



**ADB Working Paper Series**

**FINANCIAL LITERACY IN JAPAN:  
DETERMINANTS AND IMPACTS**

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No. 796  
December 2017

**Asian Development Bank Institute**

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Suggested citation:

Yoshino, N., P. J. Morgan, and L. Q. Trinh. 2017. Financial Literacy in Japan: Determinants and Impacts. ADBI Working Paper 796. Tokyo: Asian Development Bank Institute. Available: <https://www.adb.org/publications/financial-literacy-japan-determinants-and-impacts>

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**Abstract**

Financial literacy is gaining increasing importance as a policy objective in many countries. However, internationally comparable information on financial literacy is still scarce. Recently, the Bank of Japan conducted a major survey of financial literacy and financial behavior covering 25,000 individuals aged from 18 to 79. Our paper used this database to analyze the determinants of financial literacy and the effects of financial literacy on other behaviors. Generally, our study corroborated the findings of studies on other countries, but it uncovered some differences as well. We found that the main determinants of financial literacy are the educational level, income, age, and occupational status and that both financial literacy and general education levels are related positively and significantly to savings behavior and financial inclusion.

**Keywords:** financial literacy, financial behavior, financial inclusion, household saving, Japan

**JEL Classification:** D14, G11, J26

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## 1. INTRODUCTION

The literature contains several widely used definitions of financial literacy. In their review article, Lusardi and Mitchell (2014, 6) defined financial literacy as "... peoples' ability to process economic information and make informed decisions about financial planning, wealth accumulation, debt, and pensions." The handbook of the Organisation for Economic Co-operation and Development International Network on Financial Education (OECD/INFE 2016, 47) defined financial literacy as "... [a] combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing." Thus, this concept of financial literacy is multi-dimensional, reflecting not only knowledge but also skills, attitudes, and actual behavior.

Financial literacy has gained an important position on the policy agenda of many countries, and researchers have widely recognized the importance of collecting informative, reliable data on the levels of financial literacy across the adult population (OECD/INFE 2015). At their Summit in Los Cabos in 2012, the G20 Leaders endorsed the *High-Level Principles on National Strategies for Financial Education* developed by the OECD/INFE, thereby acknowledging the importance of co-ordinated policy approaches to financial education (G20 2012). At the same time, surveys have consistently shown that the level of financial literacy is relatively low, even in advanced economies (OECD/INFE 2016). Given the increasing need for individuals to manage their own retirement savings and pensions, resulting mainly from the trend of switching to defined-contribution from defined-benefit pension plans, this indicates that the need for high levels of financial literacy is rising.

Data on financial literacy provide information on the need for financial education or other supportive policies and indicate which groups have the greatest needs. Repeated surveys enable researchers to identify the improvements and the necessary further work. The use of a standardized survey instrument provides the additional benefit of being able to make cross-country comparisons of key measures of financial literacy and related variables to help to identify those countries with successful financial education policies and their applicability to other countries.

To obtain data about the state of financial literacy in Japan, the Central Council for Financial Services Information, an advisory group associated with the Bank of Japan, conducted an online survey of 25,000 individuals aged between 18 and 79, the sample being in proportion to Japan's demographic structure. The survey contained questions regarding three related aspects: financial knowledge, financial behavior, and financial attitudes.

Financial knowledge helps individuals to compare financial products and services and to make appropriate, well-informed financial decisions. A basic knowledge of financial concepts and the ability to apply numeracy skills in a financial context ensure that consumers can manage their financial affairs independently and respond appropriately to news and events that may have implications for their financial well-being. It is possible to measure financial literacy both objectively (through survey questions) and subjectively (by asking respondents to rate their own literacy compared with that of their peers).

Financial behavior (or being financially “savvy”) means taking (or not taking) financial actions. Some types of behavior, such as putting off bill payments, failing to plan future expenditures, or choosing financial products without shopping around, may have an adverse effect on an individual’s financial situation and well-being. Financial behavior may thus differ from financial literacy, and it is important to identify their relationship.

Attitudes regarding longer-term financial planning include aspects such as individuals’ time preference and willingness to make planned savings. For example, one question asked about preferences for the short term through “living for today” and spending money. Such preferences are likely to hinder behaviors that could lead to improved financial resilience and well-being.

We organized this paper as follows. Section 2 briefly discusses the literature on the determinants of financial literacy and their effects. Section 3 provides the data description. Section 4 presents the econometric models and empirical results, followed by the conclusions and policy implications in Section 5.

## 2. LITERATURE SURVEY

The literature on financial literacy has focused on two main areas: (i) the determinants of financial literacy, including age, gender, level of education, and occupation; and (ii) the effects of financial literacy on financial behavior, including saving, use of credit, and preparation for retirement.

There is already a long history of efforts to develop quantifiable measures of financial literacy based on empirically testable surveys. One of the earliest examples is that of the Jump\$tart Coalition for Personal Financial Literacy program for high school and college students in the US in 1997, which Mandell (2009) described. Lusardi and Mitchell (2006) added a set of financial literacy questions to the 2004 Health and Retirement Study (HRS), a survey of US households aged 50 and older, which served as a model for later surveys. The three core questions in the original survey aimed to assess the understanding of some key financial concepts: compound interest, real rates of return, and risk diversification. Later surveys, including the OECD/INFE survey, have built on this base but also added questions about financial attitudes, financial behavior, and financial experience. Section 3.2 below describes the methodology for calculating the scores from the survey responses.

Lusardi and Mitchell (2014) provided an extensive review of the literature on factors related to financial literacy. Financial literacy tends to follow a hump-shaped pattern with respect to age, first rising and then declining in old age. Interestingly, elderly persons’ confidence in their financial literacy shows no similar decline. Women generally score lower than men do on financial literacy, and the reasons for this are still the subject of debate. However, women tend to be more willing to admit that they do not know an answer than men are. Higher levels of education and higher levels of parents’ education are positively correlated with financial literacy. The analysis of the results of the OECD/INFE survey in the above-mentioned sample of 30 countries in OECD/INFE (2016) generally confirmed these findings.

A key question is whether financial education programs can improve financial literacy. Researchers have conducted a large number of studies, but the results are inconclusive and affected by many specific aspects of the programs studied, including the course content, knowledge of the teachers, and so on. Fernandes, Lynch, and Netemeyer (2014) performed a meta-analysis of 188 studies and found that financial education has a significant but very small effect of only 0.1% on downstream economic

behaviors. Lusardi and Mitchell (2014) cited one study by Walstad, Rebeck, and MacDonald (2010) as an example of a careful piece of research that found significant impacts of a study program on financial literacy. However, they recognized that much further research is necessary in this area. Hastings, Madrian, and Skimmyhorn (2013, 359) argued that the evidence on the effectiveness of financial education programs on financial literacy, not to mention their cost-effectiveness, is "... at best contradictory." They suggested other kinds of interventions, such as designing pension plan or savings plan default enrolment options to address observed behavioral biases; strict regulation; simplified disclosure about product fees, terms, or characteristics; and incentives to take action.

A well-developed literature has tried to link measures of financial literacy with other economic and financial behaviors, dating to Bernheim (1995, 1998) in the US, in response to the increasing shift toward defined-contribution pension plans. This area of research received a further boost after the global financial crisis of 2008–2009, which drew attention to numerous scams inflicted on individual borrowers and investors in the US and other countries. Hilgert, Hogarth, and Beverly (2003) found a strong correlation between financial literacy and daily financial management skills, while other studies found that the more numerate and financially literate are more likely to participate in financial markets, invest in stocks, and engage in precautionary saving (Christelis, Jappelli, and Padula 2010; van Rooij, Lusardi, and Alessie 2011; de Bassa Scheresberg 2013). The more financially savvy are also more likely to undertake retirement planning, and those who plan accumulate more wealth (Lusardi and Mitchell 2011). Research has corroborated these results in a number of countries. Mahdzan and Tabiani's (2013) study is an example of this kind of research in Malaysia.

On the liability side of the household balance sheet, Moore (2003) found that the least financially literate are more likely to have more expensive mortgages. Campbell (2006) showed that those with a lower income and less education are less likely to refinance their mortgages during periods of falling interest rates. Stango and Zinman (2009) found that those who are unable to calculate interest rates correctly generally borrow more and accumulate less wealth.

### **3. DATA DESCRIPTION: FINANCIAL LITERACY, SAMPLE GROUPS, AND PURCHASES OF FINANCIAL PRODUCTS**

#### **3.1 Sample Description**

An online survey investigated 25,000 individuals aged 18 to 79, and this sample was in proportion to Japan's demographic and economic structure (Central Council for Financial Services Information 2016).<sup>1</sup> The gender and age distributions were well balanced, as shown in Table 1.

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<sup>1</sup> The Bank of Japan established the Central Committee on Saving Promotion in 1971. It developed it as the Central Council for Financial Service Information, which started a financial education council in 2012 consisting of the FSA, Ministry of Education, Consumer Protection Agency, Japanese Bankers' Association, Trust Companies Association of Japan, Japan Securities Dealers' Association, and so on.

**Table 1: Distribution of the Survey Sample and Comparison with the Japan Population Census**  
(persons, %)

		Number of Samples (A)	Composition Ratios (B)	Composition Ratios in the Population Census (C)	Comparison with the Population Census (B-C)
Total		25,000	100.0	100.0	0.0
By gender	Male	12,334	49.3	49.3	0.0
	Female	12,666	50.7	50.7	-0.0
By age group	Age 18-29	4,026	16.1	16.1	0.0
	30s	4,570	18.3	18.3	-0.0
	40s	4,248	17.0	17.0	-0.0
	50s	4,163	16.7	16.6	0.0
	60s	4,849	19.4	18.7	0.7
	70s	3,144	12.6	13.3	-0.7

Source: Central Council for Financial Service Information (2016).

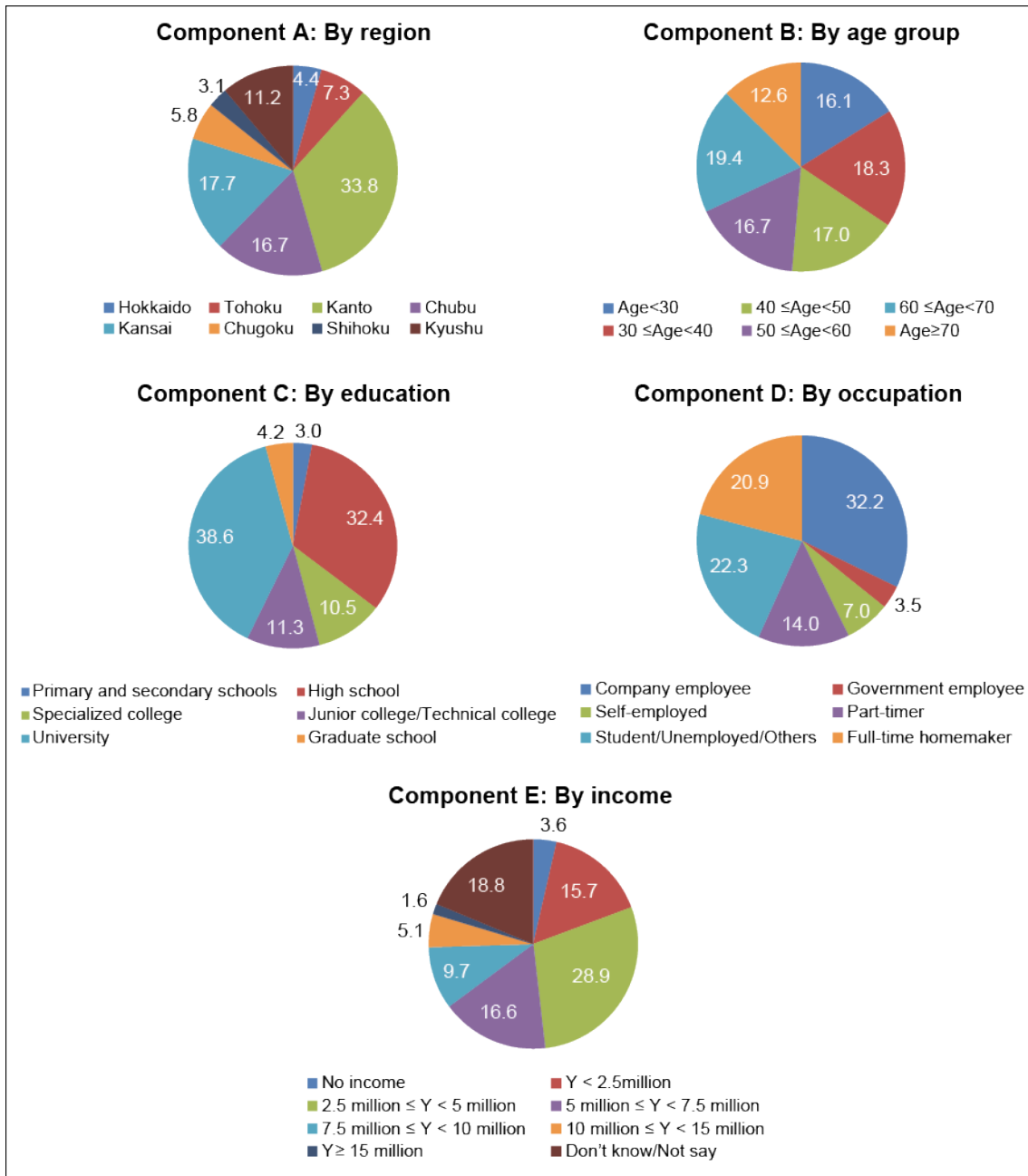
Figure 1 presents the distribution of the respondents by Japanese region (component A), age (component B), education (component C), occupation (component D), and income group (component E).

### 3.2 Descriptive Analyses

The survey contained 25 true/false questions, including 18 questions on financial knowledge and 7 questions on financial decision-making skills. It also contained data on the respondents' age, gender, level of general education and financial education, income, occupation, and frequency of reading financial and economic news. The financial knowledge questions tested basic knowledge about interest rates, the compound interest rate, inflation, and so on, and the financial decision-making skills questions identified respondents' behavior relating to family budget management and personal expense management to avoid financial trouble. The calculation of the financial literacy score was based on the number of correct answers; thus, each respondent could attain a maximum financial literacy score of 25. The average financial literacy score was 13.9 (standard deviation: 7.0); that is, on average, one-fifth of the respondents could answer at least 21 financial literacy questions correctly (Table 2), which the researchers judged to be the minimum desirable level. However, there was a large gap between men and women. While 26.5% of the male respondents could answer at least 21 questions correctly, the figure for female respondents was only 15.5%. In addition, the proportion of older people who were able to answer at least 21 questions correctly was higher than that of younger people. For example, only 10.1% of people aged below 30 could answer at least 21 questions correctly; this figure was nearly three times higher among those aged from 60 to 70. The researchers observed the same pattern for male and female respondents.



**Figure 1: Sample Distribution**  
(%)



Note: In component E, Y stands for annual income.  
Source: Authors' calculation.

**Table 2: Proportion of Respondents with a High Financial Literacy Score  
(At Least 21 Out of 25)  
(%)**

	All	Male	Female
All	20.9	26.5	15.5
Age<30	10.1	12.9	7.2
Age>=30 and Age<40	16.6	22.7	10.3
Age>=30 and Age<40	20.7	26.6	14.8
Age>=50 and Age<60	25.8	30.8	20.9
Age>=60 and Age<70	28.1	35.1	21.9
Age>=70	23.9	31.8	16.8

Source: Authors' calculation.

The proportion of respondents who had received financial education either at school or in the workplace in Japan was rather low compared with their US counterparts (6.6% vs. 21%) (Table 3). Even among students, only 14.4% had received financial education, although this figure was much higher than that of those aged from 60 to 79 and from 30 to 59.

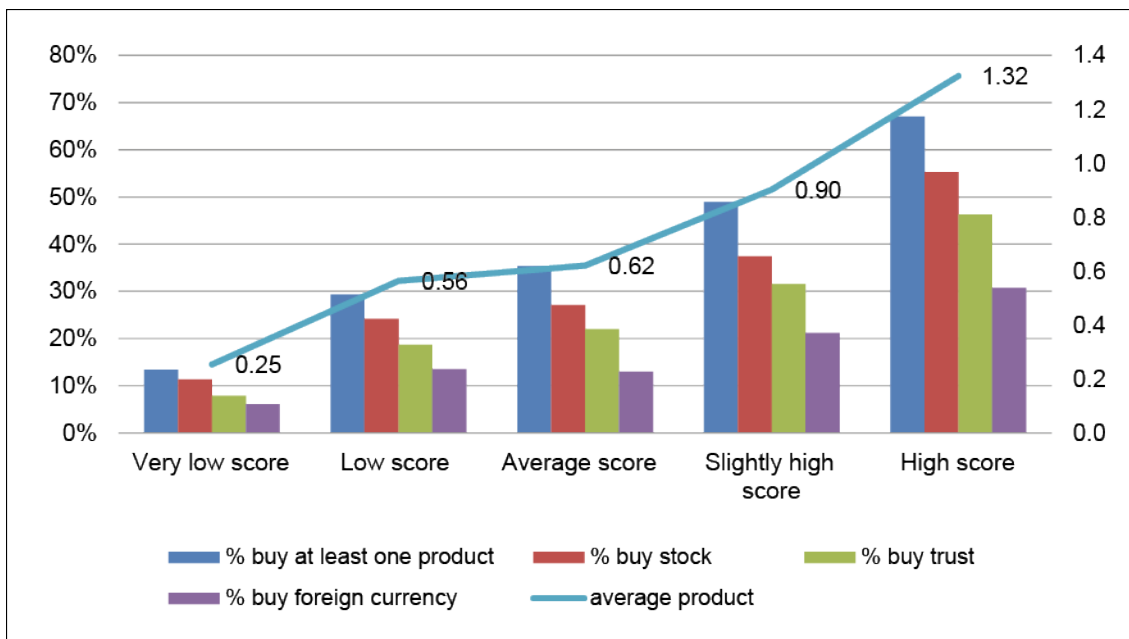
**Table 3: Financial Education in Japan and the United States**

	% with Financial Education
Japan	6.6
Age 18–29	10.7
Student (Age 18–24)	14.4
Age 30–59	6.0
Age 60–79	5.5
USA	21.0

Source: Authors' calculation (for Japanese data) and Central Council for Financial Service Information (2016) (for US data).

Figure 2 shows the correlation between the financial literacy score and the likelihood of owning various financial products. We divided the respondents into five groups based on their financial literacy score: very low scores (fewer than 7 correct answers); low scores (7 to 12 correct answers); average scores (13 to 16 correct answers); slightly high scores (17 to 20 correct answers); and high scores (more than 20 correct answers). The figure shows that, of the financial products, stocks were the most widely held while foreign currency was the least held, regardless of the financial literacy score. Moreover, there was a big difference in the likelihood of owning at least one financial product across the financial literacy score groups. Only 13.5% of the respondents in the very-low-score groups had at least one financial product. This figure increased to 35.4% and 67%, respectively, among the respondents in the average-score and high-score groups. This pattern is also apparent for each of the three financial products.

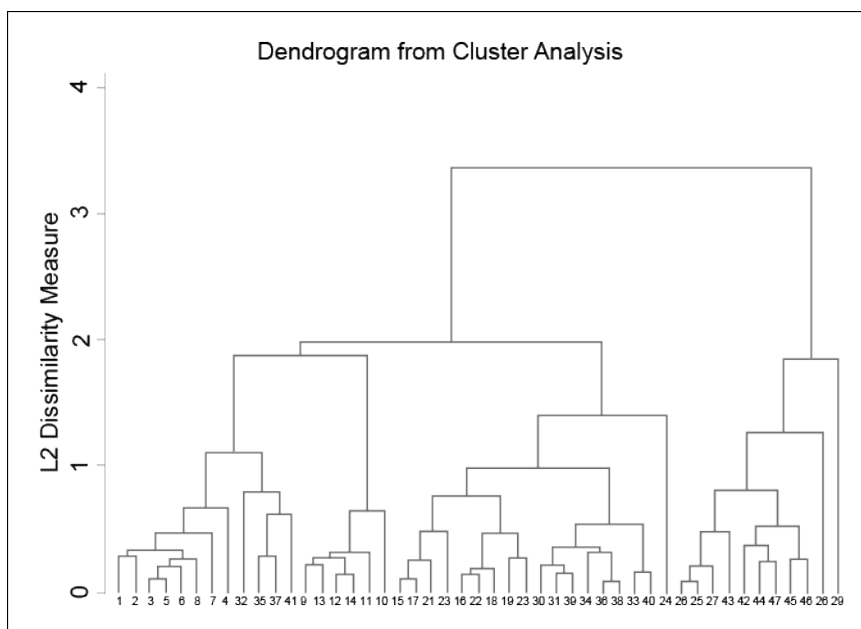
**Figure 2: Purchase of Financial Products and Financial Literacy Score by Group**



Note: The right-hand-side scale presents the average number of financial products that each group of financial literacy purchased.

Source: Authors' calculation.

**Figure 3: Cluster Analysis of Prefectures**



Source: Authors' calculation.

We performed a cluster analysis to differentiate five groups of prefectures in Japan. Group 1 and group 2 are rural regions, group 3 and group 4 are highly urban regions, and group 5 includes only Okinawa prefecture. The analysis shows different performances in urban regions from rural regions, which the regression analysis verified.

**Table 4: Groupings of Japanese Prefectures According to the Cluster Analysis**

Group 1	Group 2	Group 3	Group 4	Group 5
Yamagata	Wakayama	Nagano	Hyogo	Okinawa
Yamanashi	Miyazaki	Okayama	Saitama	
Tottori	Koichi	Tokushima	Osaka	
Ishikawa	Akita	Nara	Fukuoka	
Nagasaki	Yamaguchi	Kumamoto	Miyagi	
Tochigi	Shimane	Gifu	Chiba	
Toyama		Kagawa	Aichi	
Ibaraki		Kagoshima	Shiga	
Hokkaido		Shizuoka	Kanagawa	
Gunma		Fukui	Tokyo	
Fukushima		Oita		
Niigata		Kyoto		
Ehime				
Mie				
Saga				
Aomori				
Hiroshima				
Iwate				

Source: Authors' calculations.

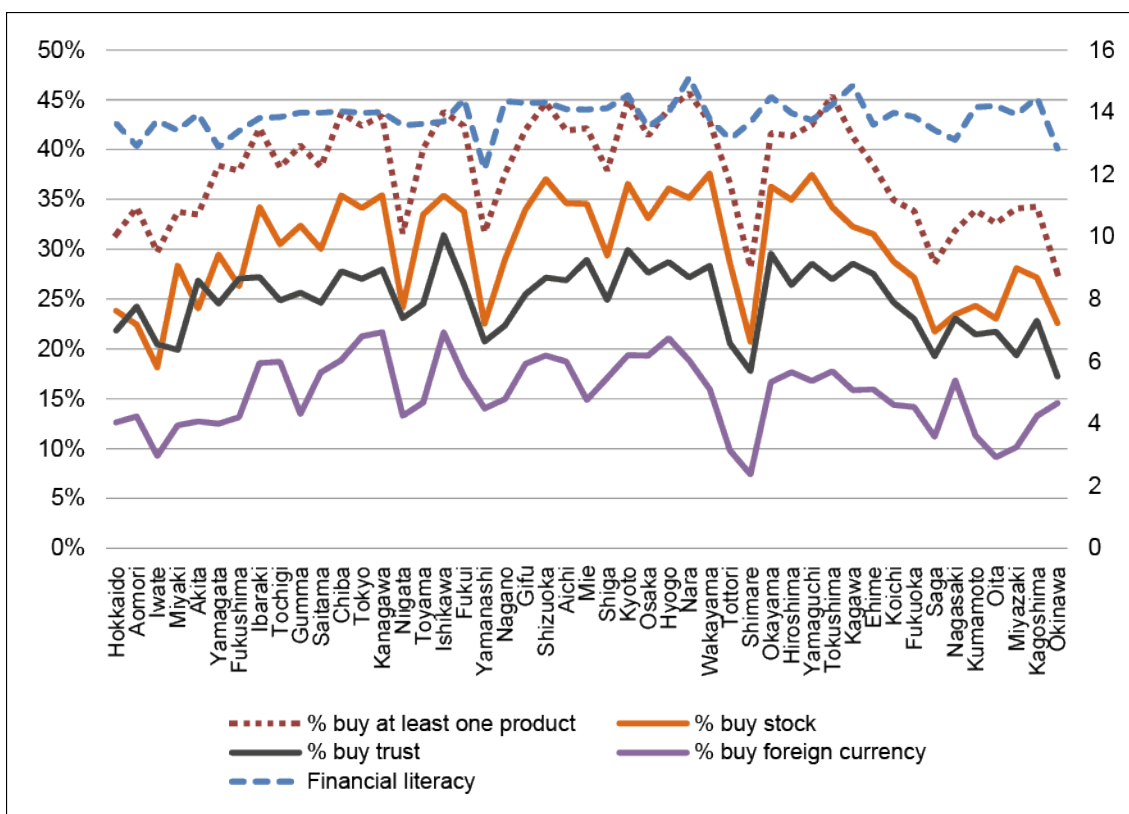
**Table 5: Number of Correct Answers by Prefecture**

	Prefecture	Objective Assessment		Self-Assessment (National Average=100)	Gap (Actual Score – Self- Assessment)
		% Correct Answers Given to Questions	National Average=100		
Highest	Nara	60.5	108.8	102	6.8
Second Highest	Kagawa	59.4	106.8	106.7	0.1
Third Highest	Kyoto	58.2	104.7	99.8	4.9
Fourth Highest	Okayama	58	104.3	101	3.3
Fifth Highest	Kagoshima	57.9	104.1	99.8	4.3
National Average		55.6	100	100	0
Fifth Lowest	Nagasaki	52.5	94.4	96.5	-2.1
Fifth Lowest	Tottori	52.5	94.4	104	-9.6
Fourth Lowest	Aomori	51.7	93	103	-10
Third Lowest	Yamagata	51.6	92.8	103	-10.2
Second Lowest	Okinawa	51.3	92.3	92.5	-0.2
Lowest	Yamanashi	48.7	87.6	94	-6.4

Source: Central Council for Financial Service Information (2016).

The respondents in Nara, Kagawa, Kyoto, Okayama, and Kagoshima prefectures had the highest proportion of correct answers (Table 5 and Figure 4). The average number of correct answers of the respondents in Nara prefecture was about 15, the highest among the 47 prefectures. On average, the respondents in Nagasaki, Tottori, Aomori, Yamagata, Okinawa, and Yamanashi prefectures had the lowest average number of correct answers (about 12–13 questions). The respondents in the prefectures with the highest number of correct answers tended to underestimate their financial knowledge, while those in the prefectures with the lowest proportion of correct answers tended to overestimate their financial literacy.

**Figure 4: Purchase of Financial Products and Financial Literacy Score by Prefecture**

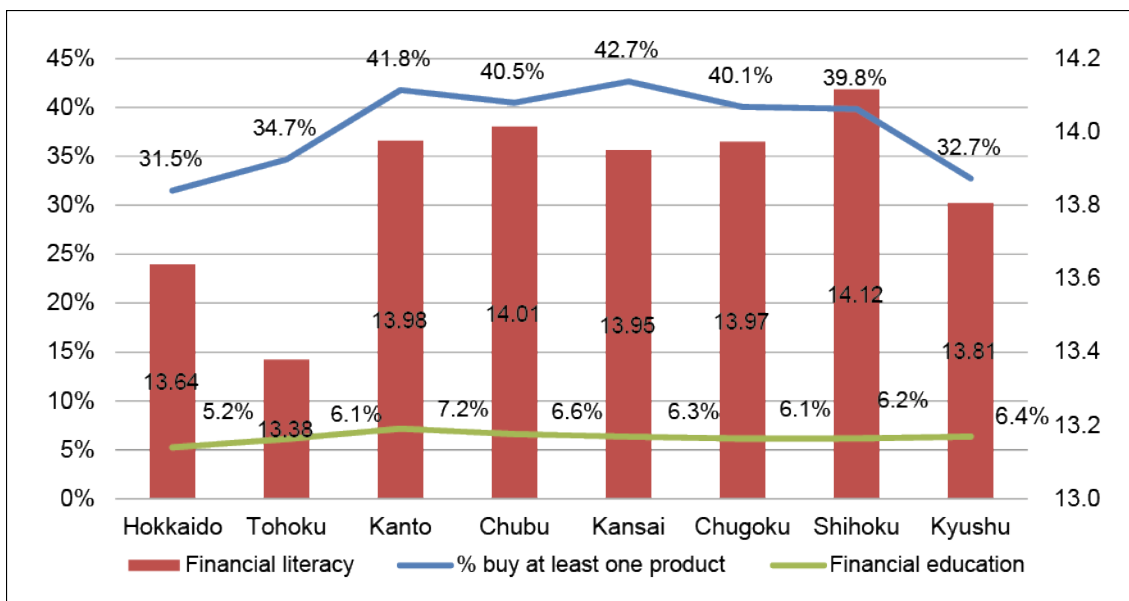


Note: The right-hand-side scale presents the financial literacy score.

Source: Authors' calculation.

Overall, the differences in financial literacy scores among the regions are negligible except for Hokkaido, Tohoku, and Kyushu, which are relatively low (Figure 5). The proportion of respondents who had bought financial products in these three regions is also smaller than that in other regions. Except for Hokkaido, the proportion of respondents who had received financial education is rather similar across the regions.

**Figure 5: Financial Education, Financial Literacy, and Purchase of Financial Products by Region**

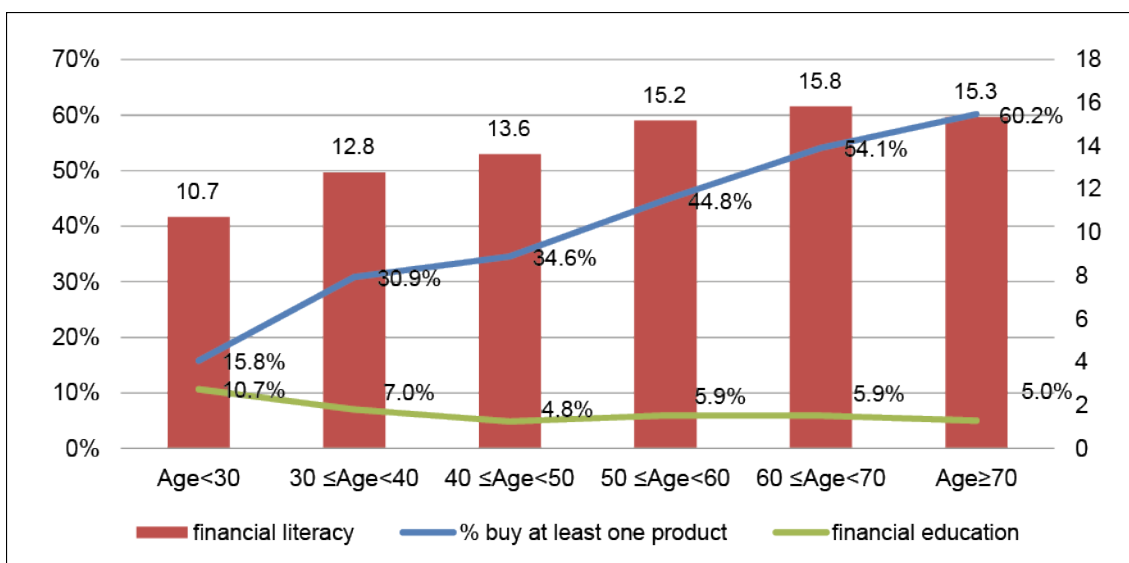


Note: The right-hand scale shows the financial literacy score.

Source: Authors' calculation.

The financial literacy increased with respondents' age up to age 70 and slightly declined among those aged from 70 to 79 (Figure 6). The proportion of those who had bought financial products also increased with age. Only 15.8% of the respondents aged under 30 had a financial product. This figure is much lower than that of the respondents aged over 60.

**Figure 6: Financial Education, Financial Literacy Score, and Purchase of Financial Products by Age Group**

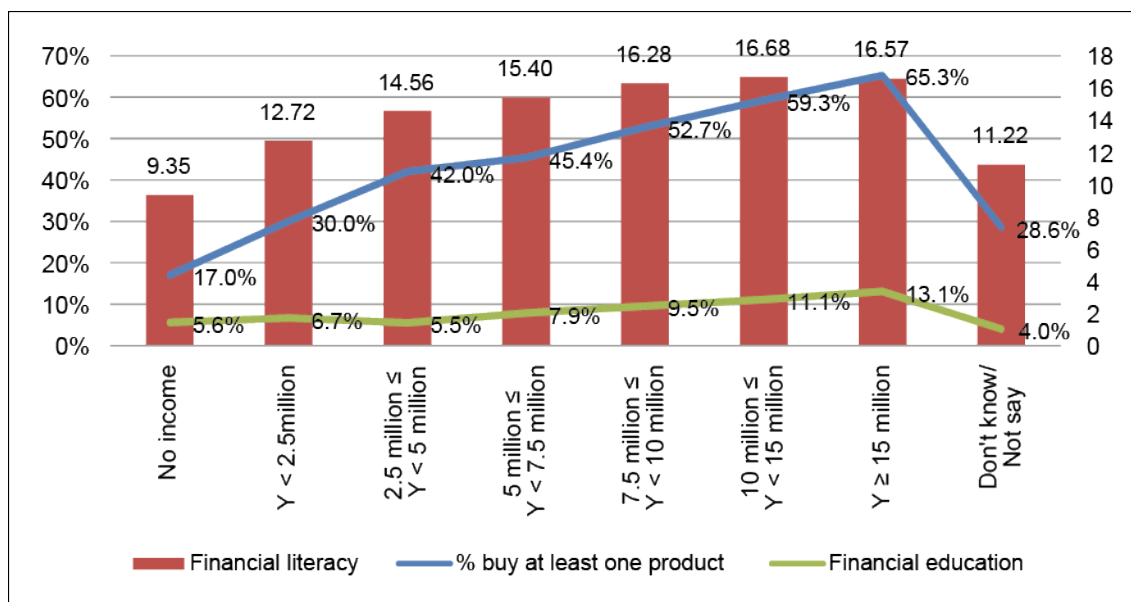


Note: The right-hand scale shows the financial literacy score.

Source: Authors' calculation.

Figure 7 shows that those with a higher income tended to have higher financial literacy scores. For example, while those with an annual income less than JPY 2.5 million had an average financial literacy score of 12.7, those with an income of at least JPY 15 million had an average financial score of 16.6. The proportion of respondents possessing at least one financial product also increased as their income increased. However, the correlation between financial education, financial literacy, and financial product purchases was weak, especially among those with an annual income of less than JPY 5 million.

**Figure 7: Financial Education, Financial Literacy score, and Purchase of Financial Products by Income Group**



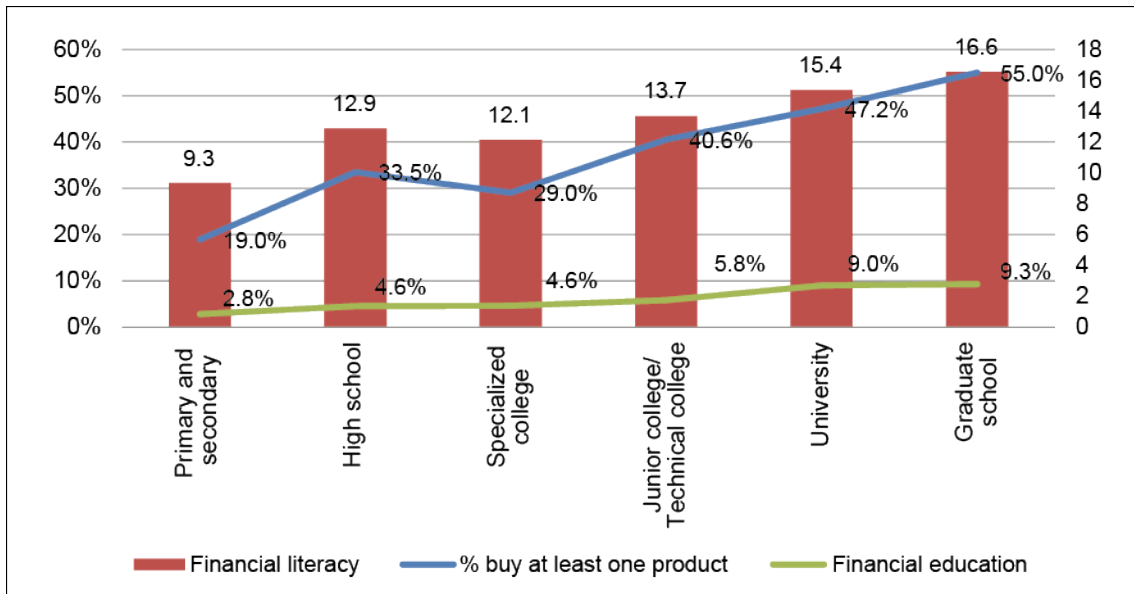
Note: The right-hand scale shows the financial literacy score.

Source: Authors' calculation.

The educational level also had a positive correlation with the financial literacy score, the likelihood of owning a financial product, and the likelihood of receiving financial education (Figure 8). Those with primary and secondary education had an average financial literacy score of only 9.3, while those with a graduate degree had an average financial literacy score of 16.6. Similarly, while only 19% of the respondents with primary and secondary education had bought a financial product, the figures for those with university and graduate school education were 47.2% and 55.5%, respectively. The likelihood of a person having financial education rose from 2.8% to 9.3% as their education level increased from primary and secondary education to graduate school.

Figure 9 shows that the average financial literacy score of the respondents in all the occupational groups was about 14, except for government employees (16.3) and part-timers (12.5). About 46% of government employees and self-employed individuals had purchased a financial product, slightly more than in other occupational groups of respondents, especially the part-timers (only 27.9). The figure also indicates that students, company employees, and government employees were the three groups of respondents with the largest proportion having received financial education.

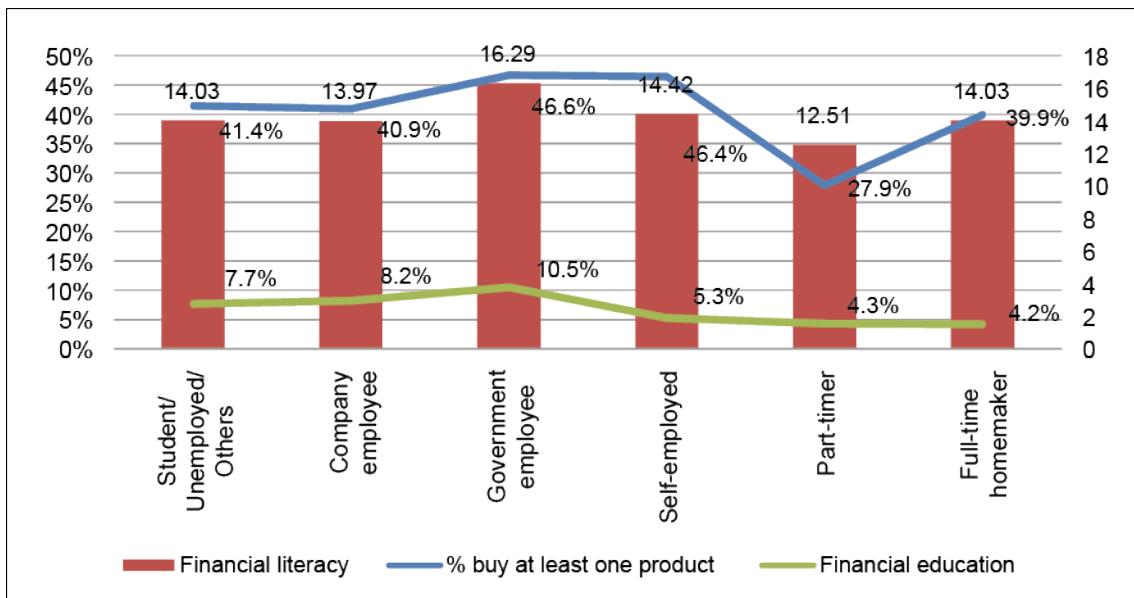
**Figure 8: Financial Education, Financial Literacy, and Possession of Financial Products by Education Level**



Note: The financial literacy score is on the right-hand scale.

Source: Authors' calculation.

**Figure 9: Financial Education, Financial Literacy Score, and Purchase of Financial Products by Occupation**



Note: The right-hand-side scale presents the financial literacy score.

Source: Authors' calculation.



## 4. REGRESSION ANALYSIS OF THE DETERMINANTS AND IMPACTS OF FINANCIAL LITERACY

### 4.1 Estimation Methods

To quantify the effect of financial literacy on saving behavior, we estimated the following equation:

$$FP_i = \beta_0 + \beta_1 FL_i + \beta_2 X_i + \eta_i \quad (1)$$

where the dependent variable  $FP_i$  indicates whether individual  $i$  holds a financial product or not. We estimated four alternative values of  $FP_i$ : (i)  $FP_1$  takes the value of one if individual  $i$  holds at least one financial product (including stocks, investment trusts, and foreign currency) and zero otherwise; (ii)  $FP_2$  takes the value of one if individual  $i$  buys stocks and zero otherwise; (iii)  $FP_3$  takes the value of one if individual  $i$  buys an investment trust and zero otherwise; and (iv)  $FP_4$  takes the value of one if individual  $i$  holds foreign currency and zero otherwise. The variable  $FL_i$  indicates individual  $i$ 's financial literacy score. As a robustness check, in some specifications we used the financial knowledge score instead of the financial literacy score. We expected that a person with a higher financial literacy score would be more likely to own a financial product.

$X_i$  is a vector of control variables, including the individual age (in log), gender, level of general education and financial education, income, occupation, and frequency of reading financial and economic news. Financial education is a binary variable that takes the value of one if individual  $i$  had received financial education either at school or at work and zero otherwise. For general education, due to data availability, we used a series of dummy variables to indicate the level of general education of individual  $i$ , including primary and secondary school, high school, specialized school, junior college, university, and graduate school. We used the group with primary and secondary schooling as the reference group (for education) in our estimation. Similarly, we categorized the income, occupation, and frequency of news reading into subgroups. The reference groups in our estimation were those without any income; student/unemployed; and those who read the financial news almost every day, respectively. We also controlled for the individual's location. There are two approaches: (i) prefecture dummies and (ii) cluster group dummies. We clustered the prefectures into five groups based on the cluster analysis presented in the previous sections.  $\eta_i$  is the error term. To estimate equation (1), we used linear probability regression and probit regression.

We further examined the determinants of financial literacy using the following equation:

$$FL_i = \alpha_0 + X'_i \alpha_1 + \epsilon_i \quad (2)$$

where  $FL_i$  is the financial literacy score as in equation (1) or, alternatively, the financial knowledge score, and  $X'$  is the vector of control variables, including individual age (in log), general education and financial education, income, occupation, frequency of reading financial and economic news, and location (either prefecture or cluster group) as in equation (1) and  $\epsilon_i$  is the error term. We used OLS to estimate this equation. As a robustness check, we also estimated equations (1) and (2) using the generalized structure economic model (GSEM) estimator.

## 4.2 Estimation Results

Table 6 presents our estimation results regarding the factors driving the decision to own at least one of the three financial products mentioned above. The dependent variable in this table is a binary variable, which takes the value of one if an individual owns at least one type of financial product (i.e. stock, investment trust, or foreign currency). We used the linear probability regression in column 1 and the probit regression in the remaining equations. We controlled for the prefecture dummies in columns 1 and 3 and the cluster dummies in column 2. The estimation results show a positive correlation between financial literacy and the likelihood of possessing at least one financial product. More specifically, in all the specifications, a one standard deviation increase in financial literacy increased the likelihood of holding at least one financial product by 8.4 to 8.9 percentage points. Having financial education was also positively associated with the likelihood of holding a financial product.

**Table 6: Financial Literacy and Decisions to Purchase Financial Products  
(Dependent Variable: Purchased Stocks, Investment Trusts, or Foreign Currency)**

	(1) OLS	(2) Probit (Marginal Effects)	(3) Probit (Marginal Effects)
Financial Literacy	0.089*** [0.003]	0.084*** [0.003]	0.084*** [0.003]
Financial Education	0.135*** [0.011]	0.131*** [0.011]	0.131*** [0.011]
Age (in Log)	0.263*** [0.008]	0.280*** [0.008]	0.281*** [0.008]
Being a Male	0.041*** [0.007]	0.039*** [0.007]	0.039*** [0.007]
<b>Education</b>			
High School	0.026* [0.014]	0.040** [0.018]	0.041** [0.018]
Specialized College	0.033** [0.015]	0.054*** [0.019]	0.054*** [0.019]
Junior College/Technical College	0.084*** [0.016]	0.105*** [0.019]	0.103*** [0.019]
University	0.091*** [0.014]	0.109*** [0.018]	0.105*** [0.018]
Graduate School	0.142*** [0.019]	0.164*** [0.022]	0.159*** [0.022]
<b>Income</b>			
< 2.5 Million	-0.013 [0.014]	0.003 [0.019]	0.003 [0.019]
>=2.5 Million and <5 Million	0.020 [0.014]	0.034* [0.019]	0.033* [0.019]
>=5 Million and <7.5 Million	0.039*** [0.015]	0.052*** [0.019]	0.051*** [0.019]
>=7.5 Million and <10 Million	0.059*** [0.016]	0.064*** [0.020]	0.062*** [0.020]

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Table 6 *continued*

	(1) OLS	(2) Probit (Marginal Effects)	(3) Probit (Marginal Effects)
>=10 Million and <15 Million	0.098*** [0.018]	0.100*** [0.022]	0.097*** [0.022]
>= 15 Million	0.124*** [0.025]	0.125*** [0.028]	0.120*** [0.028]
Don't Know/Not Say	-0.027** [0.014]	-0.021 [0.019]	-0.023 [0.019]
<b>Occupation</b>			
Company Employee	-0.008 [0.008]	0.018** [0.008]	0.017** [0.008]
Government Employee	-0.025 [0.017]	-0.003 [0.016]	0.002 [0.016]
Self-Employed	-0.008 [0.012]	0.012 [0.012]	0.011 [0.012]
Part-Timer	-0.043*** [0.009]	-0.026*** [0.010]	-0.027*** [0.010]
Full-Time Homemaker	-0.014 [0.009]	0.004 [0.009]	0.003 [0.009]
<b>Frequency of Information Acquired</b>			
About Once a Week	-0.114*** [0.008]	-0.103*** [0.008]	-0.102*** [0.008]
About Once a Month	-0.159*** [0.011]	-0.137*** [0.011]	-0.135*** [0.011]
Less Often than Once a Month	-0.268*** [0.008]	-0.251*** [0.008]	-0.250*** [0.008]
Never	-0.301*** [0.008]	-0.323*** [0.009]	-0.321*** [0.009]
Others	-0.301*** [0.068]	-0.291*** [0.064]	-0.281*** [0.065]
<b>Regional Group Dummies</b>			
Group 2		-0.002 [0.013]	
Group 3		0.021** [0.008]	
Group 4		0.031*** [0.006]	
Group 5		-0.053** [0.026]	
Prefecture Dummies	YES	NO	YES
Constant	-0.628*** [0.035]		
R-sq/Pseudo R-sq	0.278	0.238	0.241
N	25,000	25,000	25,000

Note: Reference groups: for education, those with primary and secondary education and those who do not report their education); for income, the no-income group; for occupation, students, unemployed, and others; for frequency of financial information, almost every day; and for prefectures, Hokkaido.

Source: Authors' estimation.

The relationships between the decision to hold a financial product and the other control variables are consistent with our expectations. Individuals who had received financial education either at their company or at school were more likely to buy all three financial products. While men were more likely to possess a financial product than women were, older respondents seemed to be more risk averse than younger ones.<sup>2</sup> More educated individuals were also more likely to hold at least one financial product. For example, those with a graduate degree were more likely to hold a financial product than those with only secondary education by 14 to 16 percentage points. We also found a positive correlation between income and the possession of financial products. The results indicate that the likelihood of holding a financial product was not different between those with an annual income below 5 million yen per year and the reference group (i.e. those without any income). Those with an annual income between 5 million yen and 7.5 million yen were more likely to have financial products than the reference group by about 3–5 percentage points. The corresponding figures for those with an annual income from 7.5 to 10 million yen, from 10 million to 15 million yen, and higher than 15 million yen were 6 percentage points, 10 percentage points, and 12 percentage points, respectively. We did not find a difference in the likelihood of holding financial products between the reference group (including students, the unemployed, and those who did not report their profession) and those who work as salaried employees, government employees, self-employed, or full-time homemakers. However, part-time workers were less likely to hold financial products than the reference groups. Those who read financial and economic news/information daily also had a higher likelihood of holding financial products.

**Table 7: Financial Knowledge and the Decision to Purchase Financial Products (Stocks, Investment Trusts, or Foreign Currency)**

	(4) OLS	(5) Probit (Marginal Effects)	(6) Probit (Marginal Effects)
Financial Knowledge	0.102*** [0.003]	0.096*** [0.003]	0.096*** [0.003]
Financial Education	0.129*** [0.011]	0.125*** [0.011]	0.125*** [0.011]
Age (in Log)	0.248*** [0.008]	0.265*** [0.008]	0.266*** [0.008]
Being a Male	0.033*** [0.007]	0.031*** [0.007]	0.031*** [0.007]
<b>Education</b>			
High School	0.023 [0.014]	0.036** [0.018]	0.037** [0.018]
Specialized College	0.029* [0.015]	0.050*** [0.019]	0.050*** [0.019]
Junior College/Tech. College	0.079*** [0.016]	0.100*** [0.019]	0.099*** [0.019]
University	0.083*** [0.014]	0.100*** [0.018]	0.097*** [0.018]
Graduate School	0.133*** [0.019]	0.155*** [0.022]	0.150*** [0.022]

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<sup>2</sup> We, however, did not find any non-linear relationship between age and the likelihood of holding a financial product. The estimation results are available on request.

Table 7 continued

	(4) OLS	(5) Probit (Marginal Effects)	(6) Probit (Marginal Effects)
<b>Income</b>			
< 2.5 Million	-0.013 [0.014]	0.003 [0.019]	0.003 [0.019]
>=2.5 Million and <5 Million	0.020 [0.014]	0.034* [0.019]	0.033* [0.019]
>=5 Million and <7.5 Million	0.039*** [0.015]	0.051*** [0.019]	0.050*** [0.019]
>=7.5 Million and <10 Million	0.057*** [0.016]	0.063*** [0.020]	0.061*** [0.020]
>=10 Million and <15 Million	0.097*** [0.018]	0.099*** [0.022]	0.095*** [0.022]
>=15 Million	0.121*** [0.025]	0.121*** [0.028]	0.116*** [0.028]
Don't Know/Not Say	-0.022 [0.014]	-0.016 [0.019]	-0.018 [0.019]
<b>Occupation</b>			
Company Employee	-0.008 [0.008]	0.017** [0.008]	0.017** [0.008]
Government Employee	-0.027 [0.017]	-0.005 [0.015]	-0.000 [0.015]
Self-Employed	-0.007 [0.012]	0.013 [0.011]	0.012 [0.011]
Part-Timer	-0.041*** [0.009]	-0.024** [0.010]	-0.026*** [0.010]
Full-Time Homemaker	-0.013 [0.009]	0.005 [0.009]	0.004 [0.009]
About Once a Week	-0.113*** [0.008]	-0.101*** [0.008]	-0.099*** [0.008]
About Once a Month	-0.154*** [0.011]	-0.131*** [0.011]	-0.130*** [0.011]
Less Often than Once a Month	-0.261*** [0.008]	-0.242*** [0.008]	-0.241*** [0.008]
Never	-0.289*** [0.008]	-0.311*** [0.009]	-0.309*** [0.009]
Others	-0.298*** [0.067]	-0.288*** [0.063]	-0.278*** [0.064]
<b>Regional Group Dummies</b>			
Group 2		-0.002 [0.013]	
Group 3		0.019** [0.008]	
Group 4		0.030*** [0.006]	
Group 5		-0.051** [0.026]	
Prefecture Constant	YES -0.567*** [0.035]	NO	YES
R-sq/Pseudo R-sq	0.284	0.243	0.247
N	25,000	25,000	25,000

Source: Authors' estimation.

We also examined the relationship between financial knowledge, the main subcomponent of the financial literacy score, and the decision to hold a financial product. We present the estimation results in Table 7. The financial knowledge score was positively associated with the likelihood of purchasing a financial product, and this relationship was statistically significant at the 1% level. A one standard deviation increase in financial knowledge increased the likelihood of holding a financial product by about 10 percentage points. This figure is slightly higher than that for the overall financial literacy score, suggesting that financial knowledge may play a dominant role in the relationship between financial literacy and the likelihood of holding a financial product. For the other variables, we found that their relationships with financial knowledge were not significantly altered compared with the results presented in Table 6.

Table 8 reports the effect of financial literacy on the likelihood of holding individual financial products. The dependent variables in this table are also binary variables, which take the value of one if an individual had bought stocks (columns 7 and 8), investment trusts (columns 9 and 10), or foreign currency (columns 11 and 12) and zero otherwise. We used linear probability regressions in columns 7, 9, and 11 and probit regressions in columns 8, 10, and 12.

**Table 8: Financial Literacy and the Decision to Buy Stock, Invest in an Investment Trust, or Hold Foreign Currency**

	(7)	(8)	(9)	(10)	(11)	(12)
	Buying Stock=1		Buying Investment Trust=1		Buying Foreign Currency=1	
	OLS	Probit	OLS	Probit	OLS	Probit
Financial Literacy	0.060*** [0.003]	0.057*** [0.003]	0.060*** [0.003]	0.060*** [0.003]	0.034*** [0.003]	0.034*** [0.003]
Financial Education	0.133*** [0.011]	0.119*** [0.010]	0.129*** [0.010]	0.113*** [0.009]	0.134*** [0.009]	0.102*** [0.008]
Age (in Log)	0.212*** [0.008]	0.235*** [0.008]	0.208*** [0.008]	0.240*** [0.008]	0.101*** [0.007]	0.126*** [0.008]
Being a Male	0.078*** [0.007]	0.076*** [0.007]	-0.003 [0.006]	-0.006 [0.007]	-0.006 [0.006]	-0.008 [0.006]
<b>Education</b>						
High School	0.026 [0.016]	0.041** [0.017]	0.006 [0.015]	0.020 [0.016]	0.004 [0.014]	0.019 [0.014]
Specialized College	0.014 [0.017]	0.033* [0.018]	0.009 [0.017]	0.025 [0.018]	0.021 [0.015]	0.041*** [0.015]
Junior College/Technical College	0.059*** [0.017]	0.080*** [0.018]	0.050*** [0.017]	0.070*** [0.018]	0.037** [0.015]	0.058*** [0.015]
University	0.076*** [0.016]	0.090*** [0.017]	0.070*** [0.015]	0.085*** [0.016]	0.053*** [0.014]	0.070*** [0.014]
Graduate School	0.115*** [0.020]	0.129*** [0.021]	0.108*** [0.019]	0.125*** [0.021]	0.120*** [0.017]	0.128*** [0.019]
<b>Income</b>						
< 2.5 Million	-0.010 [0.016]	0.003 [0.018]	-0.001 [0.015]	0.018 [0.017]	-0.015 [0.014]	-0.008 [0.016]
>=2.5 Million and <5 Million	0.018 [0.015]	0.025 [0.018]	0.034** [0.015]	0.048*** [0.017]	-0.008 [0.013]	-0.003 [0.016]
>=5 Million and <7.5 Million	0.036** [0.016]	0.042** [0.018]	0.038** [0.016]	0.052*** [0.018]	0.014 [0.014]	0.016 [0.017]

*continued on next page*

Table 8 *continued*

	(7)	(8)	(9)	(10)	(11)	(12)
	Buying Stock=1		Buying Investment Trust=1		Buying Foreign Currency=1	
	OLS	Probit	OLS	Probit	OLS	Probit
>=7.5 Million and <10 Million	0.049*** [0.017]	0.048** [0.019]	0.056*** [0.017]	0.063*** [0.019]	0.031** [0.015]	0.025 [0.017]
>=10 Million and <15 Million	0.086*** [0.019]	0.076*** [0.021]	0.095*** [0.019]	0.090*** [0.020]	0.059*** [0.017]	0.040** [0.019]
>=15 Million	0.126*** [0.025]	0.107*** [0.027]	0.150*** [0.025]	0.129*** [0.026]	0.099*** [0.022]	0.066*** [0.024]
Don't Know/Not Say	-0.029* [0.016]	-0.030* [0.018]	-0.009 [0.015]	-0.003 [0.017]	-0.026* [0.014]	-0.031* [0.016]
<b>Occupation</b>						
Company Employee	-0.010 [0.008]	0.018** [0.008]	-0.033*** [0.008]	0.002 [0.008]	0.012* [0.007]	0.030*** [0.007]
Government Employee	-0.041*** [0.015]	-0.007 [0.015]	-0.027* [0.015]	0.010 [0.015]	0.008 [0.013]	0.030** [0.013]
Self-Employed	-0.015 [0.011]	0.007 [0.011]	-0.056*** [0.011]	-0.024** [0.010]	0.014 [0.010]	0.027*** [0.010]
Part-Timer	-0.039*** [0.009]	-0.023** [0.010]	-0.058*** [0.009]	-0.041*** [0.009]	-0.017** [0.008]	-0.011 [0.008]
Full-Time Homemaker	-0.013 [0.009]	0.010 [0.009]	-0.024*** [0.009]	-0.002 [0.009]	-0.011 [0.008]	-0.001 [0.008]
<b>Frequency of Information Acquired</b>						
About Once a Week	-0.132*** [0.007]	-0.112*** [0.008]	-0.098*** [0.007]	-0.078*** [0.008]	-0.089*** [0.006]	-0.074*** [0.007]
About Once a Month	-0.186*** [0.010]	-0.158*** [0.011]	-0.120*** [0.010]	-0.093*** [0.010]	-0.105*** [0.009]	-0.086*** [0.009]
Less Often than Once a Month	-0.270*** [0.008]	-0.253*** [0.008]	-0.198*** [0.007]	-0.181*** [0.007]	-0.158*** [0.007]	-0.149*** [0.006]
Never	-0.286*** [0.008]	-0.305*** [0.008]	-0.208*** [0.008]	-0.232*** [0.008]	-0.167*** [0.007]	-0.186*** [0.006]
Others	-0.249*** [0.070]	-0.221*** [0.067]	-0.251*** [0.068]	-0.225*** [0.053]	-0.192*** [0.061]	-0.181*** [0.043]
Constant	-0.511*** [0.037]		-0.504*** [0.036]		-0.201*** [0.032]	
R-sq/Pseudo R-sq	0.237	0.217	0.185	0.1867	0.122	0.146
N	25,000	25,000	25,000	25,000	25,000	25,000

Source: Authors' estimation.

The estimation results show that financial literacy is positively associated with the likelihood of holding stocks, investment trusts, or foreign currency, and this relationship was statistically significant at the 1% level. The effects of financial literacy on the likelihood of holding different types of financial products differed according to the product. A one standard deviation increase in financial literacy increased the likelihood of buying stocks or investment trusts by 6 percentage points, while it increased the likelihood of buying foreign currency by only 3 percentage points.

While, in general, the behavior of most of the other variables in this table was not qualitatively different from that presented in Tables 4 and 5, there was some variation by product. Men were more likely to buy stocks than women were, while they were not different from women regarding their decisions to buy either investment trusts or foreign currency. An older person had a higher likelihood of buying stocks or investment trusts than foreign currency. With regard to the income level, not only did those with an annual income above 5 million have a higher propensity to buy investment trusts than those with at most secondary education, but those with an income from 2.5 million yen to 5 million yen also had a higher probability than those without income.

**Table 9: Determinants of Financial Literacy and Financial Knowledge**

Dependent Variable	(13)	(14)	(15)
	Financial Literacy	Financial Literacy	Financial Knowledge
Financial Education	0.214*** [0.021]	0.214*** [0.021]	0.242*** [0.020]
Age (in Log)	0.475*** [0.016]	0.473*** [0.016]	0.560*** [0.016]
Being a Male	-0.001 [0.014]	0.001 [0.014]	0.078*** [0.014]
<b>Education</b>			
High School	0.281*** [0.033]	0.281*** [0.033]	0.283*** [0.032]
Specialized College	0.263*** [0.036]	0.263*** [0.036]	0.262*** [0.035]
Junior College/Tech. College	0.358*** [0.036]	0.358*** [0.036]	0.357*** [0.035]
University	0.558*** [0.033]	0.557*** [0.033]	0.564*** [0.033]
Graduate School	0.716*** [0.043]	0.713*** [0.043]	0.715*** [0.042]
<b>Income</b>			
< 2.5 Million	0.269*** [0.034]	0.271*** [0.034]	0.234*** [0.033]
>=2.5 Million and <5 Million	0.407*** [0.034]	0.411*** [0.034]	0.354*** [0.033]
>=5 Million and <7.5 Million	0.508*** [0.035]	0.512*** [0.035]	0.451*** [0.034]
>=7.5 Million and <10 Million	0.538*** [0.037]	0.541*** [0.037]	0.487*** [0.036]
>=10 Million and <15 Million	0.551*** [0.041]	0.555*** [0.041]	0.496*** [0.040]
>=15 Million	0.461*** [0.055]	0.464*** [0.055]	0.440*** [0.054]
Don't Know/Not Say	0.040 [0.034]	0.042 [0.034]	-0.017 [0.033]

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**Table 9** *continued*

Dependent Variable	(13) Financial Literacy	(14) Financial Literacy	(15) Financial Knowledge
<b>Occupation</b>			
Company Employee	−0.135*** [0.016]	−0.135*** [0.016]	−0.117*** [0.016]
Government Employee	0.036 [0.034]	0.035 [0.034]	0.051 [0.033]
Self-Employed	−0.110*** [0.024]	−0.111*** [0.024]	−0.104*** [0.023]
Part-Timer	−0.129*** [0.019]	−0.127*** [0.019]	−0.134*** [0.019]
Full-Time Homemaker	−0.076*** [0.019]	−0.075*** [0.019]	−0.079*** [0.018]
About Once a Week	−0.043*** [0.015]	−0.043*** [0.015]	−0.054*** [0.015]
About Once a Month	−0.219*** [0.021]	−0.220*** [0.021]	−0.238*** [0.021]
Less Often than Once a Month	−0.342*** [0.016]	−0.342*** [0.016]	−0.375*** [0.016]
Never	−0.844*** [0.017]	−0.844*** [0.017]	−0.855*** [0.017]
Others	−0.141 [0.145]	−0.139 [0.145]	−0.146 [0.141]
Regional Group	NO	YES	NO
Prefecture	YES	NO	YES
Constant	−2.242*** [0.078]	−2.257*** [0.075]	−2.559*** [0.076]
R-sq/Pseudo R-sq	0.270	0.269	0.302
N	25,000	25,000	25,000

Source: Authors' estimation.

Table 9 reports our estimation results regarding the determinants of financial literacy and financial knowledge. The dependent variable in columns 13 and 14 is financial literacy, and that in column 15 is financial knowledge. In column 13 we controlled for prefecture dummies, and in column 14 we controlled for cluster group dummies. The estimation results indicate that financial education was strongly associated with both financial literacy and financial knowledge. Older persons also tended to have higher financial literacy and financial knowledge scores than younger ones. While an individual's gender did not affect his or her financial literacy overall, men were more likely to have greater financial knowledge than women were. This suggests that women were more likely to have "savvier" financial behavior and better financial attitudes than men. Those with higher education had higher financial literacy and financial knowledge scores. We also found that a higher income was linked with higher financial literacy scores. Those with annual incomes higher than 15 million yen per year had financial literacy scores and financial knowledge scores that were higher than those with no income by 40 percentage points. This gap was much smaller than the gap between those with income from 5 million yen per year and those with income from 15 million per year (ranging from 45 percentage points to 55 percentage points). With regard to the respondents' occupation, when we controlled for the education level as well as the

income level, company employees, the self-employed, part-time workers, and full-time homemakers had lower financial literacy and financial knowledge scores than the reference group (students and unemployed), while there was no significant difference between the government employees and the reference group. Those who read financial and economic news daily tended to have higher financial literacy and financial knowledge scores than those who read news less frequently.

We checked the robustness of our results using a structural economic model. We report the results in Table 10. Column 16 shows the results of the first equation concerning the decision to hold a financial product, while column 17 shows the results of the second equation regarding the determinants of financial literacy. We found that the results were not significantly different from those in Table 6 (column 1) and Table 9 (column 1). This confirms our previous findings about the role of financial literacy in the decision to hold financial products and the determinants of financial literacy.

**Table 10: Structural Equation Model: Two Simultaneous Equations:  
Decision to Purchase Financial Products; Financial Literacy**

	(16) Purchase Financial Products	(17) Financial Literacy
Financial Literacy	0.089*** [0.003]	
Financial Education	0.135*** [0.011]	0.214*** [0.022]
Age (in Log)	0.262*** [0.008]	0.473*** [0.016]
Being a Male	0.041*** [0.007]	0.001 [0.014]
<b>Education</b>		
High School	0.025 [0.016]	0.281*** [0.033]
Specialized College	0.032* [0.017]	0.263*** [0.036]
Junior College/Tech. College	0.084*** [0.017]	0.358*** [0.036]
University	0.093*** [0.016]	0.557*** [0.033]
Graduate School	0.146*** [0.020]	0.713*** [0.042]
<b>Income</b>		
< 2.5 Million	-0.014 [0.016]	0.271*** [0.033]
>=2.5 Million and <5 Million	0.020 [0.016]	0.411*** [0.032]
>=5 Million and <7.5 Million	0.040** [0.017]	0.512*** [0.034]

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Table 10 *continued*

	(16) Purchase Financial Products	(17) Financial Literacy
>=7.5 Million and <10 Million	0.060*** [0.018]	0.541*** [0.036]
>=10 Million and <15 Million	0.102*** [0.019]	0.555*** [0.040]
>=15 Million	0.129*** [0.026]	0.464*** [0.053]
Don't Know/Not Say	-0.026 [0.016]	0.042 [0.033]
<b>Occupation</b>		
Company Employee	-0.007 [0.008]	-0.135*** [0.016]
Government Employee	-0.029* [0.016]	0.035 [0.032]
Self-Employed	-0.007 [0.012]	-0.111*** [0.024]
Part-Timer	-0.041*** [0.010]	-0.127*** [0.020]
Full-Time Homemaker	-0.013 [0.009]	-0.075*** [0.019]
<b>Frequency of Information Acquired</b>		
About Once a Week	-0.115*** [0.008]	-0.043*** [0.015]
About Once a Month	-0.160*** [0.010]	-0.220*** [0.021]
Less Often than Once a Month	-0.270*** [0.008]	-0.342*** [0.016]
Never	-0.302*** [0.008]	-0.844*** [0.017]
Others	-0.306*** [0.072]	-0.139 [0.147]
<b>Regional Group Dummies</b>		
Group 2	-0.003 [0.013]	0.023 [0.027]
Group 3	0.020** [0.008]	0.079*** [0.017]
Group 4	0.032*** [0.006]	0.008 [0.013]
Group 5	-0.045* [0.026]	-0.020 [0.054]
Constant	-0.581*** [0.036]	-2.257*** [0.073]

Source: Authors' estimation.

## 5. CONCLUSIONS

Based on a sample of 25,000 respondents, we analyzed both the effects of financial literacy on the savings behavior of Japanese people and the determinants of financial literacy. The results were consistent with those of other studies. We found that both financial literacy and financial education were correlated significantly and positively with investment in the three financial products that this study considered—stocks, investment trusts, and foreign currency. Purchases of these products were also positively associated with age, male gender, education, and income levels.

We found that the level of financial literacy was significantly and positively correlated with having received financial education, age, education level, and income. The results for gender were mixed, with males scoring significantly higher in some specifications but not in others. Correcting for possible endogeneity by estimating a combined structural model for investment in financial products and financial literacy confirmed the results.

The results imply that policy measures to increase financial education can improve financial literacy and thereby have a positive impact on savings. This suggests that programs to strengthen financial literacy can exert a significant and positive macroeconomic impact.

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