.1. Data

This study mainly used data from the 2025 wave of the "Survey on Life and Money," an online survey conducted jointly by Rakuten Securities and Hiroshima University. The data were collected in January and February 2025, targeting Rakuten Securities account holders aged 18 years and older who had logged into their websites at least once in the past year. As some respondents had participated since 2022 or 2023 as part of a data panel, several variables were merged from the 2022 and 2023 waves, which were conducted between November and December of those respective years. The survey included questions on investment behavior, as well as sociodemographic, economic, and psychological preferences. After removing entries with missing variables, the final sample size consisted of 161,765 observations, representing 69.9% of the original 231,307 responses.

Rakuten Securities was selected for this study due to its extensive reach within the Japanese population. As of January 2025, the platform has more than 12 million users, representing around 10% of Japan's total population, which is the largest among domestic securities companies (Rakuten Securities 2025). Moreover, it accounts for nearly 24.5% of all online securities accounts in the country, which total approximately 49 million, according to the Japan Securities Dealers Association (2025). These figures underscore Rakuten Securities' substantial market presence and support the generalizability of the findings to a broader segment of Japan's active investors.

2.2. Variables

2.2.1. Dependent Variable

We define investment loss tolerance as the amount of loss that an individual can withstand while holding an investment instrument. This study focuses on tolerance for the investment loss of mutual funds. Investment loss tolerance was measured using a hypothetical scenario method, which is frequently employed in academic research and financial advisory practice to investigate individual financial behavior or investment decision-making (Grable and Lytton 2003; FinaMetrica 1998). The survey question is as follows:

Q1. Suppose you invest JPY 1 million in an investment trust and make a loss. How much will you keep the investment until? (Select one)

1. JPY 990,000 (JPY 10,000 loss or 1% loss)
2. JPY 900,000 (JPY 100,000 loss or 10% loss)
3. JPY 800,000 (JPY 200,000 loss or 20% loss)
4. JPY 700,000 (JPY 300,000 loss or 30% loss)
5. JPY 600,000 or less (JPY 400,000 loss or more, or 40% loss or more)

Based on this response, we create a discrete dependent variable (1% loss, 10% loss, 20% loss, 30% loss, and 40% loss or more) for use in our estimation analysis.

2.2.2. Independent Variable

Overconfidence refers to investors' overly optimistic perceptions of their financial literacy. Consistent with previous literature (Chu et al. 2016; Xia et al. 2014; Yeh and Ling 2021), we define overconfidence as a condition in which subjective financial literacy exceeds objective financial literacy. This conceptualization aligns with Alba and Hutchinson's (2000) definition of overconfidence as a form of discrepancy between actual and perceived knowledge. Following the methodology of Bawalle et al. (2025), this study measures objective financial literacy using the following "Big Three" major financial literacy questions developed by Lusardi and Mitchell (2008):

Q2. Suppose you have JPY 10,000 in a savings account. In addition, assume that the interest rate is 2% per year and you never withdraw money or interest payments. After 5 years, how much would you have in this account in total?

1. More than JPY 10,200
2. Exactly JPY 10,200
3. Less than JPY 10,200
4. Do not know

Q3. Imagine that the interest rate on your savings account is 1% per year and inflation is 2% per year. After one year, how much would you be able to buy with the money in this account?

1. More than today
2. Exactly the same
3. Less than today
4. Do not know

Q4. Please indicate whether the following statement is True or False: "Buying a single company stock is generally a safer investment than a stock mutual fund."

1. True
2. False
3. Do not know

The first and second questions assess respondents' understanding of basic economic concepts such as interest rates and inflation, as well as their ability to perform basic numerical calculations. The third question measures respondents' knowledge of stocks, mutual funds, and investment risk diversification. The percentage of correct answers to these three questions is calculated and defined as objective financial literacy.

Subjective financial literacy is measured using a statement that gauges respondents' confidence in their financial knowledge: "*I am confident about my financial knowledge.*" The response options are a five-level Likert scale: (1) totally agree, (2) somewhat agree, (3) neither agree nor disagree, (4) somewhat disagree, and (5) completely disagree. Respondents who selected either (1) totally agree or (2) somewhat agree were classified as confident. Using these objective and subjective measures, this study defines overconfident respon-

dents as those with objective financial literacy below the average (0.791) but who still exhibit confidence.

To control for sociodemographic, economic, and psychological factors, the independent variables included gender, age, marital status, number of children, years of education, employment status, household income, household assets, risk aversion, and myopic views of the future. Several variables in the panel samples, such as objective financial literacy, years of education, and myopic views of the future, were obtained from the 2022 and 2023 waves. Table 1 provides detailed definitions of each variable.

Table 1. Variable definitions.

Variables	Definition
Dependent Variable	
Investment loss tolerance	Discrete variable: how much loss respondents can withstand if they invest JPY 1 million in an investment trust (1% loss/10% loss/20% loss/30% loss/40% or more loss)
Independent Variable	
Overconfidence	Binary variable: 1 = having overconfidence regarding financial literacy, 0 = otherwise
Gender	Binary variable: 1 = male, 0 = female
Age	Continuous variable: respondent's age
Age squared	Continuous variable: age squared
Marital status	Binary variable: 1 = having a spouse, 0 = otherwise
Number of children	Continuous variable: number of children
Education year	Continuous variable: years of education
Having a job	Binary variable: 1 = having a job, 0 = otherwise
Household income	Continuous variable: the total annual income, including tax, for the household in 2024 (unit: JPY)
Household asset	Continuous variable: total household financial assets
Risk aversion	Continuous variable: respondent's risk aversion (the answer to the following question: when you usually go out with an umbrella, what is the probability of rain?)
Myopic view of the future	Discrete variable: 1 = completely opposite, 2 = somewhat opposite, 3 = cannot say, 4 = somewhat agree, 5 = completely agree with the idea that "the future is uncertain, so there is no point in thinking about it."

2.3. Descriptive Statistics

The descriptive statistics in Table 2 show that respondents can withstand an average investment loss of 24.5% if they invest JPY 1 million in investment trusts. Furthermore, 5.1% of the respondents were classified as overconfident. Regarding sociodemographic characteristics, 67.0% of the respondents were male, with an average age of 46. A total of 67.0% were married, and respondents had an average of more than one child. They had received an average of 15 years of education, and 89.6% were employed in some capacity. Regarding economic status, the average household income and assets were JPY 7.7 million and JPY 21.6 million, respectively. Regarding psychological characteristics, the average risk aversion was 0.54, and the average degree of myopia was 2.4.

Table 2. Descriptive statistics.

Variable	Mean	Std. Dev.	Min	Max
Dependent Variable				
Investment loss tolerance	0.245	0.128	0.01	0.4
Independent Variable				
Overconfidence	0.0513	0.221	0	1
Gender	0.670	0.470	0	1
Age	46.39	12.28	18	90
Age squared	2303	1181	324	8100
Marital status	0.670	0.470	0	1
Number of children	1.134	1.116	0	12
Education year	15.08	2.088	9	21
Having a job	0.896	0.305	0	1
Household income	7,688,000	4,288,000	1,000,000	20,000,000
Household assets	21,600,000	25,550,000	2,500,000	100,000,000
Risk aversion	0.535	0.238	0	1
Myopic view of the future	2.428	0.966	1	5
Observations		161,765		

Table 3 presents the distribution of investment loss tolerance based on overconfidence. According to the ANOVA results, overconfidence was not a significant predictor on its own. However, as sociodemographic, economic, and psychological factors may mediate the effects on investment loss tolerance (Bayar et al. 2020; Restana and Komalasari 2023; Muktadir-Al-Mukit 2022), a regression analysis controlling for these variables should be conducted in this study.

Table 3. Distribution of investment loss tolerance by overconfidence.

Investment Loss Tolerance	Overconfidence		
	0	1	Total
1% loss	7516 4.9%	447 5.4%	7963 4.9%
10% loss	37,092 24.2%	1845 22.3%	38,937 24.1%
20% loss	36,775 23.9%	2010 24.2%	38,785 24.0%
30% loss	24,044 15.7%	1407 17.0%	25,451 15.7%
40% loss or more	48,047 31.3%	2582 31.1%	50,629 31.3%
Total	153,474 100%	8291 100%	161,765 100%
F-statistics		F = 1.84	

2.4. Methods

This study performed a regression analysis to investigate the relationship between investment loss tolerance and overconfidence. Given that the dependent variable is discrete and ordinal in nature, we adopted ordered probit and ordered logit models, both of which are appropriate for modeling outcomes with a finite number of ordered categories. The selection of these models is further justified by their widespread use in related financial

behavior research. For example, Sung and Hanna (1996) employed ordered probit analysis to explore demographic and socioeconomic factors to determine household risk tolerance. Similarly, Fang et al. (2021) applied ordered probit and logit models to assess the impact of wealth accumulation on household risk tolerance among the Chinese. The estimation equation was as follows:

$$Y_i = f(OC_i, X_i, \varepsilon_i) \tag{1}$$

where Y_i is the measure of the ith respondent's investment loss tolerance. OC represents whether respondent i is overconfident. X is a vector of individual sociodemographic, economic, and psychological characteristics. ε is the error term. The full specification of Equation (1) is as follows:

$$\begin{aligned} Investment\ loss\ \ & tolerance_i \\ & = \beta_0 + \beta_1 Overconfidence_i + \beta_2 Gender_i + \beta_3 Age_i \\ & + \beta_4 Age\ squared_i + \beta_5 Marital\ status_i \\ & + \beta_6 Number\ of\ children_i + \beta_7 Education\ year_i \\ & + \beta_8 Having\ a\ job_i + \beta_9 Log\ of\ household\ income_i \\ & + \beta_{10} Log\ of\ household\ assets_i + \beta_{11} Risk\ aversion_i \\ & + \beta_{12} Myopic\ view\ of\ the\ future_i + \varepsilon_i \end{aligned} \tag{2}$$

We tested for multicollinearity by calculating the correlation coefficients and variance inflation factors (VIFs), as a strong interrelationship among independent variables can lead to inaccurate estimation results. As the correlation coefficients were below 0.7, and all VIF values were less than 3, multicollinearity was not a concern in the estimated model.

3. Estimation Results

Tables 4 and 5 report the results of the regression analyses using ordered probit and ordered logit models, respectively, to estimate the association between investment loss tolerance and overconfidence. Model 1 controls for sociodemographic variables; Model 2 includes sociodemographic and economic variables; and Model 3 adds psychological variables to these. The results show that, in both the ordered probit and ordered logit models, overconfidence has a positive impact on investment loss tolerance in Model 1 but is negatively associated with investment loss tolerance in Models 2 and 3. This finding indicates that overconfident investors are likely to be less tolerant of investment losses when controlling for sociodemographic, economic, and psychological factors. The results for the control variables are similar across both model types. Male gender, age, log of household income, and log of household assets are positively associated with investment loss tolerance in all estimation models. Conversely, age squared, having a spouse, number of children, having a job, risk aversion, and myopic views are negatively associated with it in all models. Education year shifts from a positive to a negative association with loss tolerance in Models 2 and 3.

Table 4. Results of the ordered probit regression analysis.

	Dependent Variable: Investment Loss Tolerance		
Variables	**Model 1**	**Model 2**	**Model 3**
Overconfidence	0.0217 *	−0.0351 ***	−0.0300 **
	(0.0122)	(0.0124)	(0.0124)
Gender	0.3733 ***	0.3748 ***	0.3717 ***
	(0.0059)	(0.0060)	(0.0060)
Age	0.0445 ***	0.0274 ***	0.0276 ***
	(0.0015)	(0.0016)	(0.0016)

Table 4. *Cont.*

	Dependent Variable: Investment Loss Tolerance		
Variables	**Model 1**	**Model 2**	**Model 3**
Age squared	−0.0005 ***	−0.0004 ***	−0.0004 ***
	(0.0000)	(0.0000)	(0.0000)
Marital status	−0.0413 ***	−0.1034 ***	−0.1046 ***
	(0.0068)	(0.0073)	(0.0073)
Number of children	−0.0326 ***	−0.0162 ***	−0.0180 ***
	(0.0029)	(0.0030)	(0.0030)
Education year	0.0239 ***	−0.0085 ***	−0.0084 ***
	(0.0013)	(0.0014)	(0.0014)
Having a job	−0.0768 ***	−0.0229 **	−0.0220 **
	(0.0098)	(0.0102)	(0.0102)
Log of household income		0.0184 ***	0.0164 ***
		(0.0057)	(0.0057)
Log of household assets		0.2513 ***	0.2501 ***
		(0.0030)	(0.0030)
Risk aversion			−0.1276 ***
			(0.0119)
Myopic view of the future			−0.0423 ***
			(0.0029)
/cut1	−0.3524 ***	2.9364 ***	2.7232 ***
	(0.0407)	(0.0812)	(0.0823)
/cut2	0.7709 ***	4.0941 ***	3.8822 ***
	(0.0406)	(0.0813)	(0.0823)
/cut3	1.4125 ***	4.7580 ***	4.5468 ***
	(0.0406)	(0.0814)	(0.0825)
/cut4	1.8346 ***	5.1937 ***	4.9831 ***
	(0.0407)	(0.0815)	(0.0825)
Observations	161,765	161,765	161,765
Pseudo R-squared	0.0129	0.0314	0.0321
Log likelihood	−237,609	−233,147	−232,981

Note: Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5. Results of the ordered logit regression analysis.

	Dependent Variable: Investment Loss Tolerance		
Variables	**Model 1**	**Model 2**	**Model 3**
Overconfidence	0.0510 **	−0.0433 **	−0.0358 *
	(0.0204)	(0.0208)	(0.0208)
Gender	0.6207 ***	0.6258 ***	0.6200 ***
	(0.0101)	(0.0101)	(0.0102)
Age	0.0752 ***	0.0459 ***	0.0463 ***
	(0.0026)	(0.0026)	(0.0026)
Age squared	−0.0009 ***	−0.0007 ***	−0.0007 ***
	(0.0000)	(0.0000)	(0.0000)
Marital status	−0.0764 ***	−0.1746 ***	−0.1765 ***
	(0.0114)	(0.0122)	(0.0123)
Number of children	−0.0568 ***	−0.0283 ***	−0.0313 ***
	(0.0049)	(0.0050)	(0.0050)
Education year	0.0377 ***	−0.0171 ***	−0.0170 ***
	(0.0022)	(0.0023)	(0.0023)
Having a job	−0.1412 ***	−0.0422 **	−0.0402 **
	(0.0164)	(0.0172)	(0.0173)

Table 5. *Cont.*

	Dependent Variable: Investment Loss Tolerance		
Variables	**Model 1**	**Model 2**	**Model 3**
Log of household income		0.0192 **	0.0159 *
		(0.0097)	(0.0097)
Log of household assets		0.4283 ***	0.4263 ***
		(0.0050)	(0.0050)
Risk aversion			−0.2062 ***
			(0.0202)
Myopic view of the future			−0.0718 ***
			(0.0049)
/cut1	−0.8292 ***	4.6027 ***	4.2472 ***
	(0.0691)	(0.1384)	(0.1401)
/cut2	1.2681 ***	6.7474 ***	6.3935 ***
	(0.0684)	(0.1379)	(0.1396)
/cut3	2.3099 ***	7.8335 ***	7.4811 ***
	(0.0685)	(0.1382)	(0.1399)
/cut4	2.9952 ***	8.5471 ***	8.1958 ***
	(0.0686)	(0.1384)	(0.1401)
Observations	161,765	161,765	161,765
Pseudo R-squared	0.0126	0.0313	0.0320
Log likelihood	−237,661	−233,158	−232,996

Note: Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4. Discussion

4.1. Discussion of Our Results

Tolerating the risk of investment losses is essential for individual investors to generate long-term profits. However, overconfidence bias, characterized by irrational overestimation of one's financial knowledge, can diminish loss tolerance beyond the baseline level formed by sociodemographic, economic, psychological, and cultural factors (Bawalle et al. 2025; Kafayat 2014; Deaves et al. 2009; Barber and Odean 2001; Pompian 2012; Chaudhary 2025; Daniel et al. 1998; Bayar et al. 2020; Muktadir-Al-Mukit 2022; Restana and Komalasari 2023; Nakagawa and Shimizu 2000; Rieger et al. 2015). This study empirically tests this hypothesis by directly investigating the relationship between overconfidence and investment loss tolerance using regression analysis. The results support our hypothesis, revealing that overconfidence significantly reduces investment loss tolerance after controlling for sociodemographic, economic, and psychological factors. This finding suggests that overconfidence in financial literacy leads to riskier portfolios than competence and a tendency to sell investments to avoid even small losses during market declines, aligning with behavioral finance theories such as self-attribution bias, overreaction hypothesis, prospect theory, and dual-process model. This suggestion is supported by Bawalle et al. (2025), who demonstrated that overconfident investors are more likely to sell their investments impulsively during a financial crisis.

While overconfidence was positively associated with investment loss tolerance when controlling only for sociodemographic factors (Model 1), it was negatively associated when economic factors were included (Models 2 and 3). These results highlight the importance of controlling for economic factors such as annual income and financial assets as determinants of investment loss tolerance. Given that the pseudo-R-squared values and likelihoods, which indicate the goodness of fit of the estimation models, increase from Model 1 to Model 3, we focus on the result of Model 3, regarding it as closer to the expected outcome.

Regarding the control variables, our findings indicate that men are more likely to tolerate investment losses than women, which is consistent with Bayar et al. (2020). Tolerance for investment loss tends to increase with age; however, the relationship is convex rather than linear. This pattern is consistent with the life-cycle theory of portfolio choice and saving behavior: prior to retirement, individuals are more willing to accept losses and maintain investments to pursue long-term gains for retirement savings. In contrast, older individuals are less able to recover from losses and may need to liquidate their investments to cover living expenses, as they face greater difficulty in securing a stable income (Bodie et al. 1992; Cocco et al. 2005). Beyond life-cycle considerations, generational differences in values and attitudes toward risk may also contribute to this pattern observed in the relationship between investment loss tolerance and age. For example, older generations, shaped by more traditional and risk-averse financial norms, may be more sensitive to investment losses. On the contrary, younger generations, more exposed to global financial cultures, may be relatively more open to taking the risk of losses (Ogihara 2018; Horioka 1990).

Investors who are married or have more children tend to exhibit a lower tolerance for investment losses, suggesting that having more household members prevents people from accepting the risk of such losses. This finding is consistent with Irandoust (2017) and Bayar et al. (2020). Investors with more years of education cannot withstand much investment loss, which is in contrast with much of the literature. Previous studies have shown that more years of education are associated with greater financial literacy and a deeper understanding of risk, leading to higher financial risk tolerance (Bayar et al. 2020; Koekemoer 2019; Grable 2000).

This discrepancy may be attributable to cultural differences, as our data were derived from Japanese investors. Japanese people have culturally conservative financial attitudes (Horioka 1990), and formal education may promote prudence, planning, and long-term thinking (Fiel'ardh 2024). Consequently, higher education may reinforce a preference for financial stability, which contributes to reduced psychological tolerance for investment losses in Japan. Future studies should conduct cross-national comparisons to further investigate this possibility.

Moreover, people with jobs tend to be less tolerant of investment losses than those who are unemployed. One possible explanation is that regular income from employment may reduce the incentive to take financial risks in pursuit of high returns. Higher income and financial assets enable people to afford more investment losses, probably because losses have less impact on such households.

Finally, as expected, investors with higher risk aversion exhibit a lower tolerance for investment losses, aligning with the basic economic assumption that risk-averse individuals are more sensitive to future uncertainty and losses (Kahneman and Tversky 1979). A myopic view of the future encourages investors to tolerate fewer investment losses, consistent with the findings of Restana and Komalasari (2023).

4.2. Research Limitations

Although this is the first study to elucidate that overconfidence is negatively associated with investment loss tolerance, it has several limitations. First, our measurement of investment loss tolerance is a subjective index based on a generalized scenario that may deviate from the actual behavior. However, this subjective measure is simple and useful compared to an index based on actual behavioral data, which requires strict control of detailed information such as how many investments were sold, how much the market declined at the time, what stock was sold, and the individual's circumstances at the time. Importantly, the validity of our findings is supported by their consistency with previous studies that rely on observed investor behavior. For instance, Bawalle et al. (2025) found

that overconfidence was positively associated with panic selling during the COVID-19 market shock. This alignment suggests that our subjective index reasonably reflects underlying behavioral tendencies, even when assessed outside of real-world market conditions.

Second, the generalizability of the findings is somewhat limited, as the sample consists solely of customers from a single online securities firm, albeit the largest in Japan in terms of the number of accounts. Third, the use of cross-sectional data limits the ability to establish causal relationships and examine long-term effects. Future research should employ a wide range of cross-sectional and longitudinal data across broader investor populations or alternative platforms to test the robustness of our results.

Despite these limitations, this study contributes significantly to the existing literature by providing novel insights into how overconfidence can impair investment behavior, specifically by reducing individuals' tolerance for investment losses.

5. Conclusions

Using a large-scale dataset of Japanese individual investors, this study examines the relationship between overconfidence and investment loss tolerance as measured by a standardized hypothetical scenario. The analysis reveals that overconfidence is statistically significantly and negatively associated with investment loss tolerance, even after controlling for sociodemographic, economic, and psychological factors.

These findings offer several practical implications for financial institutions, government agencies, and educational organizations aiming to support more rational investor behavior. First, efforts should be made to prevent investors from developing overconfidence by encouraging investors to objectively compare their behavior with average investor benchmarks and recognize the limitations of their financial competence. Second, financial institutions can identify tendencies toward overconfidence in users by leveraging artificial intelligence (AI) to analyze their behavioral patterns, thereby providing personalized support. Third, for investors who already exhibit overconfidence, reviewing their past investment decisions may help them identify self-evaluation biases and bridge the gap between perceived and actual financial literacy. Fourth, institutions can structure an investment environment that promotes long-term holding by overconfident investors, such as offering investment plans with restricted trading opportunities or limiting the frequency and volume of investment-related information, to reduce the likelihood of excessive trading driven by overconfidence.

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Abbreviations

The following abbreviations are used in this manuscript:

JPY	Japanese Yen
VIF	Variance Inflation Factor
S&P	Standard & Poor's (e.g., S&P 500 Index)
JSPS	Japan Society for the Promotion of Science
KAKENHI	Grants-in-Aid for Scientific Research
COVID-19	Coronavirus Disease 2019
IRB	Institutional Review Board
ANOVA	Analysis of Variance

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