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Yamori, Nobuyoshi

Ueyama, Hitoe

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Financial Literacy and Low Stock Market Participation of Japanese Households[#]

Nobuyoshi Yamori,[*] Kobe University

Rokkodai 2-1, Nada-Ku, Kobe Hyogo Japan

yamori@rieb.kobe-u.ac.jp

and

Hitoe Ueyama, Nagoya Gakuin University

Abstract

We investigated whether low financial literacy of Japanese households causes their low stock market participation. Based on our survey, we found that high financial literacy tends to increase stock market participation. We also found that households with higher financial literacy do not necessarily have a high shareholding ratio among financial assets.

Key Words

Financial literacy, Stock market participation, Stockholding, Japan, Households

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[*] Corresponding author.

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1. Introduction

It is well known that Japanese households hold a smaller part of their financial assets in stocks than US and European households do. For example, according to the Bank of Japan (2020), "Equity" accounts for only 9.6% of total Japanese household financial assets. The figures for the United States and the Euro Area are 32.5% and 17.2%, respectively. Similarly, "Investment Trusts" account for 3.4% of Japanese household financial assets, while figures for the United States and the Euro Area are 12.3% and 8.7%, respectively.

On the other hand, the Japan Securities Dealers Association (2019) reports that the average individual Japanese investor holds 8.97 million yen in stocks, while having 16.28 million yen in financial assets. Therefore, focusing on Japanese investors, the stocks' ratio to total financial assets is above 55%. This means that once Japanese households invest in stocks, they hold stocks at a high percentage. Therefore, low stock market participation rates may cause the low ratio of stocks in household financial assets in the Japanese household sector.

Previous studies have investigated the causes of low stock market participation rates. Van Rooij et al. (2011) used a survey of Dutch households to find that those with low financial literacy are much less likely to invest in stocks. Using data from nine European

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countries, Thomas and Spataro (2018) and Arrondel et al. (2015) also found that financial literacy positively and significantly affects stock market participation. Chu et al. (2017), Liao et al. (2017), and Zhu and Xiao (2021) found the same results regarding China.

Motivated by these studies, we investigated whether low financial literacy causes low stock market participation in Japan. Using our survey results, we confirmed that poor financial literacy causes low stock market participation in Japan, even after considering endogeneity. In other words, financial education is effective in increasing the number of stock investors. Additionally, once considering financial literacy level and endogeneity, we didn't find gender differences in stock market participation. We also found that households with higher financial literacy do not necessarily have a higher ratio of shareholding to financial assets.

This paper is organized as follows. We explain our empirical model in Section 2 and our data set in Section 3. In Section 4, we explain how to measure financial literacy. In Section 5, we present our estimation results. Section 6 concludes this paper.

2. Empirical Model

We use a regression model to analyze the effect of financial literacy on a household's portfolio choices. More concretely, we investigate whether households with high financial literacy tend to participate in stock markets and whether households with high financial literacy tend to hold a higher ratio of stocks among their financial assets.

However, the simple regression approach is often criticized because investment experience affects financial literacy. Therefore, in addition to simple regression (e.g., the probit model and the OLS model), we use an instrumental variables (IV) estimation model to tackle this endogeneity issue between financial literacy and stock investment.

Our IV model is as follows.

(First-stage equation)

$$y_{1i} = b_1 x_i + b_2 z_i + u_i$$

(Second-stage equation)

(1) Stock market participation

$$y_{2i}^* = c_{11} x_i + c_{12} y_{1i} + v_i$$

$$y_{2i} = \begin{cases} 1 & if \quad y_{2i}^* > 0 \\ 0 & if \quad y_{2i}^* \leq 0 \end{cases}$$

(2)Stock shares in financial assets

$$y_{3i} = c_{21} x_i + c_{22} y_{1i} + v_i$$

In the first-stage equation, the dependent variable y_{1i} is the financial literacy of the respondent, i. x_i are exogenous variables, and z_i are instruments. In the second-stage equations, y_{2i} is the stock market participation dummy, with $y_{2i} = 1$ if $y_{2i}^* > 0$

(stockholding) and 0 otherwise. We use the maximum likelihood estimator for equation (1) in the stock market participation regression. Furthermore, y_{3i} is the proportion of equities in financial assets for households that own equities. We use the two-step estimator (2SLS) to estimate equation (2) for the all-respondents sample and the stock-owners sample. We estimate equations (1) and (2) independently.

3. Data

The data are from the Survey on Wealth Building, Securities, Investment, and Financial Literacy. We conducted this online survey in April 2019 and obtained responses from 500 respondents who own either stocks or mutual funds and 500 respondents who own none of the above.[1] Therefore, the ratio of individuals who hold risky assets is higher than the national average. However, we sent out a random request for cooperation to members registered with a web survey company. Our sample included the first 500 responses, each based on stock and mutual fund investment experience. Table 1 shows the descriptive statistics of the variables used in the regression. According to the table, our sample's average annual income and assets are similar to the national average.

[1] See Yamori and Ueyama (2020) for details.

The proportion of respondents holding Japanese companies' equities is 36.4% (i.e., the stock market participation ratio). When we limit it to those investing in stocks, the proportion of shares in financial assets (i.e., conditional ownership) is 24.5%.

Table 1 Summary of statistics of the estimation sample

	Mean	Std.	Min.	Max.
Male	0.80	0.40	0	1
Age	46.7	8.1	22	59
Education (intermediate or high school)	0.24	0.43	0	1
Education (university or higher)	0.60	0.49	0	1
Married	0.60	0.49	0	1
Number of children	0.90	1.02	0	3
Occupation dummies (self-employed)	0.12	0.32	0	1
Occupation dummies (public worker)	0.09	0.28	0	1
Occupation dummies (employee at a large company)	0.19	0.39	0	1
Occupation dummies (employee at a small company)	0.39	0.49	0	1
Income (respondent) (ten thousand)	612.6	439.4	0	3,000
Income* (respondent's spouse) dummy (ten thousand)	271.0	371.0	0	3,000
Financial wealth (ten thousand)	1358.7	2170.0	0	10,000
Debt (ten thousand)	586.5	1314.5	0	10,000
Net financial wealth (ten thousand)	751.0	2504.5	-10,000	10,000
Stock market participation (%)	36.4	48.1	0	100
Stock shares in financial wealth (only ownership) (%)	24.5	23.3	2.5	100
Number of observations		1,000		

Note: *Stock market participation* means the proportion of respondents holding Japanese companies' equities.

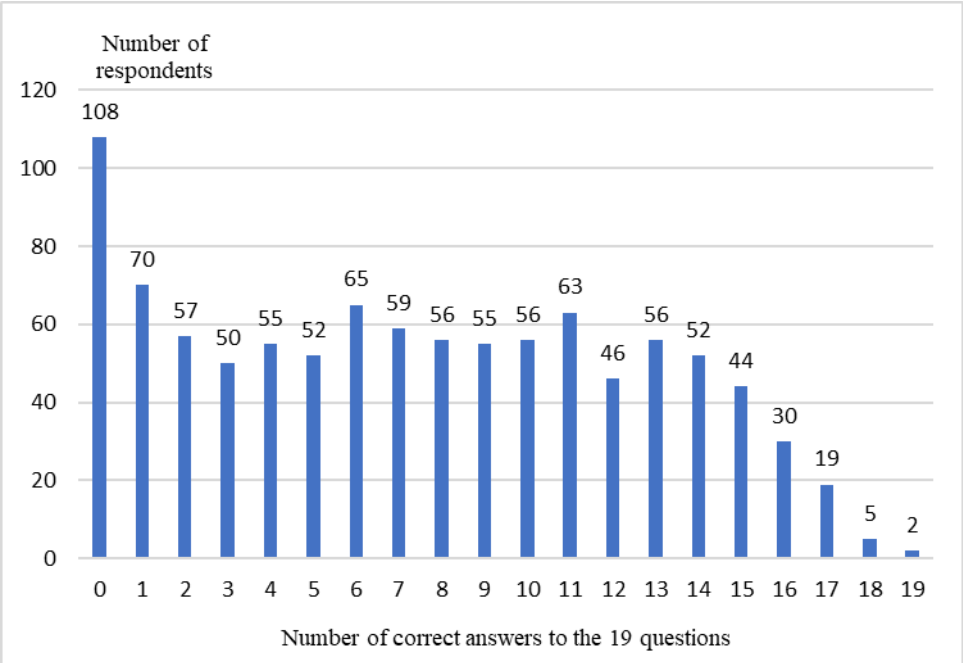
4. Measuring Financial Literacy

The measure of financial literacy is based on the 19 questions from the "Survey on Wealth Building, Securities Investment, and Financial Literacy." Nineteen questions consist of the Big Three questions (see Lusardi and Mitchell [2014]) and the other sixteen

advanced questions.[2]

Figure 1 shows the distribution of financial literacy, defined as the number of correct answers to the 19 questions. Of 1,000 respondents, 10.8% have the lowest financial literacy (answered all questions incorrectly or "do not know"), and 2% have the highest financial literacy. The average number of correct answers to the 19 questions was 7.4, and the median was 7.

Figure 1 Distribution of financial literacy



[2] Following Liao et al. (2017), we use basic and advanced financial literacy variables instead of the 19 questions literacy variable, but the results are similar to those in Tables 2 and 3.

5. Estimation Results

5.1 Stock Market Participation

First, we examine the relationship between financial literacy and stock market participation. Column 1 in Table 2 shows the regression result using a simple probit model. Gender, education, number of children, occupation, and net financial wealth affect stock market participation. Financial literacy has a positive significance at the 1% level, even after controlling for the respondents' demographic and economic characteristics; this indicates that financial literacy matters for stock ownership.

Furthermore, we consider that individuals can improve their financial knowledge via stock investment; thus, we conduct an IV estimation to tackle this reverse causality. We use three instruments together to indicate financial literacy[3]; (1) a five-point-scale variable for the degree of effort devoted to accumulating wealth to save for retirement, (2) the participant's experience dummy of finance seminars conducted in the workplace,[4] and (3) the experience dummy of financial education from elementary school through high school.

Column 3 in Table 2 shows the IV estimation results. The coefficient of *financial literacy* is still significantly positive. After considering endogeneity, we can safely conclude that financial literacy significantly increases the probability of participating in

[3] We selected the instruments after testing for overidentified restrictions for several instrumental variables.

[4] If the respondent had ever attended a seminar sponsored or introduced by the individual's employer, the dummy variable is 1; otherwise, it is 0. According to the test score, those who have attended such seminars have higher financial literacy than those who have not attended such seminars.

the stock market.

We obtain another interesting result about the gender effect from Table 2. Literature in financial literacy often finds a gender difference; females are more likely to have lower financial literacy. However, previous studies examining the gender effect on participation in stock markets showed mixed results. Importantly, Almenberg and Dreber (2015) found that failing to consider financial literacy in the estimation misleads one to conclude that females tended to participate less in stock markets; the gender effect disappeared once financial literacy was considered.

Columns 1 and 2 in Table 2 show that the "female" dummy's coefficient in the simple probit estimation model with and without the financial literacy variable is negative and significant at the 10% and 5% statistical levels, respectively. However, as shown in Column 3 of Table 2, the "female" dummy's coefficient was insignificant once endogeneity was considered. The estimation when financial literacy and endogeneity are considered suggests that this gender effect on stock market participation disappeared. Our result is consistent with that of Almenberg and Dreber (2015).

Table 2 Regression results for stock market participation

	Probit	Probit	IV Probit
Constant	0.47	0.83	-0.37
	(1.38)	(1.31)	(1.15)
Financial literacy	0.089***		0.22***
	(0.01)		(0.009)
Female	-0.26*	-0.35**	0.078
	(0.15)	(0.14)	(0.13)
Age	-0.084	-0.067	-0.078
	(0.06)	(0.06)	(0.05)
Age squared	0.00099	0.00076	0.00095*
	(0.0007)	(0.0007)	(0.001)
Education dummy (intermediate/high school graduate)	-0.22*	-0.27**	0.020
	(0.13)	(0.12)	(0.11)
Number of children	-0.12**	-0.09*	-0.11**
	(0.05)	(0.05)	(0.05)
Occupation dummies (self-employed)	0.12	0.23	-0.15
	(0.19)	(0.19)	(0.16)
Occupation dummies (public worker)	0.047	0.094	-0.11
	(0.21)	(0.20)	(0.17)
Occupation dummies (employee at a large company)	0.57***	0.65***	0.035
	(0.17)	(0.16)	(0.16)
Occupation dummies (employee at a small company)	0.26*	0.31**	-0.0036
	(1.14)	(1.14)	(0.12)
Income (respondent)	0.00015	0.00024**	-0.000095
	(0.0001)	(0.0001)	(0.0001)
Income* (respondent's spouse) dummy	0.00028	0.00023	0.00025*
	(0.0002)	(0.0002)	(0.0001)
Net financial wealth	0.000086***	0.00012***	-0.000022
	(0.00002)	(0.00002)	(0.00002)
Number of observations	749	749	740

Note: Robust standard errors are in parentheses.

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

5.2 Stockholding Ratio

Prior studies have not reached consensus on the impact of financial literacy on stock ownership. Van Rooij et al. [2011] and Arrondel et al. [2015] showed that financial literacy significantly increases the probability of stock market participation but has no effect on the stockholding ratio after entering the stock market. However, Liao et al.

[2017] found a significant relationship between the stockholding ratio and financial literacy. Therefore, it is worth examining the relationship between financial literacy and the ratio of stocks in financial assets regarding Japanese data. We think that estimations with all samples may obtain biased results, because Table 2 suggests that individuals holding no stocks are financially illiterate. It is more interesting to examine whether, among investors holding some stocks, more financially literate investors have a higher ratio of stocks among their financial assets than stock investors who are less financially literate.

Table 3 shows the regression result of stock shares in the financial assets of the all-respondents sample and stock-investors-only sample (conditional ownership ratio). Columns 1 and 3 of Table 3 show that financial literacy is positive and significant at the 1% and 5% levels in the OLS model.

Of course, these results may be biased because of the endogeneity problem. Therefore, we use the IV model. Financial literacy's coefficient is still significant in all sample estimations in Table 3 (Column 2). However, when we exclude individuals holding no stocks from the sample, the result changes significantly. Namely, as shown in Column 4 of Table 3, the IV model finds that financial literacy's coefficient is now insignificant. This result is consistent with the results of van Rooij et al. [2011] and Arrondel et al. [2015].

Table 3 Stockholding share regression results

	All samples		Conditional ownership	
	OLS	2SLS (IV)	OLS	2SLS (IV)
Constant	27.1	19.3	-4.20	-0.82
	(19.5)	(22.6)	(32.4)	(34.7)
Financial literacy	1.01***	3.25***	0.58**	0.64
	(0.15)	(0.85)	(0.28)	(2.18)
Female	-2.59	0.20	-3.21	-3.44
	(2.05)	(2.59)	(3.66)	(4.44)
Age	-0.91	-1.37	1.35	1.15
	(0.88)	(1.02)	(1.47)	(1.51)
Age squared	0.01	0.01	-0.017	-0.015
	(0.01)	(0.01)	(0.02)	(0.02)
Education dummy (intermediate/high school graduate)	0.44	2.15	4.47	4.64
	(1.79)	(2.13)	(3.41)	(3.70)
Number of children	-2.32***	-2.97***	-3.51**	-3.64***
	(0.76)	(0.90)	(1.37)	(1.36)
Occupation dummies (self-employed)	0.58	-2.47	2.25	2.13
	(2.72)	(3.29)	(4.81)	(5.47)
Occupation dummies (public worker)	-5.03*	-7.14**	-7.93	-8.05
	(2.89)	(3.41)	(5.00)	(5.21)
Occupation dummies (big company's employee)	3.02	-0.59	0.35	0.32
	(2.38)	(3.02)	(3.91)	(4.30)
Occupation dummies (small company's employee)	-1.80	-3.60	-3.73	-3.83
	(1.99)	(2.36)	(3.58)	(3.68)
Income (respondent)	0.01	0.003	0.0036	0.0035
	(0.002)	(0.002)	(0.003)	(0.003)
Income* (respondent's spouse) dummy	0.001	0.002	-0.00089	-0.00084
	(0.002)	(0.003)	(0.004)	(0.004)
Net financial wealth	0.001**	-0.0001	0.000064	0.000094
	(0.0003)	(0.0005)	(0.0005)	(0.001)
Number of observations	717	708	354	351

Note: Robust standard errors are in parentheses.

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

6. Conclusions

This paper found that low financial literacy is a cause for Japanese households' low participation in the stock market. Financial literacy helps to overcome information costs that hinder individuals from holding stocks. Therefore, once they participate, their financial literacy level does not affect the ratio of stocks in their financial assets. We did not find gender differences in stock market participation once adequately considering financial literacy.

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