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**Financial Literacy and Securities
Investments: Based on the Results
of “Survey on Wealth Building,
Securities Investment and
Financial Literacy”**

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Financial Literacy and Securities Investments:*

Based on the Results of “Survey on Wealth Building, Securities Investment and Financial Literacy”

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Abstract

Japanese households are reluctant to invest in stocks. In recent times, the Japanese government has established new securities investment schemes such as NISA and iDeCo to aim at the wealth-building of households. According to prior research conducted by van Rooij et al. (2011), how the household conducts securities investments is influenced by the level of financial literacy of the household. The low financial literacy of Japanese households may cause them not to invest in stocks. In order to clarify the situation in Japan, we conducted a questionnaire survey targeting general consumers with the title “Survey on Wealth Building, Securities Investment, and Financial Literacy” in April 2019 and received responses from 1,000 people. We found that people with higher financial literacy are likely to make more stock investments and can obtain higher yields from investment. Furthermore, we found that those with higher financial literacy were also likely to be taking financially desirable actions (such as diversified investment portfolios and implementing life planning).

Key Words

Financial Literacy; Securities Investment; Survey; Stock Participation.

1. Introduction

It is well known that Japanese households are reluctant to invest in stocks. Japanese households hold more than half of their financial assets in bank deposits. In recent years, the Japanese government has begun promoting a small investment tax exemption schemes, such as NISA (Nippon Individual Savings Account) and iDeCo (Individual-type Defined Contribution Pension Plan) to achieve stable wealth-building of the households. In 2018, the government initiated “Installment-type NISA” to promote long-term, diversified, and installment-type investments from small amounts. In such ways, the promotion of wealth-building of households through securities investments has become a significant policy challenge.

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In the academic community as well, the correlation between financial literacy and securities investment behavior is a subject of proactive research. For example, van Rooij et al. (2011) clarified that those with higher financial literacy tend to be more active in stock investments using data from a questionnaire survey. Recently, Bekaert et al. (2017) found that those who have higher financial literacy are likely to diversify their defined contribution pension plan portfolio. Therefore, Low financial literacy of Japanese households may cause their low stock market participation and undiversified portfolio.

The impact that financial literacy has on wealth building through the securities market is an important research theme. Thus, in order to gather necessary data concerning Japan, we decided to conduct a web survey with the title “Survey on Wealth Building, Securities Investment, and Financial Literacy.” Regarding financial literacy measures, in addition to the three major questions used by Lusardi and Mitchell (2008, 2014) (basic questions on compound interest, inflation, and diversified investment), various questions were formulated concerning other prior research and surveys. Additionally, Allgood and Walstad (2016) pointed out that one’s subjective evaluation (self-confidence) and objective evaluation toward financial literacy, respectively, have different ways of influencing one’s financial behavior. Therefore, we included questions related to subjective evaluation of their own financial literacy level. One feature of this paper is the attempt made to measure financial literacy based on various scales.

The structure of this paper is as follows. Section 2 is a report on the summary of the survey and the basic attributes of the respondents. In Section 3, we analyze the correlation between the level of financial literacy measured from various angles and securities investments or the lack thereof. In Section 4, we examine the correlation between the level of financial literacy and investment performance. Section 5 confirms whether those with higher financial literacy are inclined to engage in desirable financial behavior. Finally, we summarize the conclusion of this paper in Section 6.

2. Summary of the “Survey on Wealth Building, Securities Investment and Financial Literacy ” and basic attributes of the respondents

(1) Summary of the survey

“Survey on Wealth Building, Securities Investment, and Financial Literacy” (hereafter “the Survey”) was conducted from April 5-8, 2019, using Rakuten Insight’s web survey service. There were 1,000 respondents between the 20s to 50s age group who (1) are presently working, (2) are not working in a financial field or a position requiring high-level financial knowledge, (3) have a clear academic background, and (4) have seriously read the questions. The respondents who met the foregoing conditions were screened, and 500 of those who own either stock or investment trusts and 500 of those who own neither, a total of 1000 persons, were chosen as subjects for the Survey.

Regarding the questionnaire sheet, it was created based on our previous questionnaire sheets (Yamori, Ueyama, Yanagihara [2018]), with reference to questions from Bekaert et al. (2017), Korniotis and Kumar (2005), Lusardi and Mitchell (2008, 2014), OECD INFE (2011), Committee for the Promotion of Financial Education’s “Financial Literacy Map,” Japan Securities Dealers Association’s “2018 Nationwide Survey on Securities Investments

(individual survey), and Japan Securities Dealers Association's "2018 Individual Investors' Awareness Survey on Securities Investments."

(2) Basic attributes of respondents

In the Survey conducted in a manner as mentioned above, approximately 40% of the samples were regular employees of small to medium-size companies, and 20% were regular employees of large companies. 80% were male, and 20% were female. Calculating their average annual income and amount of assets under a specific assumption¹, the average annual income of the respondents was 6.13 million yen, and the annual income of their spouses was 2.71 million yen. The average financial assets of the respondents were 13.59 million yen, average real estate assets were 10.17 million yen, and the average loan balance was 5.87 million yen.

Those who are presently investing in stocks were 38.7%, while those with previous stock investment experience was 7.4%. 53.9% of the total respondents did not have any experience in stock investments, 11.1% of them replied "I've never invested in stocks, but I would like to try," 23.9% replied "I've never invested in stocks, and I'm not sure about the future," and only slightly less than 20% replied "I've never invested in stocks and I don't plan to." Many people in the Survey are potentially interested in stock investments.

To those who have experience in stock investments, we inquired about their experience in stock investments and their motive for engaging in such investments. As a result, a great percentage (39.5%) replied "I learned about hospitality programs for stockholders²," followed by "I wanted to increase my present income" (37.9%), then "I learned that small investments (from 1,000 yen, for example) is possible" (26.2%) and "I learned of tax benefits related to investments (e.g., NISA and iDeCo)" (22.4%), indicating "hospitality programs for stockholders" constitute a vital opportunity for stock investments.

¹ In the Survey, we did not ask for the exact amount of income and assets. Instead, we asked respondents to choose from options (e.g., over 6 million yen to 10 million yen or less). Therefore, we estimated the amount using the median of the options.

² The "hospitality programs for stockholders" are widespread in Japan. About 40% of listed companies in Japan have such programs. Under this program, stockholders can receive not only dividends but also their own products (for example, beverage manufacturers distribute their beverages) or prepaid cards.

3. Financial literacy and securities investments

(1) Subjective level of financial literacy and securities investments

Table 1 Self-evaluation on financial knowledge according to stock/investment trust ownership

	Total	Owners	Non-owners
Total	1000 (100%)	500 (100%)	500 (100%)
1. Considerably inferior to average	203 (20.3%)	69*** (13.8%)	134*** (26.8%)
2. Slightly lower than average	215 (21.5%)	99 (19.8%)	116 (23.2%)
3. Average	289 (28.9%)	194*** (38.8%)	95*** (19.0%)
4. Slightly knowledgeable than average	106 (10.6%)	84*** (16.8%)	22*** (4.4%)
5. Considerably knowledgeable than average	32 (3.2%)	18 (3.6%)	14 (2.8%)
6. Unsure	155 (15.5%)	36*** (7.2%)	119*** (23.8%)
Chi-square statistic	—	137.3***	

Note) ***indicates statistically significant difference at 1% level, ** at 5% level and *at 10% level.

■ indicates a statistically significantly high value and ■ indicates statistically significantly low value. The same applies to tables hereafter.

Table 1 shows the results of the self-evaluation of the respondents' financial knowledge. A great number (28.9%) replied, "Average," followed by "Slightly lower than average" at 21.5%, then "Considerably inferior to average" at 20.3%. So, 41.8% responded lower than average (total of "considerably inferior" and "slightly lower"), while 13.8% replied more knowledgeable than average (total of "slightly knowledgeable" and "considerably knowledgeable"). Nearly a majority considered themselves lower than average regarding their financial knowledge, and slightly more than 10% regarded themselves knowledgeable.

The two right columns in Table 1 is a comparison of self-valuation on financial knowledge according to stock/investment trust ownership. Allgood and Walstad (2016) pointed out that subjective evaluation (self-confidence) and objective evaluation of financial literacy influence one's financial behavior in different ways. We can easily imagine that even if one has proper knowledge, he/she may hesitate if he/she lacks self-confidence. Therefore, there is a possibility that subjective self-evaluation has a more significant impact on financial behavior.

According to Table 1, a significant difference at the 1% level can be seen in the self-evaluation of financial knowledge according to ownership of shares/investment trusts. A significantly greater number of stock/investment trust owners responded "Average" or "Slightly more knowledgeable than average," while a significant number of non-owners responded, "Significantly lower than average" or "Unsure." Incidentally, the ratio of stock/investment trust owners who responded "Knowledgeable" (total of "slightly knowledgeable" and "considerably knowledgeable") in their self-evaluation was 20.4%, while the ratio of stock/investment trust non-owners who responded "Knowledgeable" was only 7.2%. The difference is statistically significant at the 1% critical level. Also, 33.6% of stock/investment trust owners replied "Lower than average" (total of "considerably inferior" and "slightly

lower”), while 50% of the non-owners replied “Lower than average,” indicating that the majority of non-owners of stock/investment trusts evaluated themselves as lacking in financial knowledge.

(2) Three Questions of Lusardi and Mitchell (2008) and securities investments

In this survey, the three questions of Lusardi and Mitchell (2008), known to be an internationally established scale with regard to financial literacy (questions related to interest rate calculation, the impact of inflation, and diversified investment), have been used. Following Campbell (2016), we call these three questions “the Big Three.”

First, Table 2 shows the results of the question, “If 1 million yen in cash is put into a 1-year maturity bank term deposits (2% annual interest rate) and left without withdrawing and renewed under the same conditions, how much do you expect to receive after five years?” This question surveys the understanding with regard to interest rate calculation (compound interest effect). The correct answer is “1. More than 1.1 million yen,” and 45.8% answered correctly.

Table 2 Understanding of interest rate calculation (compound interest)

Total	1000 (100%)
1. More than 1.1 million yen (correct answer)	458 (45.8%)
2. 1.1 million yen exactly	140 (14.0%)
3. Less than 1.1 million yen	245 (24.5%)
4. Unsure	157 (15.7%)

The next question was, “Suppose prices are declining at an annual rate of 5%, and the annual interest rate of bank accounts is 3%. If money is deposited in a bank account for one year, what do you think would generally happen to the amount of commodities and services you can purchase with that money after one year?” Table 3 shows the results thereof. This question examines the understanding of deflation (and real interest rate). The correct answer is “3. It will increase,” and 37.1% answered correctly.

Yamori, Ueyama, and Yanagihara (2018) asked a similar question, “Suppose the annual inflation rate is 5%, and the annual bank interest rate is 3%.” The question asked about the effect of inflation. The rate of correct answers to this question was high at 78%, which means that Japanese people have a better understanding of inflation than deflation³. Japan has been struggling amid a deflation trend since around 2000, but it appears that fewer people understand the meaning of deflation compared to inflation.

³ Note that Yamori, Ueyama, and Yanagihara (2018) targeted people in their 60s, 70s, and 80s, while this paper targeted people in their 20s, 30s, 40s, and 50s. The difference may come from these age differences.

Table 3 Understanding of deflation / real interest rate

Total	1000 (100%)
1. Will decrease	280 (28.0%)
2. No change	104 (10.4%)
3. Will increase (correct answer)	371 (37.1%)
4. Unsure	245 (24.5%)

Thirdly, we asked the question “Generally speaking, do you think that investment yield is more stable if stocks of one company are purchased rather than if stock investment trusts (investment in stocks of multiple companies) are purchased?” Table 4 shows the results. This question examines the understanding of the advantages of diversified investment. The correct answer is “2. I do not think so,” and the rate of correct answers was 55.3%.

Table 4 Understanding of diversified investment

Total	1000 (100%)
1. I think so	94 (9.4%)
2. I do not think so (correct answer)	553 (55.3%)
3. Unsure	353 (35.3%)

Table 5 shows the results of the number of correct answers to the preceding three questions. 18.4% answered correctly to all the questions, 27.5% answered two questions correctly, and 28% answered one question correctly, while 26.1% could not answer any of the questions correctly.

The two right columns in Table 5 is a comparison of the number of correct answers to the Big Three (Q29-Q 31) according to stock/investment trust ownership. We found a significant difference at the 1% level in the number of correct answers to the Big Three according to stock/investment trust ownership. Roughly one-fourth of the stock/investment trust owners (25.4%) answered all the questions correctly, and 15% of the owners could not answer any of the questions correctly. On the other hand, the number of perfect scores on the part of non-owners was significantly low at roughly 10%, and about 40% of non-owners could not answer any of the questions correctly. Incidentally, the average rate of correct answers among stock/investment trust owners was 1.70, while the score was 1.06 among non-owners.

Table 5 Comparison of correct answers to the Big Three according to stock/investment trust ownership

	Total	Owners	Non-owners
Total	1000 (100%)	500 (100.0%)	500 (100.0%)
All answers (3 answers) correct	184 (18.4%)	127*** (25.4%)	57*** (11.4%)
2 answers correct	275 (27.5%)	173*** (34.6%)	102*** (20.4%)
1 answer correct	280 (28.0%)	125** (25.0%)	155** (31.0%)
All answers (3 answers) incorrect	261 (26.1%)	75*** (15.0%)	186*** (37.2%)
Chi-square statistic	—	95.4***	
Average no. of correct answers	1.38	1.70	1.06
Mann-Whitney U statistic	—	-9.66***	

(3) Ten applied financial literacy questions and securities investment

In this survey, in addition to the Big Three questions, we asked ten true-false questions, as shown in Table 6. Table 6 shows that in all questions, the rate of correct answers among stock/investment trust owners was significantly high at the 1% level, scoring over double that of non-owners. The questions for on which stock/investment trust owners scored highly: “9. Stock brokerage fee varies by the securities company” (Correct answer rate: 67.8%) and “6. In making long-term investments, an annual fee of an investment trust is not important” (Correct answer rate: 62.2%), both exceeding 60% in the rate of correct answers.

Table 6 Comparison of financial literacy according to stock/investment trust ownership
(Ten applied questions)

	Owners	Non-owners	Chi-square statistic
Total	500 (Correct answer rate)	500 (Correct answer rate)	
1. In general, when interest rates rise, bond prices also rise.	170*** (34.0%)	66*** (13.2%)	60.0***
2. From the perspective of post-retirement wealth building, employees of listed companies should hold the majority of their retirement reserve in their company's stock.	270*** (54.0%)	144*** (28.8%)	65.4***
3. In order to form wealth through stock investment, it is necessary to repeat buying and selling of stock in a timely and frequent manner.	173 (34.6%)	83 (16.6%)	42.5***
4. It is challenging to find stocks that will increase in price more than average even for those knowledgeable of the stock market.	301*** (60.2%)	175*** (35.0%)	63.7***
5. Generally speaking, investors who invest in 20 firms are less likely to suffer significant loss compared to investors who invest in 2 firms.	289*** (57.8%)	144*** (28.8%)	85.6***
6. In making long-term investments, an annual fee of an investment trust is not essential.	311*** (62.2%)	162*** (32.4%)	89.1***
7. In Japan, it is difficult to find investment trusts with an annual fee that is less than 1% of the assets.	180*** (36.0%)	53*** (10.6%)	90.3***
8. The deposit insurance system partially protects investment trusts purchased at banks.	188*** (37.6%)	74*** (14.8%)	67.2***
9. Stock brokerage fee varies by the securities company	339*** (67.8%)	154*** (30.8%)	136.9***
10. Financial ADR system (ADR: Alternative Dispute Resolution) is operated by financial companies and tends to be more advantageous for such businesses.	109*** (21.8%)	52*** (10.4%)	24.1***

Table 7 is a comparison of the number of correct answers for the ten applied questions in Table 6, according to stock/investment trust ownership or the lack thereof. Depending on the ownership of stock/investment trust or the lack thereof, we found a significant difference at the 1% level. Stock/investment trust owners dominated regarding six or more correct answers, while more than half of non-owners had one or less correct answers.

Incidentally, the average number of correct answers among stock/investment trust owners was 4.7, while non-owners scored half of that, namely 2.2, manifesting a significant difference between scores of owners and non-owners.

Table 7 Comparison of the number of correct answers for applied questions according to stock/investment trust ownership

	Owners	Non-owners
Total	500 (100.0%)	500 (100.0%)
All answers (10) correct	14*** (3.8%)	0*** (0%)
9 answers correct	30*** (6.0%)	10*** (2.0%)
8 answers correct	44*** (8.8%)	13*** (2.6%)
7 answers correct	69*** (13.8%)	21*** (4.2%)
6 answers correct	70*** (14.0%)	30*** (6.0%)
5 answers correct	57 (11.4%)	49 (9.8%)
4 answers correct	48* (9.6%)	33 (6.6%)
3 answers correct	35 (7.0%)	38 (7.6%)
2 answers correct	31 (6.2%)	24 (4.8%)
1 answers correct	21*** (4.2%)	47*** (9.4%)
All answers (10) incorrect	81*** (16.2%)	235*** (47.0%)
Chi-square statistic	171.8***	
Average no. of correct answers	4.66	2.21
Mann-Whitney U statistic	-12.7***	

(4) Understanding of present value and securities investments

In order to compare the understanding of discounted present value of future cash flows, we asked the question, “Which has a higher value, financial product A which offers a total of 50,000 yen, 10,000 yen annually from this year for five years, or financial product B which offers 50,000 yen in lump sum five years from now?” Table 8 shows the comparison of the correct answers according to stock/investment trust ownership or the lack thereof.

The present value of financial product A which offers annually 10,000 yen for five years is higher than the present value of product B. The rate of correct answers among stock/investment trust owners was 51.2%, whereas non-owners scored 30.2%. Therefore, there is a significant difference between owners and non-owners regarding the understanding of the present value of future cash flows.

Table 8 Comparison in the understanding of present value according to stock/ investment trust ownership

	Owners	Non-owners
Total	500 (100.0%)	500 (100.0%)
1. Value of financial product A is high (correct answer)	256*** (51.2%)	151*** (30.2%)
2. Value of financial product B is high	72 (14.4%)	64 (12.8%)
3. Both are the same	113 (22.6%)	101 (20.2%)
4. Unsure	59*** (11.8%)	184*** (36.8%)
Chi-square statistic	92.5***	

(5) Understanding of consumption tax calculation and securities investment

In order to compare the understanding of the consumption tax calculation, we asked, “Suppose the consumption tax rate is 10%. To purchase a product that is 11,000 yen excluding tax, how much do you need to pay?” Table 9 shows the correct answer rate according to the ownership of stock/investment trust or the lack thereof. The rate of correct answers among stock/investment trust owners was 80.0%, whereas the rate was 67.0% among non-owners. A significantly low correct answer rate was observed among non-owners.

Table 9 Comparison in the understanding of consumption tax calculation according to stock/investment trust ownership

	Owners	Non-owners
Total	500 (100.0%)	500 (100.0%)
1. 1,100 yen	9** (1.8%)	21** (4.2%)
2. 10,000 yen	13** (2.6%)	4** (0.8%)
3. 10,100 yen	16** (3.2%)	6** (1.2%)
4. 11,100 yen	22 (4.4%)	29 (5.8%)
5. 12,100 yen (correct answer)	400*** (80.0%)	335*** (67.0%)
6. Unsure	40*** (8.0%)	105*** (21.0%)
Chi-square statistic	50.0***	

(6) Understanding of the stock market function and securities investment

Table 10 shows the comparison of the understanding of the stock market function according to the ownership of stock/investment trust or the lack thereof. Looking at the rate of selection of the correct options “3. Stock market mediates persons who want to buy and persons who want to sell” and “4. The maximum loss for stock purchased

for 1 million yen is 1 million yen,” 68.8% of stock/investment trust owners selected “3” and 42% of non-owners selected “3.” Also, 35% of stock/investment trust owners selected “4,” while 15.6% of non-owners selected “4.” The results manifested that the rate of correct answers given by non-owners of stock/investment trust was significantly low.

Table 10 Comparison of understanding of the stock market according to stock/investment trust ownership

	Owners	Non-owners	Chi-square statistic
Total	500 (Selection rate)	500 (Selection rate)	
1. Future stock prices can be forecasted.	16** (3.2%)	6** (1.2%)	4.65*
2. Stock prices should increase.	18 (3.6%)	9 (1.8%)	3.08
3. Stock market mediates persons who want to buy and persons who want to sell (correct answer).	344*** (68.8%)	210*** (42.0%)	72.7***
4. The maximum loss for stock purchased for 1 million yen is 1 million yen (correct answer).	175*** (35.0%)	78*** (15.6%)	49.8***
5. All statements above are incorrect.	49*** (9.8%)	76*** (15.2%)	6.67**
6. Unsure.	63*** (12.6%)	191*** (38.2%)	86.5***

(7) Understanding of stock ownership and securities investment

In order to compare the level of understanding of owning stock, we asked the question, “Which of the following explains the meaning of X buying Company B’s stock?” Table 11 shows the rate of correct answers according to stock/investment trust ownership or the lack thereof.

The correct option is “1. It means that X owns a part of Company B.” As shown in Table 11, 50% of stock/investment trust owners selected this option while the ratio was 39.6% among non-owners, indicating a significant low correct answer rate of non-owners. The rate of selection for “5. Unsure” was significantly high among non-owners of stock/investment trust.

Table 11 Comparison in the understanding of stock ownership according to ownership of stock/investment trust

	Owners	Non-owners	Chi-square statistic
Total	500 (Selection rate)	500 (Selection rate)	
1. It means X owns a part of Company B (correct answer).	250*** (50.0%)	198*** (39.6%)	10.9***
2. It means X is loaning Company B money.	119** (23.8%)	91** (18.2%)	4.73**
3. X bears the responsibility of debt repayment for Company B.	42 (8.4%)	39 (7.8%)	0.12
4. The above statements are all incorrect.	89*** (17.8%)	58*** (11.6%)	7.66***
5. Unsure.	55*** (11.0%)	160*** (32.0%)	65.3***

(8) Understanding of investment trust and securities investment

In order to compare the level of understanding with regard to an investment trust, we asked the question, “Which of the following is correct concerning investment trust?” Table 12 is a summary of the rate of correct answers according to stock/investment trust ownership or the lack thereof.

The correct option is “2. Investment trusts are invested in a wide range of financial assets (such as stocks and bonds).” 63.2% of stock/investment trust owners selected correctly, while the ratio was 27.4% among the non-owners, showing a significantly low ratio of correct answers among non-owners, less than half that of owners. Approximately 60% of non-owners of stock/investment trust selected “5. Unsure.”

Table 12 Comparison in the understanding of investment trust according to stock/investment trust ownership

	Owners	Non-owners	Chi-square statistic
Total	500 (Selection rate)	500 (Selection rate)	
1. When an investor purchases investment trust, it cannot be converted into cash during the first year.	11 (2.2%)	15 (3.0%)	0.63
2. Investment trusts are invested in a wide range of financial assets (such as stocks and bonds) (Correct answer).	316*** (63.2%)	137*** (27.4%)	129.3***
3. Based on past yields, investment trust guarantees the investor a specific yield.	36 (7.2%)	36 (7.2%)	0.00
4. The above statements are all incorrect.	46 (9.2%)	34 (6.8%)	1.96
5. Unsure.	110*** (22.0%)	299*** (59.8%)	147.8***

(9) Understanding of corporate bonds and securities investment

In order to compare the level of understanding with regard to corporate bonds, we asked the question, “Which of the following is correct with regard to X purchasing Company B’s corporate bond?” Table13 is a summary of the rate of correct answers according to ownership of stock/investment trust or the lack thereof.

The correct answer is, “2. It means X is loaning Company B money.” The rate of selecting the correct answer among stock/investment trust owners was 62.8%, while the corresponding ratio among non-owners was 40.4%, indicating a significantly low correct answer rate among the non-owners. Regarding stock/investment trust non-owners, a significantly high ratio of 38.8% selected “5. Unsure.”

Table 13 Comparison in the level of understanding of corporate bonds according to stock/investment trust ownership

	Owners	Non-owners	Chi-square statistic
Total	500 (Selection rate)	500 (Selection rate)	
1. It means X owns a part of Company B.	47 (9.4%)	42 (8.4%)	0.31
2. It means X is loaning Company B money (Correct answer)	314*** (62.8%)	202*** (40.4%)	50.2***
3. X bears the responsibility for debt repayment for Company B.	64 (12.8%)	63 (12.6%)	0.01
4. The above statements are all incorrect.	29 (5.8%)	28 (5.6%)	0.02
5. Unsure.	82*** (16.4%)	194*** (38.8%)	62.8***

(10) Awareness level of securities investment terminology and securities investment

In this survey, we inquired about the awareness level of ten financial terminologies listed in Table 14. The score for “I fully understand the contents” was 4 points, “I have heard of it and understand the general idea” was 3 points, “I have heard of it but do not understand the idea” was 2 points and “I have never heard of it” was 1 point. Based on this scoring system, we compared the mean value according to stock/investment trust ownership or the lack thereof. The higher the mean value, the higher the awareness level.

As Table 14 shows, the awareness level among stock/investment trust owners was significantly high at the 1% level for all terminology. In particular, the awareness level of “3. Takeover bid (TOB)” and “6. Stock margin trading⁴” was high with 2.69 points for stock/investment trust owners. On the other hand, the mean value among non-owners of stock/investment trust for all terminology was around the 1 point level.

⁴ Margin trading means that investors borrow funds (or stocks) from brokerages by offering cash and stocks as collateral and invest borrowed funds in stocks (or sell borrowed stocks).

Table 14 Comparison of the awareness level of stock/investment trust terminology

	Owners	Non-owners	Mann-U
1. Active investment	2.14	1.30	-14.4***
2. Brokerage commission for purchase and sales of stock	2.57	1.59	-14.7***
3. Takeover bid (TOB)	2.69	1.90	-13.5***
4. Consolidated taxation (Profit and loss offsetting system)	2.23	1.34	-14.0***
5. 3-year loss carry forward deduction	2.22	1.34	-13.8***
6. Stock margin trading	2.69	1.66	-16.3***
7. ESG investment	1.54	1.12	-9.21***
8. No-load investment trust	1.88	1.12	-13.8***
9. Investor protection fund	1.58	1.15	-9.76***
10. Financial ADR	1.52	1.11	-9.69***

4. Financial literacy and investment performance

(1) Diversified investment behavior according to financial literacy level

In this survey, we asked respondents to choose financial assets that they currently hold from 27 options, such as Yen denominated demand deposits, Yen denominated time deposits, stocks of Japanese companies, investment trusts investing in domestic stocks, and so on. Table 15 shows the comparison of the number of presently-owned financial product types according to the number of correct answers to Lusardi and Mitchell's Big Three questions. The average number of financial asset types invested by those who answered all questions correctly was 3.4, while the average number of types invested by those who answered all incorrectly was 1.3. The higher the financial literacy level of an individual is, the more types of financial assets he/she invests in. The results indicate a positive correlation between the number of correct answers and the number of investment types (correlation coefficient is 0.34). This difference is significant at the 1% level. Although statistically significant difference is not seen in the pair test with regard to the number of investment types between those with a perfect score and those with two correct answers, there was a significant difference at the 1% level in all other pairs.

Table 16 is a comparison of the number of types of financial products presently owned according to the financial literacy level evaluated from the ten applied questions in Q11. The average number of financial assets invested in by those who had a perfect score was 6.7 types, in contrast to the average of 1.3 types by those who had no correct answers. The higher the financial literacy level of an individual is, the more types of financial assets he/she invests in. The results based on Q11 also indicate a positive correlation between the number of correct answers and the number of investment types (correlation coefficient is 0.43).

Therefore, we find that people with high financial literacy tend to hold a more diversified portfolio.

Table 15 Average investment type according to financial literacy level (number of correct answers to Big Three)

	Number of persons	Average investment types (number)
3 correct answers (all correct)	184	3.40
2 correct answers	275	2.90
1 correct answer	280	2.04
0 correct answers (all incorrect)	261	1.32
Kruskal-Wallis statistic	141.6***	

Table 16 Average investment types according to the level of financial literacy (number of correct answers for ten applied questions)

	Number of persons	Average investment types
10 correct answers (all correct)	14	6.71
9 correct answers	40	4.07
8 correct answers	57	3.67
7 correct answers	90	3.69
6 correct answers	100	2.98
5 correct answers	106	2.54
4 correct answers	81	2.12
3 correct answers	73	1.90
2 correct answers	55	1.96
1 correct answer	68	1.96
0 correct answer (all incorrect)	316	1.34
Kruskal-Wallis statistic	204.5***	

(2) Comparison of financial literacy according to returns on financial assets

Table 17 is a comparison of the financial literacy level according to the average return rate from financial assets in the last five years. There was a significant difference at the 1% level in the average number of correct answers according to the return rate of financial assets for both the Big Three and the ten applied questions. This result shows that those who have achieved high returns have a tendency to score highly, on average.

Table 17 Comparison of the average number of correct answers to Big Three/applied questions by returns on financial assets

	Number of persons	Big Three (Q29 -Q31)	Applied questions (Q39)
Annual rate 10% or higher	27	2.07	5.44
Annual rate 5% or more - less than 10%	61	1.82	5.26
Annual rate 3% or more - under 5%	80	1.75	5.20
Annual rate 1% or more - under 3%	124	1.85	4.86
Annual rate 0% or more - under 1%	151	1.58	3.97
Nearly 0%	213	1.35	3.10
Negative	49	1.57	3.90
Unsure	295	0.82	1.69
Kruskal-Wallis statistic	—	146.8***	194.0***

(3) Comparison of financial literacy level according to the satisfaction level of returns on financial assets

The Survey asked the satisfaction level to the realized rate of return on financial assets. As we excluded those who replied “Unsure” to the rate of return on financial assets in Table 17, the question targeted 705 persons. Table 18 is a comparison of the financial literacy level according to the satisfaction level.

There was a significant difference at the 1% level in the average number of correct answers according to the satisfaction level to the rate of return on financial assets. There was a positive correlation between the satisfaction level and the average number of correct answers. The few numbers of respondents (12 respondents) failed to produce statistically significant results regarding those who responded, “Extremely satisfied.” However, in the pair test, there was a statistically significant difference in the average number of correct answers for those who replied, “2. Somewhat satisfied” and “4. Not satisfied.”

Table 18 Comparison of the average number of correct answers to Big Three/applied questions according to the satisfaction level of returns on financial assets

	Number of persons	Big Three (Q29 - Q31)	Applied questions (Q39)
1. Extremely satisfied	12	2.00	4.92
2. Somewhat satisfied	180	1.77	4.87
3. Not very satisfied	285	1.63	4.15
4. Not satisfied	228	1.46	3.59
Kruskal-Wallis statistic	—	11.5***	19.0***

5. Desirable financial behavior and financial literacy

(1) Awareness toward life planning

Life planning is essential to a stable life. In this survey, in order to compare the awareness of the importance of life planning throughout one's lifetime, the question "Q7. Are you presently conscious about life planning (formulating life planning, including future income and expenditures with various life events in mind)?" As a result, 14.1% replied, "1. I give considerable thought to it," 44.5% replied, "2. I give some thought to it," indicating that the majority (58.6%) are conscious about life planning. On the other hand, 24.1% replied, "3. I hardly give any thought to it," and 11.9% replied, "4. I do not give any thought to it," showing 36% are not thinking about life planning.

In this paper, we divided respondents into two groups. Namely, respondents who answered "I give considerable thought to it" and "I give some thought to it" were considered Good Performers (GP), and those who answered "I hardly give any thought to it" and "I do not give any thought to it" were considered Bad Performers (BP). Table 19 shows the comparison in the rate of correct answers to each of the questions regarding financial literacy between Good Performers (GP) and Bad Performers (BP). Here, those who replied "Cannot say" or "Forgot/not applicable" were excluded.

In all questions, we found a statistically significant difference at the 5% level in the rate of correct answers between GP and BP. The question which had the greatest difference was the question regarding the annual fee for investment trust, "Q39. 6. In long-term investment, the annual fee for investment trust is not important." There was a 22.3% point difference in the rate of correct answers between GP and BP.

Table 19 Comparison in the rate of correct answers according to life planning awareness

Question type	Breakdown	GP (Number of persons 586)	BP (Number of persons 360)	Difference	The rank of difference in descending order	Chi- square
Basic 3 questions (Q29-Q31)	Q29 (Compound interest)	52.9%	38.9%	14.0%	9	17.6***
	Q30 (Inflation)	42.7%	32.8%	9.9%	15	9.17***
	Q31 (Diversified investment)	63.8%	46.7%	17.1%	6	26.8***
Securities market - related questions	Q32. Future value	47.4%	33.9%	13.5%	10	16.8***
	Q33. Consumption tax calculation	78.5%	69.7%	8.8%	18	9.20***
	Q34. Stock market function	24.9%	15.8%	9.1%	17	10.9***
	Q35. Meaning of stock ownership	43.3%	30.6%	12.7%	14	15.4***
	Q36. Meaning of investment trust	51.4%	31.4%	20.0%	4	36.2***
	Q37. Meaning of corporate bond	54.3%	38.1%	16.2%	8	23.5***
10 applied questions (Q39)	1. Correlation between interest rate and bond	28.7%	18.9%	9.8%	16	11.4***
	2. Employee stock ownership rate (diversified investment)	48.6%	35.6%	13.0%	12	15.5***
	3. Frequency in buying/selling of stock	32.1%	18.9%	13.2%	11	19.7***
	4. Finding stocks with the potential of becoming bullish	57.8%	37.5%	20.3%	2	36.9***
	5. Number of invested issues (diversified investment)	53.4%	33.1%	20.3%	2	37.2***
	6. Annual fee for investment trust	58.4%	36.1%	22.3%	1	44.2***
	7. Investment trust fee of less than 1%	31.6%	13.3%	18.3%	5	40.0***
	8. Deposit protection system for investment trusts	32.4%	19.4%	13.0%	12	18.8***
	9. Security company's brokerage commission for buying/selling stocks	58.0%	41.1%	16.9%	7	25.5***
	10. Financial ADR system	19.8%	11.9%	7.9%	19	9.83***

(2) Various types of financial behavior and financial literacy

In this survey, we inquired regarding various types of financial behavior as shown in Table 20.

First, looking at the most highly-selected item under “It applies perfectly,” the item “I pay bills by the due date” had a 63.2% selection rate. The next highest item was “When withdrawing money from an ATM, I often choose a time when withdrawal fees are not incurred” with 53.1%, followed by “When choosing a credit card, I consider the annual fee” with 41.9%.

On the other hand, the item that was most often chosen as “It does not apply at all” was “I often delay in credit card repayment” with 72.5%, followed by “I use household account apps such as Money Forward for budget management” with 54.5%. Besides, the most highly-selected item under “I cannot say either way” was “I have set a long-term financial asset goal and have worked hard to reach the goal” with 35.5%.

Table 20 Financial behavior of respondents

	It perfectly applies	If anything, it applies	Cannot say either way	If anything, it does not apply	It does not apply at all	Forgot/not applicable
1. When starting a new financial transaction, I compare products from multiple companies or multiple products from the same.	124 (12.4%)	379 (37.9%)	285 (28.5%)	74 (7.4%)	64 (6.4%)	74 (7.4%)
2. When withdrawing money from an ATM, I often choose a time when withdrawal fees are not incurred.	531 (53.1%)	241 (24.1%)	141 (14.1%)	45 (4.5%)	28 (2.8%)	14 (1.4%)
3. I use household account apps such as Money Forward for budget management.	61 (6.1%)	76 (7.6%)	119 (11.9%)	130 (13.0%)	545 (54.5%)	69 (6.9%)
4. I consider carefully before purchase whether I can afford it.	190 (19.0%)	408 (40.8%)	248 (24.8%)	110 (11.0%)	34 (3.4%)	10 (1.0%)
5. I pay bills by the due date.	632 (63.2%)	230 (23.0%)	95 (9.5%)	22 (2.2%)	11 (1.1%)	10 (1.0%)
6. I am careful about the state of my household finances.	269 (26.9%)	448 (44.8%)	197 (19.7%)	58 (5.8%)	21 (2.1%)	7 (0.7%)
7. I have set a long-term financial asset goal and have worked hard to reach the goal.	99 (9.9%)	236 (23.6%)	355 (35.5%)	166 (16.6%)	130 (13.0%)	14 (1.4%)
8. When choosing a credit card, I consider the annual fee.	419 (41.9%)	367 (36.7%)	136 (13.6%)	46 (4.6%)	20 (2.0%)	12 (1.2%)
9. I often delay in credit card repayment.	6 (0.6%)	28 (2.8%)	90 (9.0%)	85 (8.5%)	725 (72.5%)	66 (6.6%)

Note) There were 1000 samples for all the questions (the sum of the ratios in the horizontal axis is 100%).

Table 21 Average value of rank for ten desirable financial behavior

Rank	Question	The average value of rank
1	Q39.5. Number of invested issues (diversified investment)	3.8
2	Q39.9. Security company's brokerage commission for buying/selling stocks	5.2
3	Q36. Meaning of investment trust	6.1
4	Q39.6. Annual fee for investment trust	6.2
5	Q39.4. Finding stocks with the potential of becoming bullish	7.1
6	Q29. (Big Three/compound interest calculation)	7.4
7	Q33. Calculation of consumption tax	7.8
8	Q32. Future value	8.5
9	Q30. (Big Three/inflation)	8.8
10	Q37. Meaning of corporate bond	10.4
11	Q35. Meaning of stock ownership	11.1
12	Q31. (Big Three/diversified investment)	11.6
13	Q39.1. Correlation between interest rates and bonds	12.3
14	Q39.2. Employee stock ownership rate (diversified investment)	12.4
15	Q39.7. Investment trust fee of less than 1%	12.5
16	Q34. Function of the stock market	12.7
17	Q39.8. Deposit protection system for investment trusts	13.0
18	Q39.3. Frequency of buying/selling stock	14.2
19	Q39.10. Financial ADR system	18.2

It is interesting to investigate which type of financial literacy encourages desirable financial behaviors. In the Survey, we obtained the awareness toward life planning and the nine types of financial behavior shown in Table 20. In the same manner, as explained regarding life planning awareness, we separated respondents into GP (persons engaging in good financial behavior) and BP (persons not engaging in good financial behavior). We calculated the rate of the correct answer of 19 financial literacy questions for GP and BP regarding each behavior. Then, we ranked 19 questions based on the difference in the rate of correct answer between GP and BP. For example, “Annual fee for investment trust,” is in the first place for life planning (shown in Table 19). The question “Annual fee for investment trust” is the second place for comparative behavior for financial products (not shown in the table). Considering the other eight financial behaviors, the average rank of the question is 6.2.

Table 21 summarizes the average of the ranks of these 19 questions. For example, the item “Annual fee for investment trust,” with an average rank of 6.2, is the fourth. The smaller the average value in Table 21 is, the more significant the difference in the correct answer rate between GP and BP is.

“Q39.5 Generally speaking, investors who invest in 20 companies are less likely to suffer major loss compared to investors who invest in 2 companies” is the question with the least average value. Namely, this knowledge reflects understanding or lack of understanding with regard to the concept of diversified investment. Therefore, knowledge about the diversified investment has the most significant determinant between persons engaging in good financial behavior (GP) and persons not engaging in good financial behavior (BP). Note that, although there is a question regarding diversified investment in the Big Three, it ranks 12th in Table 21 and remains in the middle. Despite the need to understand the concept of diversified investment, sufficient consideration is necessary as to what type of instructions with regard to diversified investment should be given. Also, the contents of questions to be given in the financial literacy test require further investigation.

6. Conclusion

In this paper, the correlation between financial literacy level and investment behavior using various scales was analyzed based on “Survey on Wealth Building, Securities Investment, and Financial Literacy” conducted in April 2019. The following results were obtained.

A significant difference at the 1% level was found in the self-evaluation of financial knowledge according to stock/investment trust ownership or the lack thereof. The ratio of stock/investment trust owners who evaluated themselves “Knowledgeable” was 20.4%, while only 7.2% of the non-owners replied “Knowledgeable.” In other words, those who are not confident with respect to their financial knowledge are reluctant about investing in marketable securities.

In comparing the number of correct answers to the Big Three (Q29-Q31) according to stock/investment trust ownership or the lack thereof, there was a significant difference at the 1% level in the number of correct answers. Approximately one-fourth of stock/investment trust owners answered all questions correctly, while approximately 10% of stock/investment trust non-owners scored perfectly on all questions. On the other hand, only 15% of owners replied to all questions incorrectly, while about 40% of non-owners answered all questions incorrectly. We also examined ten additional financial literacy questions. We found a significant difference between stock/investment

trust owners and non-owners at the 1% level in terms of the number of correct answers. Stock/investment trust owners got higher scores than non-owners.

Our results are consistent with van Rooij et al. (2011), who found positive correlations between financial literacy and stock market participation. Our results show that the higher one's subjective or objective financial literacy is, the more inclined he/she is in investing in stocks or investment trusts.

Furthermore, we investigated whether people with higher financial literacy hold a diversified investment portfolio and obtain higher returns. The results showed that the types of financial assets invested by those who scored perfectly averaged 6.7 types, while the average was 1.3 types for those who answered all questions incorrectly. This result proves that the higher a person's financial literacy level is, the more types of financial assets he/she invests in. Persons with higher financial literacy likely hold a more diversified portfolio.

When making a comparison of the financial literacy level according to the average rate of return from financial assets in the past 5 years, those who are achieving higher rates of return have a tendency to obtain a higher score in the questions. Therefore, we can conclude that financial literacy is positively correlated with investment behavior and rates of returns achieved.

Lastly, we examined whether people with higher financial literacy behave in a desirable manner, such as making life planning and avoiding paying unnecessary fees. We found that people with higher financial literacy tended to take financially desirable behaviors. It is also notable that each kind of financial literacy has a different impact on financial behavior. For example, knowledge about "annual fee for investment trust" was the item that had the most considerable influence on whether or not to have life planning. The results suggest that what kinds of knowledge should be preferentially taught to encourage some kinds of healthful behaviors.

This paper contributed to the quantitative understanding of the effects of improving financial literacy. This paper also provides essential suggestions on what kind of financial and economic education should be conducted in order to guide people to desirable financial behavior.

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