Investment Patterns and Performance of Japanese Individual Investors

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Declaration of Competing Interest

The authors declare that they have no competing interests.

Abstract

This study examines investment patterns and performance of individual investors in Japan, using microdata from the Japan Securities Dealers Association's Survey on Securities Investment by Individual Investors. We show that women exhibit a higher likelihood of realizing positive trading profits than men. Younger investors are also more likely than their older counterparts to generate trading profits. In addition to demographic characteristics, we incorporate measures of time discounting and risk aversion. While these behavioral measures are significantly associated with investment behavior, their relation to realized trading profits appears limited. These findings enhance our understanding of investment behavior and performance among retail investors in Japan.

Keywords

Individual Investors, Trading Behavior, Investment Performance, Time Discounting, Risk Aversion, Stock Market.

1. Introduction

Over the past several years, Japan has accelerated policy initiatives aimed at supporting household asset formation under national slogans such as the “Doubling Asset-based Incomes Plan” and promoting a shift toward what the government calls “a fundamental shift from savings to investment”. Since 2022, the Kishida administration has positioned the policy of promoting Japan as a “Leading Asset Management Center” as a central pillar of its economic strategy, emphasizing the need to channel household financial assets into productive investments. In line with this policy direction, the government has permanently expanded and strengthened the NISA program and has promoted investment education through both public institutions and private organizations, thereby improving the institutional environment for individual investors.

Despite these efforts, Japanese households hold approximately 2,000 trillion yen in financial assets, more than half of which remain in cash and deposits. Compared with other advanced economies, the shift toward risk assets has progressed only gradually. To overcome this long-standing structural characteristic, it is essential not only to enhance institutional frameworks but also to develop a more detailed understanding of the behavior and performance of individual investors.

Prior studies have also documented that demographic characteristics such as gender and marital status can be associated with differences in investment behavior and performance (Barber and Odean(2001), Ruenzi and Zimmerer(2024)). In particular, Barber and Odean (2001) analyze investor performance in detail using actual transaction data from individual investors.

In the United States and other countries, several research primarily based on actual transaction records has documented how individual investors’ characteristics are related to investment

performance. In Japan, however, access to transaction level data for research purposes is severely restricted due to data protection and privacy concerns, making comparable analyses difficult. To address this limitation, this study uses investor level microdata from the Japan Securities Dealers Association's Survey on Securities Investment by Individual Investors (2019–2023) and conducts as detailed an empirical investigation as the data permit. Focusing on respondents who hold risk assets, we examine how demographic factors (gender, age, and marital status) and behavioral measures (time discounting and risk aversion) are associated with realized investment profits, distinguishing between investors who report gains and those who report losses. In Japan, even studies using investor level microdata rarely provide a detailed analysis of individual investors' investment performance. Accordingly, this study aims to contribute, albeit modestly, to the literature on personal finance by offering new evidence on investment outcomes among Japanese retail investors.

Understanding the investment behavior of individual investors is becoming increasingly important in light of recent policy initiatives led by the Financial Services Agency and the Japan Securities Dealers Association. We expect that the findings of this study will contribute to ongoing discussions on policies designed to encourage household asset formation.

The structure of this paper is as follows. Section 2 provides an overview of the relevant literature and outlines the hypotheses to be examined. Section 3 details the data, variables, and empirical methods employed in the analysis. Section 4 reports the estimation results. Section 5 offers concluding remarks, including policy and practical implications, and discusses potential avenues for future research.

2. Literature Review

2.1 Investor Characteristics and Their Relation to Investment Behavior and Performance

Prior studies suggest that gender differences in overconfidence contribute to differences in trading behavior in risky assets. Regarding gender differences in overconfidence, Lundeberg and Fox (1994) find that although both men and women exhibit overconfidence, men tend to be more overconfident than women. Similarly, Prince (1993) suggests that men are more likely than women to perceive themselves as competent in financial matters. Bajtelsmit and Bernasek (1996) argue that women exhibit greater risk aversion than men, which leads them to allocate a smaller share of their portfolios to stocks. Van Rooij et al. (2011) show that women are less likely than men to participate in the stock market. Furthermore, recent research has examined differences in trading volume. Using experimental data from a simulated market, Cueva et al. (2019) show that men are more confident in their trading decisions and trade more frequently than women. Studies using actual transaction data also provide evidence on gender differences in trading behavior. Barber and Odean (2001) analyze more than 35,000 accounts from a major U.S. discount brokerage between February 1991 and January 1997 to examine the stock trading behavior of men and women. They empirically show that men trade more frequently than women due to greater overconfidence, and that the resulting increase in trading costs reduces their investment returns.[1] Furthermore, Barber et al. (2009) provide evidence that individual investors systematically incur large trading losses. Using complete transaction-level data from the Taiwan Stock Exchange, they

[1] In Japan, to the best of our knowledge, no studies have analyzed actual transaction data from securities firms as has been done in overseas research. However, several studies using publicly available aggregated data have been conducted, including Kamesaka et al. (2003), Hood et al. (2013) and Kurumizawa et al. (2021).

show that individual investors suffer an annual performance penalty of approximately 3.8 percentage points, while institutional investors earn positive abnormal returns.

Prior research has documented that risk tolerance declines with age, leading older individuals to adopt more conservative asset allocations (Campbell, 2006). Marital status has likewise been identified as a significant determinant of life-cycle behavior and financial decision-making. For example, Barber and Odean (2001) show that trading frequency varies systematically across marital status categories. Prior evidence indicates that single men exhibit the highest trading frequency, whereas trading activity among women also varies by marital status. Married women trade the least. Furthermore, unmarried men typically characterized as the most overconfident are shown to be more likely to experience substantial investment losses.

2.2 Behavioral Characteristics in Relation to Investment Behavior and Performance

A key behavioral characteristic relevant to individual investors is time discounting. In the classical exponential discounting framework proposed by Samuelson (1937), the discount rate is assumed to be constant over time, such that future utility is discounted exponentially at a fixed rate. Let x denote utility at date τ,ρ the discount rate, and W the present value of utility received τ periods ahead. Then W is given by:

$$W(x,\ \tau\ ) = x\ \cdot \frac{1}{(1+\rho)\ \tau}$$

However, insights from behavioral economics indicate that individuals do not necessarily evaluate future outcomes using a constant discount rate. Rather, empirical evidence frequently shows a declining discount rate over time, whereby individuals disproportionately value

immediate rewards relative to delayed ones a pattern known as present-biased or time-inconsistent preferences. To capture such behavior, hyperbolic discounting has been introduced. Hyperbolic models feature steep discounting over short horizons and relatively milder discounting over longer horizons (Laibson(1997)).

Another behavioral characteristic of relevance is risk aversion. Prior research examining the relationship between risk aversion and stock market participation includes Lee et al. (2015), who analyze household survey data from the Dutch Central Bank. They show that individuals with higher levels of risk aversion tend to forecast lower stock returns and, further, that higher return expectations are associated with a greater likelihood of stock market participation.

A related strand of research focuses on investors' myopic loss aversion. Using transaction level data from U.S. brokerage accounts, Odean (1998) documents that investors tend to sell winning positions too quickly while retaining losing positions a behavioral pattern consistent with myopic loss aversion. Such behavior is theoretically grounded in prospect theory (Kahneman and Tversky, 1979), which posits that losses loom larger than gains of equal magnitude, thereby generating asymmetric valuation of outcomes. Subsequent work has advanced this concept by demonstrating that more frequent evaluation of investment outcomes increases the likelihood of experiencing losses and thereby strengthens loss-averse behavior. Haigh and List (2005), using experimental data from students and professional traders, show that professional traders exhibit an even stronger tendency toward myopic loss aversion. Although myopic loss aversion is theoretically and empirically well established, the dataset employed in this study does not allow for direct measurement of this behavioral bias. Accordingly, the empirical analysis is restricted to observable behavioral characteristics: time discounting and risk aversion.

This study draws on prior work such as Odean (1998), Barber and Odean (2000), and Barber and Odean (2001), which use actual brokerage records to examine gender differences in trading behavior and performance. Based on this literature, we formulate two hypotheses regarding Japanese individual investors:

Hypothesis 1: Men are more likely than women to engage in trading activity.

Hypothesis 2: Women are more likely than men to realize positive investment profits.

To our knowledge, no prior study has conducted a detailed analysis of the investment performance of Japanese individual investors using micro-level survey data. The present study provides the first such evidence by applying insights from the international literature to Japanese households, thereby contributing new academic knowledge on the behavioral and demographic determinants of investment outcomes.

3. Analysis Data, Variables, and Estimated Models

This section describes the data used in the analysis, the construction of the variables, and the empirical models employed in this study.

3.1 Analysis Data

Table 1 shows the sample sizes for each survey year used in this study. We begin by identifying respondents who reported holding stocks in the JSDA survey. Individuals who chose ambiguous response options such as “cannot say either way” to the items measuring time discounting and loss aversion were excluded. The resulting sample for the analysis of trading behavior comprises 10,871 respondents. For the analysis of investment performance, we applied the same screening

procedure and additionally removed respondents who did not conduct any trading transactions. The final sample contains 8,009 individuals.

Following Ikebata et al. (2025), this study uses microdata from the Japan Securities Dealers Association's Survey on Securities Investment by Individual Investors, conducted annually from 2019 to 2023.[2] The data used in this study come from an online survey conducted annually by the Japan Securities Dealers Association, targeting individual investors aged 20 and older in Japan. Using the same dataset, Ikebata et al. (2025) investigates the association between stock holding periods and investors' behavioral characteristics and financial literacy. In contrast, this paper centers on investors' trading behavior and their realized investment outcomes. Several empirical studies have utilized survey data from the Japan Securities Dealers Association (JSDA). Fukuda and Akahira (2024) analyze the determinants of individual investors' investment decisions using a binary response model and show that demographic characteristics, financial literacy, time preference, and risk attitudes significantly affect participation of NISA accounts. Similarly, Kaneko and Suzuki (2025) use the same JSDA survey data to examine the adoption of robo-advisory services and find that higher financial literacy increases the likelihood of adopting new financial services. These studies indicate that the JSDA survey data provide a useful basis for analyzing the behavior of individual investors in Japan.While this line of research highlights the usefulness of survey-based data for analyzing investment behavior and financial decision-making, existing studies primarily focus on participation decisions and service adoption. In contrast, relatively little attention has been paid to how individual investors' characteristics

[2] The *Survey on Securities Investment by Individual Investors* is an annual nationwide questionnaire conducted by the Japan Securities Dealers Association (JSDA) since 2006. The survey targets individual investors across Japan and collects information on securities holdings, investment objectives, opinions on taxation systems, and other aspects of investment attitudes. The survey periods for each wave are as follows: 2023: July 12–15; 2022: July 13–15; 2021: July 5–9; 2020: June 30–July 5; and 2019: July 5–11. In this study, we use data from the 2019–2023 to ensure consistency in the questionnaire items and measurement of the variables employed in our analysis.

and behavioral traits are associated with realized investment performance. This study addresses this gap by examining the relationship between investor attributes, behavioral factors, and realized trading outcomes using the JSDA survey data.

Table 1 Sample Size by Survey Year

	Analysis of Investment Behavior		Analysis of Investment Performance	
	Sample Size	Share (%)	Sample Size	Share (%)
2019 Survey	2,237	20.6	1,680	21.0
2020 Survey	2,250	20.7	1,668	20.8
2021 Survey	2,199	20.2	1,609	20.1
2022 Survey	2,138	19.7	1,556	19.4
2023 Survey	2,047	18.8	1,496	18.7
Total	10,871	100.0	8,009	100.0

3.2 Variables Used in the Analysis

We describe the dependent variable, independent variables, and control variables used in the analysis. Table 3 shows the summary statistics for these variables.

3.2.1 Dependent Variables

This study examines both the investment behavior and investment performance of individual investors. For the analysis of trading behavior, we examine whether individual investors who hold stocks engage in buying or selling transactions. For the analysis of investment performance, we use three different dependent variables: (i) a dummy variable indicating whether an investor realizes a positive trading profit (taking the value of 1 for positive gains and 0 otherwise); (ii) the

amount of trading profit or loss; and (iii) a proxy for investment returns. Table 2 shows the definitions of these dependent variables.

For the dependent variables used in the analysis of trading behavior and investment performance, we rely on respondents' answers to the survey question: "Please indicate your realized trading profit or loss in securities over the past year (excluding unrealized gains and losses). Select one option." The response options consist of eleven ordered categories indicating profit or loss ranges from "a trading gain of 5 million yen or more" to "a trading loss of 5 million yen or more" as well as an additional option stating that the respondent did not trade any securities during the year.

Respondents could select from the following categories:

1. Gain of 5 million yen or more
2. Gain of 3–5 million yen
3. Gain of 1–3 million yen
4. Gain of 0.5–1 million yen
5. Gain of less than 0.5 million yen
6. Approximately zero (±10,000 yen)
7. Loss of less than 0.5 million yen
8. Loss of 0.5–1 million yen
9. Loss of 1–3 million yen
10. Loss of 3–5 million yen
11. Loss of more than 5 million yen

12. Did not trade any securities during the past year

For the analysis of trading behavior, we construct a dummy variable indicating whether an investor engaged in any trading activity. Respondents who selected any of the categories from 1 to 11 are coded as 1, and those who selected category 12 (no trading during the past year) are coded as 0.

For the dependent variables related to investment performance, category 12 is excluded from the sample because it indicates that the respondent did not conduct any transactions.

For the trading‐profit dummy, we assign a value of 1 to respondents who selected categories 1 through 5 (indicating positive realized gains), and 0 otherwise.

For the trading‐profit amount, we convert each respondent's categorical response into a continuous value by replacing each category with the midpoint of its corresponding profit‐loss interval.[3]

For the proxy of investment returns, we divide the imputed trading-profit amount obtained by replacing each profit–loss category with the midpoint of its interval by dividing the midpoint imputed trading profit by the midpoint imputed amount of securities holdings. The variable for securities holdings is based on the survey question asking respondents to answer the current

[3] For the open-ended categories, we adopt a simple imputation rule by assigning 7.5 million yen to the "5 million yen or more" profit category and 7.5 million yen to the corresponding loss category. Although methods based on parametric distributional assumptions such as lognormal or gamma distributions can be used to estimate class means, they require additional assumptions and validation. Therefore, to maintain transparency and simplicity, we use midpoints for all closed intervals and assign reasonable analyst-determined values for the open-ended ranges.

market value of their securities (stocks, mutual funds, and bonds). The answer options consist of nine categories ranging from “less than 100,000 yen” to “5 million yen or more.” As with the trading-profit categories, each holdings category is converted to a continuous value using the midpoint of its range. It should be noted, however, that the reported securities holdings reflect the amount held at the time of the survey (e.g., in 2023) rather than the amount held at the beginning of the previous year.

Table 2　Definitions of Dependent Variables

Category	Dependent Variable	Definition
Investment Behavior	Trading Activity Dummy	A dummy variable that equals 1 if the respondent engaged in securities trading during the year, and 0 otherwise.
Investment Performance	Profit Dummy	A dummy variable that equals 1 if the respondent reported realizing trading profits, and 0 otherwise.
	Profit Amount	A continuous variable obtained by replacing each categorical range of realized gains or losses with its midpoint value.
	Return Proxy	A ratio variable calculated by dividing the Profit Amount by the midpoint value of the respondent’s reported securities holdings.

3.2.2 Independent Variables

Based on the findings of prior studies reviewed in Section 2, we include as independent variables the demographic and behavioral characteristics that have been shown to be related to individual investors' trading behavior and investment performance. The demographic variables consist of gender, age, and marital status. The behavioral characteristics include time discounting and risk aversion.

For the demographic variables, we construct a gender dummy that takes the value of 1 for female respondents and 0 for male respondents. Age is used as a continuous variable based directly on the self answered value. For marital status, we define a dummy variable that equals 1 if the respondent is married and 0 otherwise.

For the behavioral characteristics, we define variables for time discounting and risk aversion. For time discounting, respondents were asked: "Assuming the payment is guaranteed, if you had to choose between (1) receiving 100,000 yen today and (2) receiving 110,000 yen one year from now, which would you prefer?" We define a dummy variable equal to 1 if the respondent selected option (1) ("I think so") and 0 if the respondent selected option (2) ("I do not think so"). Respondents who selected "neither" are excluded from the analysis. For risk aversion, respondents were asked: "If you invest 100,000 yen, there is a 50% chance of gaining 20,000 yen and a 50% chance of losing 10,000 yen. In this situation, you would choose not to invest." A dummy variable is defined as 1 for respondents who agreed ("I think so") and 0 for those who disagreed ("I do not think so"), again excluding respondents who answered "neither."

3.2.3 Control Variables

As control variables, we use annual income, the amount of securities holdings, and dividend income. We also include year dummy variables using 2019 as the base year to control for year differences in market conditions. Income and asset size have been shown in previous studies to be positively associated with the ownership of risky assets. Because, in this study, we use annual income and the amount of securities holdings as control variables. Regarding the ownership of risky financial assets, previous studies have reported associations with factors such as occupation (Gil-Hernández et al. (2024)), family structure, and health status (Love(2010)). Although the dataset used in this study does not include information on respondents' health status. And we also estimated models including variables for occupation and family structure, however, these variables did not yield statistically significant results.

Annual income is measured based on responses to the question: "What was your personal annual income (gross) during the past year? Please include bonuses and any additional income." Respondents chose from eight categories ranging from "less than 3 million yen" to "20 million yen or more." Each income category is converted to a continuous value by replacing it with the midpoint of the interval, and the resulting value is divided by 100 so that the unit is expressed in million yen.

For the amount of securities holdings, as shown in Section 3.2.1, we use the values obtained by replacing each response category with the midpoint of its interval, and we further divide the value by 100 to set the unit to one million yen.

Dividend income is based on responses to the question: "How much dividend income from stocks did you receive during the past year (or approximately during the past year)?" Respondents selected one of eight categories, from "less than 10,000 yen" to "1 million yen or more,"

including an option indicating that no dividends were received. As with trading profits, each category is converted to its midpoint. Dividend income is included separately from trading profits in order to distinguish between realized trading outcomes and dividend income when evaluating investment performance.

Table 3 Summary Statistics of Variables

Variable	Analysis of Investment Behavior				Analysis of Investment Performance			
	Mean	Median	Max	Min	Mean	Median	Max	Min
Female Dummy	0.35	0.00	1.00	0.00	0.32	0.00	1.00	0.00
Age (years)	57.07	59.00	93.00	20.00	56.23	58.00	93.00	20.00
Married Dummy	0.73	1.00	1.00	0.00	0.72	1.00	1.00	0.00
Time Discounting Dummy	0.42	0.00	1.00	0.00	0.44	0.00	1.00	0.00
Risk Aversion Dummy	0.43	0.00	1.00	0.00	0.38	0.00	1.00	0.00
Annual Income (million yen)	4.72	4.00	25.00	1.50	4.88	4.00	25.00	1.50
Securities Holdings (million yen)	11.32	4.00	75.00	0.05	12.12	4.00	75.00	0.05
Dividend Income (10,000 yen)	17.06	3.00	150.00	0.00	19.03	7.50	150.00	0.00
Sample Size	10,871				8,009			

Note: In this study, in addition to the variables described above, we use year dummy variables, and Table 1 shows the sample size for each survey year.

3.3 Estimation Model

As noted earlier, this study analyzes the trading behavior and investment performance of individual stock investors *i*. The estimation model for trading activity (whether or not the investor executed any transactions) is presented in equation (1), and the model for investment performance is shown in equation (2).

(1) Model for Trading Behavior

For the dependent variable $TRADE_i$ which indicates whether individual investori executed any securities transactions, we define a dummy variable and estimate the model using a logit specification. In the logit model, the dummy variable takes the value of 1 if the investor conducted any securities trades and 0 otherwise.

The model is specified as:

$$TRADE_i = \beta_0 + \Sigma\beta_1 mATTm_i + \Sigma\beta_2 nBEHn_i + \gamma C_i + \epsilon_i \quad (1)$$

(2) Models for Investment Performance

We estimate investment performance in model (2) using three approaches. First, we estimate a logit model with a dummy equal to 1 if the investor realized a trading profit. Second, we regress the realized trading profit (or loss) on the explanatory variables using OLS. Third, we estimate an OLS model using a return proxy defined as trading profit divided by securities holdings. Note that this proxy excludes unrealized gains and losses. It should be noted that trading profits and losses are measured as the total amount over the preceding year, whereas securities holdings are reported as of the survey date. For instance, in the 2023 wave, securities holdings reflect respondents' reported holdings at the time of the 2023 survey, rather than at the beginning of 2022. The exclusion of unrealized gains and losses and the timing mismatch between trading profitss and

securities holdings arise from inherent constraints of the dataset and constitute measurement limitations.

The model is specified as:

$$PROFIT_i = \beta_0 + \Sigma\beta_1 mATTm_i + \Sigma\beta_2 nBEHn_i + \gamma C_i + \epsilon_i \quad (2)$$

where:

ATT_{mi} shows individual characteristics (gender, age, marital status), BEH_{ni} shows behavioral bias variables (time discounting and risk aversion), and C_i is a vector of control variables (income, securities holdings, dividend income, year).

In this model, $\beta_1 m$ and $\beta_2 n$ represent the effects of demographic and behavioral characteristics, respectively, on whether the investor trades and on the investor's trading profit or loss. γ denotes the vector of coefficients for the control variables, β_0 is the constant term, and ϵ_i is the error term.

4. Analysis Results

The estimation results of this study are presented in Tables 4 through 8.

Table 4 shows the marginal effects from the logit model in which the dependent variable indicates whether the individual investor engaged in any securities transactions.

Tables 5 through 7 present the estimation results for investment performance, using three different dependent variables. Table 5 shows the marginal effects from a logit model in which the dependent variable is a dummy equal to 1 if the investor realized a trading profit and 0 otherwise. Table 6 shows the OLS estimates obtained by using the realized trading-profit amount as the

dependent variable. Table 7 shows the OLS results using a proxy for investment returns, defined as the trading-profit amount divided by the value of securities holdings, as the dependent variable.

Tables 4 through 7 present estimation results for four different model specifications (Models I–IV). These models differ in whether demographic variables, behavioral characteristics, and control variables are included as explanatory variables, allowing us to examine how the results change across specifications and to assess the robustness of the analysis.

Table 8 provides investment performance models based on the results in Tables 5 through 7. This specification excludes variables that were not statistically significant, and we examine how the OLS estimates and the marginal effects from the logit model change.

In this study, we use these estimation models to clarify how individual investors' demographic characteristics and behavioral characteristics relate to their trading behavior and investment performance. We also examine differences in the levels of these outcomes. Based on these results, we consider the practical and policy implications.

4.1 Investment Behavior of Individual Investors

4.1.1 Relationship Between Securities Trading Activity and Demographic Characteristics

Among the demographic characteristics, we first focus on gender differences. In Model I of Table 4, which includes only demographic variables, the marginal effect of the female dummy is negative and statistically significant at the 1% level. A similar pattern is observed in Models III and IV, which additionally include behavioral characteristics and control variables. In terms of

magnitude, the results indicate that women are 6.1% to 9.9% less likely to engage in securities trading compared with men. These findings are consistent with prior research on gender differences in stock market participation. For example, Ruenzi and Zimmerer (2024) analyze financial behavior among German investors and show that men are more likely than women to participate in equity investing. Barber and Odean (2001) also report that men tend to trade more frequently due to greater overconfidence. Our results align with these studies. As stated in Hypothesis 1, Japanese male investors are likewise more likely to engage in trading than female investors.

Next, we focus on age. In Model I of Table 4, the marginal effect of age is negative and statistically significant at the 1% level. A similar pattern is observed in Models III and IV, which additionally include behavioral characteristics and control variables. In these models, the marginal effect remains negative and significant at the 1% level, indicating that each additional year of age is associated with a 0.2%–0.3% lower probability of engaging in securities trading. This result is consistent with prior research suggesting that risk tolerance tends to decline with age, leading older individuals to prefer safer asset allocations (Campbell, 2006). Our findings similarly show that the probability of executing securities trades decreases as investors age.

4.1.2 Relationship Between Securities Trading Activity and Behavioral Characteristics

Regarding time discounting, the marginal effect is positive and statistically significant at the 1% level in Models II, III, and IV of Table 4. Investors with higher time discount rates are 4.9% to 5.7% more likely to engage in securities trading than those with lower discount rates. This result

indicates that individuals with stronger present-biased preferences are more likely to engage in securities trading.

In contrast, for risk aversion, the marginal effect of the risk aversion dummy is negative and statistically significant at the 1% level across Models II, III, and IV. Highly risk-averse investors are 13.7% to 16.4% less likely to engage in securities trading compared with less risk-averse investors. Thus, investors with higher levels of risk aversion are less inclined to trade securities.

Table 4　Marginal Effects from Logit Model of Trading Behavior

Model	I	II	III	IV
Female Dummy	-0.099***		-0.062***	-0.061***
	(-10.769)		(-6.722)	(-6.241)
Age (years)	-0.002***		-0.002***	-0.003***
	(-8.644)		(-8.595)	(-11.048)
Married Dummy	-0.008		-0.003	0.002
	(-0.794)		(-0.300)	(0.236)
Time Discounting Dummy		0.049***	0.054***	0.057***
		(5.810)	(6.293)	(6.747)
Risk Aversion Dummy		-0.164***	-0.146***	-0.137***
		(-19.052)	(-16.677)	(-15.765)
Annual Income (million yen)				-0.003**
				(-2.223)
Securities Holdings (million yen)				0.001***
				(2.656)
Dividend Income (10,000 yen)				0.002***
				(7.143)
Year Fixed Effects				Yes
Sample Size			10,871	
Pseudo R-squared	0.0174	0.0315	0.0421	0.0542

Notes: Values in parentheses are z-statistics. $p < 0.10$, $p < 0.05$, and $p < 0.01$ indicate statistical significance. Robust standard errors are used for estimation.

4.2 Investment Performance of Individual Investors

This section shows the results of three different models for investment performance.

(1) a logit model using the profit dummy

We use a dummy variable as the dependent variable that takes the value of 1 if the investor realized a positive profit from securities trading, and 0 otherwise.

(2) an OLS model using profit amount

We use the amount of realized trading profit or loss from securities transactions as the dependent variable.

(3) an OLS model using the return proxy

We construct a proxy for investment returns by dividing the amount of realized trading profit or loss by the investor's securities holdings and use this proxy as the dependent variable. It should be noted that this return measure does not account for unrealized gains or losses.

These results are summarized in Tables 5–7.

4.2.1 Relationship Between Investment Performance and Demographic Characteristics

Among the demographic characteristics, we first examine gender differences. Table 5 reports the marginal effects from the logit model for the probability of realizing a trading profit. The female dummy is positive and statistically significant in Models I, III, and IV at the 10%, 5%, and 1% levels, respectively. In terms of magnitude, women are 2.3% to 6.8% more likely than men to realize a positive trading profit. In Table 6, where the dependent variable is the amount of realized trading profit or loss, the coefficient on the female dummy is positive and statistically significant at the 1% level in Model IV, which includes behavioral characteristics and control variables. In Table 7, using the return proxy as the dependent variable, the female dummy is positive and statistically significant at the 1% level across Models I, III, and IV. These findings

align with Barber and Odean (2001), who shows that women exhibit better investment performance than men. Our results similarly indicate that female investors outperform male investors in terms of realized trading profits.

Next, we examine the role of age. In Table 5, which reports the marginal effects from the logit model for the probability of realizing a trading profit, the marginal effect of age is negative and statistically significant at the 1% level in Models I, III, and IV. The estimates indicate that each additional year of age is associated with a 0.2% lower probability of realizing a positive trading profit. In Table 6, where the dependent variable is the amount of realized trading profit or loss, the coefficient on age is negative and statistically significant at the 1% level in Model IV, which includes behavioral characteristics and control variables. In Table 7, using the return proxy as the dependent variable, the age coefficient is likewise negative and statistically significant at the 1% level across Models I, III, and IV.

Figure 1 shows the predicted probability of realizing trading profits by gender and age, based on the estimation results in Table 5. Predicted values are calculated by setting all variables other than gender and age at their sample means. The plotted ranges represent 95% confidence intervals. For age, the category of 60 years corresponds to individuals aged 60 and above. The figure shows that women have a higher predicted probability of realizing trading profits than men, and that younger investors are more likely to achieve trading gains compared with older investors.

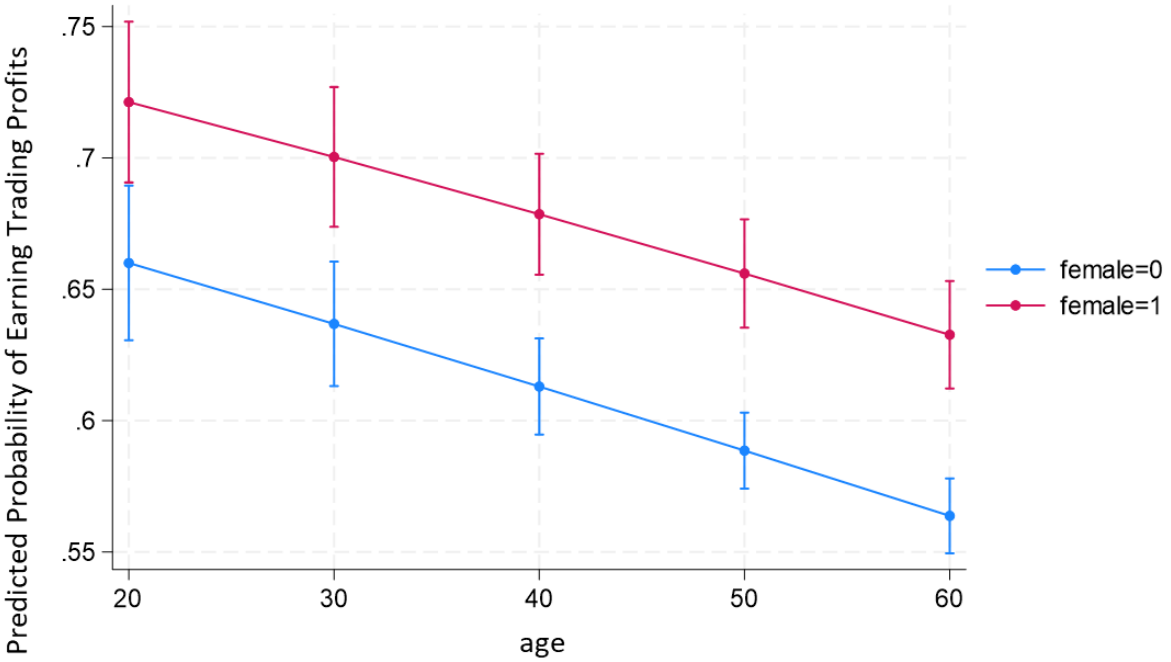


Fig.1 Predicted Probability of Earning Profits by Gender and Age Group

Regarding marital status, Table 6 shows that the coefficient is positive and statistically significant at the 5% level in Models I, III, and IV when the dependent variable is the amount of realized trading profit or loss. As noted earlier, Barber and Odean (2001) report that trading frequency varies by marital status: both unmarried men and unmarried women trade more frequently than their married counterparts and are more prone to overconfidence, which increases the likelihood of incurring trading losses. However, in our results, we do not find statistically significant effects of marital status in Tables 5 or 7.

4.2.2 Relationship Between Investment Performance and Behavioral Biases

We first examine time discounting. In Table 5, which reports the marginal effects from the logit model for the probability of realizing a trading profit, the marginal effect of the time-discounting dummy is negative and statistically significant at the 1% level in Model II, which includes only behavioral characteristics. In Model III, which additionally includes demographic characteristics, the marginal effect remains negative and is significant at the 10% level, whereas in Model IV, which further includes control variables, the coefficient is no longer statistically significant. In terms of magnitude, investors with higher time discount rates are 2.0% to 2.9% less likely to realize trading profits in Models II and III. However, when the dependent variable is the amount of realized trading profit or loss (Table 6), time discounting is not statistically significant in any specification. In Table 7, where the dependent variable is the return proxy, the time-discounting dummy is negative and significant at the 10% level only in Model II, but not in the other specifications.

We next consider risk aversion. In Table 5, the marginal effects of the risk-aversion dummy in Models II and III are negative and significant at the 10%, 5% levels, respectively. The estimates imply that investors with high risk aversion are 2.0% to 2.9% less likely to realize trading profits than less risk-averse investors. In Table 6, where the dependent variable is the amount of realized profit or loss, the coefficients for Models II and III are likewise negative and significant at the 10% level. In Table 7, where the dependent variable is the amount of realized profit or loss, the coefficients for Models II, III and IV are likewise negative and significant at the 5%, 1% levels, respectively.

Tables 5　Marginal Effects from the Logit Model on Trading Profits

Model	I	II	III	IV
Female Dummy	0.023*		0.025**	0.068***
	(1.922)		(2.097)	(5.333)
Age (years)	-0.002***		-0.002***	-0.002***
	(-5.293)		(-4.963)	(-6.066)
Married Dummy	0.000		-0.000	0.000
	(0.010)		(-0.011)	(0.009)
Time Discounting Dummy		-0.029***	-0.020*	-0.009
		(-2.640)	(-1.813)	(-0.827)
Risk Aversion Dummy		-0.020*	-0.023**	-0.011
		(-1.786)	(-1.973)	(-0.940)
Annual Income (million yen)				0.010***
				(5.583)
Securities Holdings (million yen)				0.001***
				(2.996)
Dividend Income (10,000 yen)				0.001***
				(5.622)
Year Fixed Effects				Yes
Sample Size			8,009	
Pseudo R-squared	0.0029	0.001	0.0036	0.0329

Notes: Values in parentheses are z-statistics. $p < 0.10$, $p < 0.05$, and $p < 0.01$ indicate statistical significance. Robust standard errors are used for estimation.

Tables 6　Estimation Results from the Ordinary Least Squares (OLS) Model on Profit Amount

Model	I	II	III	IV
Female Dummy	-3.784		-2.475	21.756***
	(-0.911)		(-0.583)	(4.822)
Age (years)	-0.212		-0.201	-0.613***
	(-1.591)		(-1.497)	(-4.387)
Married Dummy	10.216**		10.297**	9.356**
	(2.222)		(2.237)	(2.072)
Time Discounting Dummy		-2.082	-1.509	4.886
		(-0.494)	(-0.354)	(1.171)
Risk Aversion Dummy		-8.033*	-7.469*	-0.673
		(-1.932)	(-1.763)	(-0.165)
Annual Income (million yen)				5.574***
				(6.524)
Securities Holdings (million yen)				0.744***
				(3.332)
Dividend Income (10,000 yen)				0.892***
				(6.564)
Year Fixed Effects				Yes
Constant Term	44.174***	42.388***	46.589***	-10.200
	(6.117)	(13.976)	(6.361)	(-1.007)
Sample Size		8,009		
Adjusted R-squared	0.0009	0.0005	0.0013	0.0822

Notes: Values in parentheses are t-statistics. $p < 0.10$, $p < 0.05$, and $p < 0.01$ indicate statistical significance. Robust standard errors are used for estimation.

Tables 7　Estimation Results from the Ordinary Least Squares (OLS) Model on the Return Proxy

Model	I	II	III	IV
Female Dummy	0.038***		0.034***	0.035***
	(4.735)		(4.186)	(4.185)
Age (years)	-0.004***		-0.004***	-0.004***
	(-14.751)		(-14.615)	(-14.116)
Married Dummy	0.013		0.013	0.015*
	(1.572)		(1.543)	(1.844)
Time Discounting Dummy		-0.014*	0.003	0.004
		(-1.830)	(0.444)	(0.578)
Risk Aversion Dummy		0.021***	0.019**	0.021***
		(2.790)	(2.512)	(2.713)
Annual Income (million yen)				-0.001
				(-0.804)
Securities Holdings (million yen)				
Dividend Income (10,000 yen)				0.000
				(1.081)
Year Fixed Effects				Yes
Constant Term	0.285***	0.095***	0.279***	0.246***
	(18.443)	(17.919)	(18.098)	(13.228)
Sample Size		8,009		
Adjusted R-squared	0.0307	0.0014	0.0315	0.0425

Notes: Values in parentheses are z-statistics. $p < 0.10$, $p < 0.05$, and $p < 0.01$ indicate statistical significance. Robust standard errors are used for estimation. We calculated the Variance Inflation Factor (VIF) for Model IV in Table 7. All VIF values were below 3, indicating that no variables exhibited problematic multicollinearity in our specifications.

4.3 Effects of Demographic Characteristics on Investment Performance

Table 8 presents the estimation results from a model in which variables that were not statistically significant in Model IV of Tables 5 through 7 are excluded. The refined model is estimated using both the logit specification and ordinary least squares.

For the female dummy, statistically significant results are obtained across all three specifications, the profit dummy, the amount of realized trading profit or loss, and the return proxy. In the logit model using the profit dummy as the dependent variable, the marginal effect of the female dummy is positive and statistically significant at the 1% level, indicating that women are 6.9% more likely than men to realize a positive trading profit. In the model using the amount of realized trading profit or loss as the dependent variable, the coefficient on the female dummy is 21.216, implying that women earn, on average, 212,160 yen more in realized trading profits than men. In the model using the return proxy as the dependent variable, the coefficient on the female dummy is also positive and statistically significant at the 1% level, with an estimated effect of 0.035, indicating that women achieve returns that are 3.5% higher than those of men. These findings are consistent with prior research on gender differences in investment performance, such as Barber and Odean (2001), and suggest that among Japanese individual investors as well, women who tend to trade more cautiously and with lower risk achieve relatively superior investment outcomes.

As with gender, age is statistically significant across all three specifications the profit dummy, the amount of realized trading profit or loss, and the return proxy. In the logit model using the profit dummy as the dependent variable, the marginal effect of age is negative and statistically significant at the 1% level, indicating that each additional year of age reduces the probability of

realizing a trading profit by approximately 0.3%. In the model using the amount of realized trading profit or loss as the dependent variable, the coefficient on age is –0.588, implying that for every ten-year increase in age, realized trading profits decrease by roughly 58,800 yen. In the model using the return proxy as the dependent variable, the coefficient on age is –0.004 and significant at the 1% level, suggesting that for every ten-year increase in age, investment returns decline by approximately 4%. These findings are consistent with prior research showing that risk tolerance tends to decline with age, leading older individuals to prefer safer asset allocations (Campbell, 2006). Our results similarly suggest that younger investors, who tend to exhibit higher risk tolerance, make more aggressive investment decisions and consequently achieve relatively higher investment performance.

For the marital status variable, the married dummy is not statistically significant in the logit model where the dependent variable is the profit dummy. However, in both the model using the amount of realized trading profit or loss and the model using the return proxy as the dependent variable, the coefficients are positive and statistically significant at the 10%, 5% levels, respectively. In the specification using profit amount, the coefficient on the married dummy is 9.171, indicating that married investors earn, on average, 91,710 yen more in realized trading profits than unmarried investors. In the specification using the return proxy, the coefficient is 0.015, suggesting that married investors achieve returns that are approximately 1.5% higher than those of unmarried investors. These findings suggest that, among Japanese individual investors as well, married individuals may exhibit more stable financial behavior, possibly avoiding excessive risk-taking in order to maintain household financial stability, which in turn may contribute to improved investment efficiency.

Table 8. Investment Performance Estimated with Significant Variables Only

Model	Trading Profit Dummy	Profit Amount	Return Proxy
	Marginal Effects from the Logit Model	Ordinary Least Squares (OLS) Model	Ordinary Least Squares (OLS) Model
Female Dummy	0.069***	21.216***	0.035***
	(5.454)	(4.754)	(4.140)
Age (years)	-0.003***	-0.588***	-0.004***
	(-6.243)	(-4.269)	(-14.272)
Married Dummy	0.000	9.171**	0.015*
	(0.037)	(2.032)	(1.829)
Risk Aversion Dummy	-0.011	-0.481	0.021***
	(-0.971)	(-0.118)	(2.734)
Annual Income (million yen)	0.010***	5.567***	-0.001
	(5.592)	(6.517)	(-0.821)
Securities Holdings (million yen)	0.001***	0.734***	
	(3.050)	(3.308)	
Dividend Income (10,000 yen)	0.001***	0.893***	0.000
	(5.617)	(6.568)	(1.057)
Year Fixed Effects	Yes	Yes	Yes
Constant Term		5.718	0.290***
		(0.618)	(16.653)
Sample Size		8,009	
Adjusted R-squared	0.0328	0.0821	0.0424

Notes: Values in parentheses are t-statistics. $p < 0.10$, $p < 0.05$, and $p < 0.01$ indicate statistical significance. For the coefficient of determination, adjusted R-squared is reported for the OLS estimations, and pseudo R-squared is reported for the logit models. Robust standard errors are used for all estimations.

5. Conclusion

The empirical findings of this study may be summarized as follows. Drawing on prior work such as Barber and Odean (2001), we analyze the investment behavior and investment performance of

individual investors in Japan. The results indicate that women exhibit a significantly higher likelihood of realizing positive investment profits than men. In addition, younger investors are found to be more likely than older investors to obtain gains from securities investments.

Recent policy initiatives in Japan including the introduction and expansion of the new NISA program aim to broaden participation in financial markets, particularly among women and younger cohorts. Nevertheless, the proportion of investors remains substantially higher among men than women, and participation levels among older individuals exceed those observed among younger individuals. The empirical patterns documented in this study, together with prior findings such as those of Barber and Odean (2001), may contribute to a more informed understanding of these demographic disparities in investment behavior.

However, because the data used in this study are survey based and do not allow us to directly observe investors' actual portfolio compositions or realized investment performance, the conclusions drawn from the analysis should be interpreted with caution and are necessarily limited in scope.

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