

# Is Women's Financial Knowledge Always Lower?

-Evidence from Insurance Knowledge-

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## **Abstract**

Previous studies have consistently found that financial knowledge is lower for women. In this study, I analyze consumers' insurance knowledge by using a questionnaire to consumers in Japan and find the following. First, on the contrary to the other financial knowledge, life insurance knowledge is significantly higher, particularly for married and lower income women. Second, insurance knowledge is positively associated with education level. Third, the marriage status is associated with only insurance knowledge. The contribution of this study is that, to the best of my knowledge, it is the first to find some types of financial knowledge are higher for women.

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## 1. Introduction

The previous theoretical and empirical research have analyzed financial literacy and financial knowledge, particularly after financial crisis late 2000s. Among findings the previous empirical research have provided, one striking empirical evidence is that sex differences in financial knowledge are so persistent and widespread across countries and surveys. That is, empirical studies indicate that women's financial knowledge have been consistently lower around the world.

However, I should note that these studies have only dealt with financial knowledge regarding investment and the previous research does not shed light on financial knowledge related to risk management and insurance<sup>1</sup>. One exception is Tennyson (2011) that focus on the determinants of consumer's insurance knowledge but it did not cover the differences between insurance knowledge and other financial knowledge. Thus, they are not able to address why and how consumers have insurance knowledge and what is characteristics of insurance knowledge, relatively to the other financial knowledge.

According to National Consumer Affairs Center of Japan, the most common problems among consumers that experienced financial troubles is related to insurance products. National Survey in 2018 carried out by Japan Institute of Life Insurance indicates that 88.7% of households purchase some life insurance products. Also, according to Fact Book General Insurance in Japan 2018-2019 published from The General Insurance Association of Japan, 82.3% of private cars purchase some voluntary car insurance. Thus, while insurance products are indispensable for our lives, the research on insurance knowledge is extremely fewer by comparing its importance.

This paper addresses this gap in the literature by directly using the survey to consumers and testing the determinants of insurance knowledge. I provide evidence on insurance knowledge in detail and test the following hypotheses. The most distinctive characteristic on the research is that

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<sup>1</sup> According to Lusardi and Mitchell (2014), financial knowledge consists of inflation, compound rate and diversified investment and it is related to investments. However, financial knowledge is not limited to investments. Tennyson (2011) define knowledge related to risk management as insurance knowledge. Both financial knowledge and insurance knowledge are related to money. In this paper, insurance knowledge is regarded as a part of financial knowledge.

sex causes differences in financial literacy. All previous studies demonstrated that women's financial knowledge has been consistently lower by using data from different countries, several surveys and across generations. Therefore, the first hypothesis is financial knowledge related to insurance knowledge is lower for women.

Also, theoretical research have supposed that people will rationally choose to invest a lot, little or nothing in acquiring financial knowledge. A theoretical work on the economics and finance of education suggested that those who were worth investing should obtain financial knowledge. Therefore, the second hypothesis in this study is that education level is significantly associated with insurance knowledge.

Previous studies have failed to find that the marriage status is significantly associated with financial knowledge because it is not necessarily needed for married life. However, the marriage status can be positively and significantly associated with insurance knowledge because insurance can be inevitable for married life. Thus, the third hypothesis is that the marriage status is positively and significantly associated with insurance knowledge.

To analyze insurance knowledge, I conducted the survey: "*The survey on financial and insurance knowledge and households' choices in Japan*". The survey method enables us to use a unique sample not only relating to investing, but also risk management and insurance. The survey method has been popular (Graham and Harvey (2001)) in the corporate finance field and has been particularly effective in analyzing SME financing and insurance (e.g., Ono and Uesugi (2009), Uchida, Yamori and Udell (2012), Asai (2019)) because the information disclosure for SMEs is more limited than that of listed firms. At the same way, consumer's information are not disclosed, in terms of information protection, and the survey method will be still effective for the consumers' research. In December of 2019, I sent the survey to consumers across Japan thorough an internet. The survey were outsourced to the company and it stopped collecting data when it reached to a sample of 1,000.

I use a list of questions relating to finance and insurance knowledge. Regarding financial

knowledge regarding investment, I employ three questions by following Lusardi and Mitchell (2014) and the previous research. In the same way, I also ten questions regarding insurance knowledge that is financial knowledge regarding risk management by following Tennyson (2011). However, insurance regulation and products depend on the country specific systems and then I dropped several questions those are specific to U.S. and add questions that are specific to Japan. I adopted the number of correct answers as the dependent variable and employ several independent variables to test hypothesis and control for effects. My unique dataset allows us to penetrate much more deeply into the fundamental issues in the literature: Is women's financial knowledge always lower?

The main findings can be summarized as follows. First, the main finding of this study is that life insurance knowledge is higher for women. By contrast, other insurance knowledge and financial knowledge are significant lower for women. Second, education level is positively associated with insurance knowledge. The results are consistent with the theoretical and other empirical research. Third, the marriage status is significantly associated with insurance knowledge. The result indicates that insurance products are more needed for married life.

To the best of my knowledge, this is the first study to find that life insurance knowledge is higher for women while previous studies stressed the facts that financial knowledge is consistently lower for women. In other words, the results of this study demonstrate that the levels of financial knowledge and insurance knowledge are various. Thus, the study uncovers the underlying mechanism behind the determinants of finance and insurance knowledge of households.

This study is structured as follows. In Section 2, I develop the empirical hypotheses based on previous theoretical models and empirical studies. Section 3 presents the data, and section 4 presents the variables and the empirical model. Section 5 presents the results of the analysis, and section 6 concludes this study.

## **2. Empirical Hypotheses**

By Applying previous theoretical and empirical studies, I have proposed factors that can be associated with insurance knowledge. In this study, I use data insurance knowledge to empirically test three hypotheses from the previous research.

## **2.1 Insurance Knowledge Differences by Sex**

Gender issues have received considerable attention in statements concerning economics and finance in recent decades. One striking feature of the empirical study on financial literacy is that the large and persistent gender difference exist across countries and generations (Lusardi and Mitchell (2014)).

However, the research have shed light only on financial knowledge regarding investments. Insurance knowledge can be higher for women because more women do need life insurance and live longer. In other words, the research regarding insurance knowledge have not been conducted for a long time.

On the contrary, Mahdavi and Horton (2014) find that women's financial literacy was found to be very low even in well-educated group. Bucher-Koenen, Lusardi, Alessie and van Rooij (2017) indicate that women are less likely than men to answer correctly and more likely to indicate that they do not know the answer. Taken together, the sex difference can work in both directions, and empirical tests are needed to resolve the issue.

Therefore, the first hypothesis is as follows.

Hypothesis 1 (H1). Insurance knowledge is lower for women.

## **2.2 A Theoretical Framework for Insurance Literacy**

The previous theoretical research, such as Lusardi and Mitchell (2014) pointed out that it can be socially optimal to raise financial knowledge for everyone early in life. That is, obtaining financial knowledge through mandating financial education in high school can generate

substantial welfare boost. Thus, based on the theoretical research, the empirical research on the determinants of financial knowledge and attempts to explore the factors enhance financial knowledge have been conducted. For example, Lusardi and Mitchell (2008), Fonseca, Mullen, Zamarro, and Zissimopoulos (2012) provided empirical evidence on financial knowledge.

Though there is a substantial theoretical and empirical body of work on the financial knowledge, far less attention has been devoted to the question of how people acquire insurance knowledge. The empirical research, such as Lusardi and Mitchell (2007, 2011), confirm the fact that those without a college education are much less likely to be knowledgeable about basic financial literacy concepts, as reported in several U.S. surveys and across countries. In the same way, I expect that those with lower education are much less likely to be knowledgeable about basic insurance literacy concepts.

Therefore, I propose the second empirical hypothesis.

Hypothesis 2 (H2). The level of education is positively related to insurance knowledge.

### **2.3 Marriage Status and Insurance Knowledge**

The previous studies, such as Sekita (2011), indicate that the marriage status are not associated with financial knowledge. However, the marriage status can affect the level of insurance knowledge because the married needs insurance knowledge in many situations<sup>2</sup>. Inevitably, it is expected that those who are married know about life insurance more than the singles do. Thus, the marriage status can affect the level of insurance knowledge.

Hypothesis 3 (H3). The marriage status is positively related to insurance knowledge.

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<sup>2</sup> In fact, Bertocchi, Brunetti and Torricelli (2011) show that married women have a higher propensity to invest in risky assets than single ones, while a marital status gap does not apply to men. Barber and Odean (2001) report that the differences in portfolio turnover and net return performance are larger between the accounts of single men and single women than between the accounts of married men and married women. Thus, the marriage status can affect financial activities.

### 3. Data

This study uses “*The survey on financial and insurance knowledge and households’ choices in Japan*”, which was conducted in December of 2019. The survey asked consumers’ financial and insurance knowledge and the degree of risk aversion. The survey’s distribution and its data collection and aggregation were outsourced to *MyVoice Communications, Inc*, an online survey company in Japan. It started the survey through an internet on December 13, 2019 and stopped the survey on December 16, 2019 because the respondents reached up to 1,000. The results consist of 100 for twenties’ men and 100 women’s respondents. In the same way, I obtained data 100 men and 100 women from thirties’, forties’, fifties’ and sixties, respectively. Thus, the sample is composed of 200 for 5 age segments (20-29, 30-39, 40-49, 50-59, 60-69). I did not cover age under 20 year and over 70 years old since this study focuses on life insurance knowledge and it is assumed that insurance knowledge is basically needed from twenties’ to sixties.

I investigate insurance knowledge in Japan for the following reasons.<sup>3</sup> First, Japan is one of the largest insurance markets worldwide. According to Sigma No.3/2017, Japan was the second largest insurance market in terms of total premium volume in US dollars in 2016. Thus, this study provides empirical evidence on one of the largest insurance markets in the world. Second, Tennyson (2011) already provide simple empirical analysis by using data from the U.S. It is the largest insurance market in the world and this paper is based on data from Japan and enables us to compare them. Third, according to Lusardi and Mitchell (2014), Japan is an exceptional market where respondents gave themselves low grades in financial knowledge. In other words, most people in Japan are aware of their own shortcomings. Third, according to the Survey of Financial Literacy 2019 by Financial Central Public Relations Committee in Japan, financial literacy is the lowest among the United Kingdom, Germany, France. Thus, by examining data from Japan, this study provides new empirical evidence on distinctive market.

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<sup>3</sup> For the Japanese insurance market, see Yamori and Okada (2007).

The dataset has two main advantages. First, the original survey method outsourced to *MyVoice Communications* enables us to access to individual consumers' information. Usually, these kinds of data are disclosed as aggregate results and then usually not available to investigate them in detail. Conversely, the original survey allows me to examine 1,000 responses regarding financial and insurance knowledge, which indicates the demand-side point of view. Second, the survey method allows for the investigation of why and how consumers purchase insurance by linking with other information. Additionally, by matching the survey results with the attribute information obtained from *MyVoice Communications*, I can control for consumers' characteristics when examining the determinants of life insurance knowledge.



## **4. Variables and models**

Table 1 provides the list of variables used in the empirical analysis and their definitions.

### **4.1. Dependent variable**

The first empirical research on insurance knowledge was Tennyson (2011), who used 10-question quiz about insurance to assess consumers' insurance literacy in the U.S. Therefore, I also use this approach to create my dependent variable and employ 10-question quiz by following Tennyson's questions to measure insurance literacy in Japan. However, I exclude several questions because they are specific to the U.S. insurance and pension system and add some questions that are unique to the Japanese insurance and pension system. Questions that are employed in this study are summarized in Appendix.

Question 1 to 3 are related to property-liability insurance system and the products. Also, Question 4 to 6 are related to life insurance and pension. Additionally, Question 7 to 10 are related to risk management, insurers and regulations. For each question, "Correct", "Incorrect" and "I do not know" are exhibited to respondents and take 1 if they choose a correct answer. The sum of scores on questions are used as dependent variable in this study.

### **4.2. Independent variables**

Tennyson (2011), Jappelli, and Padula (2013), von Gaudecker (2015) and Lin, Hsiao and Yeh (2017) employed independent variables, such as gender, education, married status, ages, profession, living area and family size, to explain financial knowledge and/or insurance knowledge.

Table 1 Definition and Descriptive Statistics on Insurance and Finance Knowledge

|                              | Definition  | Number of Sample | Average | Median | Max    | Minimum |
|------------------------------|---|------------------|---------|--------|--------|---------|
| <b>Dependent Variables</b>   |   |                  |         |        |        |         |
| All Insurance Knowledge      | The sum of scores on all 10 insurance questions                                 | 1,000            | 4.346   | 5.000  | 9.000  | 0.000   |
| Property Liability Insurance | Out of all questions, the sum of scores on 3 PL insurance questions             | 1,000            | 1.523   | 2.000  | 3.000  | 0.000   |
| Life Insurance               | Out of all questions, the sum of scores on 3 life insurance questions           | 1,000            | 1.671   | 2.000  | 3.000  | 0.000   |
| Insurers and regulations     | Out of all questions, the sum of scores on 4 insurers and regulations questions | 1,000            | 1.903   | 2.000  | 3.000  | 0.000   |
| Financial Knowledge          | The sum of scores on 3 financial questions                                      | 1,000            | 1.439   | 1.000  | 3.000  | 0.000   |
| <b>Independent Variables</b> |   |                  |         |        |        |         |
| Women                        | If respondents are women then take 1, otherwise 0.                              | 1,000            | 0.500   | 0.500  | 1.000  | 0.000   |
| Education                    | Category of respondent's education  | 985              | 3.063   | 2.000  | 6.000  | 1.000   |
| Married                      | If respondents are married then take 1, otherwise 0.                            | 1,000            | 0.525   | 1.000  | 1.000  | 0.000   |
| Age                          | Age of respondents  | 1,000            | 44.778  | 46.000 | 69.000 | 20.000  |
| Profession                   | If respondents are self-employer then take 1, otherwise 0.                      | 1,000            | 0.070   | 1.000  | 1.000  | 0.000   |
| Living Area                  | If respondents live in urban areas then take 1, otherwise 0.                    | 1,000            | 0.524   | 1.000  | 1.000  | 0.000   |
| Family Size                  | Number of family members  | 1,000            | 2.761   | 3.000  | 7.000  | 1.000   |

#### **4.2.1. Key variables**

To test Hypothesis 1, I utilize attribute information obtained from *MyVoice Communications*. That is, I introduce an independent variable (*Women*) that takes 1 if respondents are women. If the distinction of sex is associated with insurance knowledge as previous empirical studies indicated, the sign of *Women* will be significantly negative.

To test Hypothesis 2, I also employ *Education* by using attribute information obtained from *MyVoice Communications*. We asked respondents about their educational background, “What is your academic history?” The answer consisted of the following choices: 1. Graduate degree; 2. Undergraduate degree; 3 Junior College or Technical college degree; 4. Vocational school; 5. High school; 6. Junior high school. If the education level is associated with insurance knowledge as theoretical studies predict, the sign of *Education* will be significantly negative.

To test Hypothesis 3, I use attribute information obtained from the company to measure the impacts of *Marriage* on insurance knowledge. That is, I introduce an independent variable (*Marriage*) that takes 1 if respondents are married. The marriage couples are needed to have life insurance knowledge and other insurance knowledge in their life. Thus, it is expected that the sign of *Marriage* will be significantly positive.

#### **4.2.2. Other variables**

In addition to these key variables, I follow Tennyson (2011) and other studies to control for the consumers’ characteristics with which insurance knowledge may be associated. Information on all control variables are obtained respondent’s basic attributes that are provided by the company without name and address. That is, we are not able to identify the individuals.

In this study, I follow the previous study and use *Age* to capture the effects of age on consumers’ insurance knowledge. As we get older, we obtain knowledge through a life and it is applied to insurance knowledge. Thus, I expect that *Age* is positively associated with insurance knowledge. For *Profession*, I use attribute information from the company and expect that self-employer have insurance knowledge because they need to arrange their insurance on their own. I also expect that those who live in urban areas (defined as Tokyo, Kanagawa, Saitama, Chiba, Aichi, Osaka, Kyoto, Hyogo) have more insurance knowledge. For *Family Size*, I have mixed expectation. That is, one possibility is that people with more family members need more insurance knowledge. On the contrary, people with more family members help each other within family members and do not need insurance knowledge. Thus, the impacts of family size on insurance knowledge is the

empirical issues<sup>4</sup>.

### 4.3 Empirical models

To test Hypotheses 1, 2, and 3, I estimate the following equation:

Insurance Knowledge =  $f$  (*Women, Education, Marriage, Age, Profession, Living Area, Family Size*)

I run an ordinary least squares (OLS) by following Tennyson (2011), Sekita (2011) and other studies as model 1. I also employ ordered probit as model 2. In this study, a hypothesis is accepted when I find significance in both regressions.

*Insurance Knowledge* is defined as the number of correct answers. *Insurance Knowledge* is divided into *Property Liability Insurance Knowledge, Life Insurance Knowledge* and *Insurers and Regulations*. They consist of ten questions and are categorized into three, three and four questions, respectively. The results of the regressions are shown in Tables 3.

*Women* is defined if respondents answered that she was women. *Education* indicates the respondents' educational background. *Marriage* is a marriage status and it shows whether respondents are married or not. *Age* indicates how old the respondents between 20 and 69. *Profession* is defined as self-employers and *Living Area* means respondents live in urban areas. *Family Size* is number of family of respondents.

## 5. Empirical results

### 5.1. Full sample

#### 5.1.1. Insurance Knowledge by Women and Men

Before examining hypotheses and the determinants of insurance knowledge, Table 2 presents the results of an independent *t*-test of insurance knowledge between women and men, where insurance knowledge is measured by the number of correct answers to questions. Table 2 indicates that the measure equals 4.572 for men but 4.120 for women for all insurance questions. Therefore, I find significant difference in *All Insurance Knowledge* between women and men and the result is consistent with the previous research. As for *Property Liability Insurance* and *Insurers and Regulations*, I find significant difference and results suggest that women are less

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<sup>4</sup> According to Sekita (2011), family size is significantly and negatively associated with financial knowledge.

knowledgeable than men.

I have assumed that all insurance knowledge is greater among men than among women because other previous studies have revealed that men are more knowledgeable than women regarding financial knowledge. However, contrary to our assumption arising from the results of previous studies, Table 2 shows that the measure equals 1.644 for men but 1.698 for women for life insurance knowledge. That is, as for *Life Insurance*, the result suggests that women are more knowledgeable than men, though the difference is not statistically significant. This finding is important and we see in detail below.

Table 2 Differences on Insurance and Finance Knowledge between Women and Man

|                              | Women | Men   | Difference |
|------------------------------|-------|-------|------------|
| All Insurance Knowledge      | 4.120 | 4.572 | -0.452***  |
| Property Liability Insurance | 1.384 | 1.662 | -0.278***  |
| Life Insurance               | 1.698 | 1.644 | 0.054      |
| Insurers and Regulations     | 1.800 | 2.006 | -0.206***  |
|                              |       |       |            |
| Financial Knowledge          | 1.566 | 2.046 | -0.480***  |

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

### 5.1.2. Determinants of Insurance Knowledge

Next, I estimate the determinants of insurance knowledge. The results presented in Tables 3 and the results are based on the full sample. *All Insurance Knowledge* in Table 3 shows that *Women* is significantly negative in both *OLS* and *Ordered Probit* models. Thus, women's all insurance knowledge is lower and the result is consistent with Table 2 and previous studies that examine financial knowledge. Therefore, Hypothesis 1 is accepted in this point. Hypothesis 1 will be further examined in the section 5.3.

Table 3 shows that *Education* is negative and significantly associated with *All Insurance Knowledge* in both models. The result means that those with higher education tend to have insurance knowledge and is consistent with previous research that have examined financial knowledge. Thus, Hypothesis 2 is accepted. Table 3 also indicates that *Married* is positive and significantly associated with insurance knowledge in both models. That is, the marriage status is positive and significantly associated with insurance knowledge. While Sekita (2011) finds that the marriage status is not significantly associated with financial knowledge, this paper indicates that those who are married have higher insurance knowledge. Therefore, Hypothesis 3 is accepted.

Turning to the other variables, *Age* is positive and significantly associated with insurance knowledge in both models, which means that older people have higher insurance knowledge. This

result is consistent with the previous research on financial knowledge. I assumed that self-employers have higher insurance knowledge because they need to decide to buy insurance or not. On the contrary to my assumption, Table 3 show that *Profession* is negative and significantly associated with insurance knowledge in both models. That is, self-employers have lower insurance knowledge. Table 3 also shows that *Living Area* and *Family Size* are not significantly associated with insurance knowledge in both models. *Property Liability Insurance* in Table 3 indicates the similar results as *All Insurance Knowledge*. One exception is that *Profession* is not significantly associated with insurance knowledge.

*Life Insurance* in Table 3 contrast in some points. That is, the coefficient of *Women* is positive but not significantly associated with insurance knowledge in *OLS* and the coefficient of *Women* is negative but not significant in *Ordered Probit*. As Table 2 indicates that life insurance knowledge is slightly higher for women, I need to examine the relationship between sex differences and life insurance knowledge below in this paper. *Life Insurance* in Table 3 shows that *Profession* and *Family Size* are negative and significantly associated with life insurance knowledge. That is, self-employers do not have higher life insurance knowledge and those with larger family size have fewer insurance knowledge. *Insurers and Regulations* in Table 3 are similar to *Property Liability Insurance* in Table 3. One exception is that *Family Size* is negative and significantly associated with insurance knowledge.

Table 3 Determinants of Insurance Knowledge  
All Insurance Knowledge

| Variables                          | All Insurance Knowledge |         |     | Property Liability Insurance  |         |     | Property Liability Insurance |         |     |                               |         |     |
|------------------------------------|-------------------------|---------|-----|-------------------------------|---------|-----|------------------------------|---------|-----|-------------------------------|---------|-----|
|                                    | OLS<br>Coefficient      | t-value |     | Ordered Probit<br>Coefficient | z-value |     | OLS<br>Coefficient           | t-value |     | Ordered Probit<br>Coefficient | z-value |     |
| Constant                           | 3.699                   | 9.914   |     |                               |         |     | 1.384                        | 9.041   |     |                               |         |     |
| Women                              | -0.516                  | -3.393  | *** | -0.252                        | -3.719  | *** | -0.287                       | -4.606  | **  | -0.331                        | -4.625  | **  |
| Education                          | -0.269                  | -4.906  | *** | -0.123                        | -4.999  | *** | -0.111                       | -4.939  | *** | -0.127                        | -4.932  | *** |
| Married                            | 0.982                   | 5.329   | *** | 0.433                         | 5.268   | *** | 0.309                        | 4.091   | *** | 0.353                         | 4.092   | *** |
| Age                                | 0.036                   | 5.593   | *** | 0.015                         | 5.201   | *** | 0.010                        | 3.956   | *** | 0.012                         | 3.942   | *** |
| Profession                         | -0.576                  | -1.970  | **  | -0.277                        | -2.129  | **  | -0.160                       | -1.335  |     | -0.192                        | -1.398  |     |
| Living Area                        | -0.120                  | -0.809  |     | -0.045                        | -0.692  |     | -0.050                       | -0.822  |     | -0.056                        | -0.808  |     |
| Family Size                        | -0.100                  | -1.597  |     | -0.043                        | -1.552  |     | 0.012                        | 0.474   |     | 0.013                         | 0.447   |     |
| cut1                               |                         |         |     | -1.107                        | -6.510  | *** |                              |         |     | -0.786                        | -4.458  | *** |
| cut2                               |                         |         |     | -0.784                        | -4.661  | *** |                              |         |     | 0.058                         | 0.328   |     |
| cut3                               |                         |         |     | -0.516                        | -3.083  | *** |                              |         |     | 1.131                         | 6.374   | *** |
| cut4                               |                         |         |     | -0.228                        | -1.361  |     |                              |         |     |                               |         |     |
| cut5                               |                         |         |     | 0.159                         | 0.948   |     |                              |         |     |                               |         |     |
| cut6                               |                         |         |     | 0.579                         | 3.436   | *** |                              |         |     |                               |         |     |
| cut7                               |                         |         |     | 1.100                         | 6.460   | *** |                              |         |     |                               |         |     |
| cut8                               |                         |         |     | 1.672                         | 9.635   | *** |                              |         |     |                               |         |     |
| cut9                               |                         |         |     | 2.424                         | 12.920  | *** |                              |         |     |                               |         |     |
| Number of Sample                   |                         | 985     |     | 985                           |         |     | 985                          |         |     | 985                           |         |     |
| Log Likelihood/ Adjusted R-squared |                         | 0.137   |     | -2094.142                     |         |     | 0.101                        |         |     | -1270.460                     |         |     |

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

Table 3 Determinants of Insurance Knowledge (Continued)

| Variables                          | Life Insurance |         |                |           | Insurers and Regulations |         |                |             |           |     |
|------------------------------------|----------------|---------|----------------|-----------|--------------------------|---------|----------------|-------------|-----------|-----|
|                                    | OLS            |         | Ordered Probit |           | OLS                      |         | Ordered Probit |             |           |     |
|                                    | Coefficient    | t-value | Coefficient    | z-value   | Coefficient              | t-value |                | Coefficient | z-value   |     |
| Constant                           | 1.130          | 6.892   |                |           | 1.829                    | 9.702   | ***            |             |           |     |
| Women                              | 0.002          | 0.027   | -0.006         | -0.077    | -0.202                   | -2.629  | **             | -0.182      | -2.609    | **  |
| Education                          | -0.073         | -3.043  | ***            | -0.073    | -2.827                   | ***     |                | -0.111      | -4.387    | *** |
| Married                            | 0.392          | 4.836   | ***            | 0.405     | 4.654                    | ***     |                | 0.321       | 3.805     | *** |
| Age                                | 0.018          | 6.436   | ***            | 0.019     | 6.214                    | ***     |                | 0.010       | 3.319     | *** |
| Profession                         | -0.302         | -2.347  | **             | -0.321    | -2.340                   |         |                | -0.123      | -0.922    |     |
| Living Area                        | -0.055         | -0.849  |                | -0.058    | -0.827                   |         |                | 0.012       | 0.184     |     |
| Family Size                        | -0.073         | -2.625  | **             | -0.074    | -2.486                   | **      |                | -0.049      | -1.717    | *   |
| cut1                               |                |         | -0.336         | -1.894    | *                        |         |                | -0.953      | -5.490    | *** |
| cut2                               |                |         | 0.309          | 1.740     | *                        |         |                | -0.359      | -2.079    | **  |
| cut3                               |                |         | 1.231          | 6.847     | ***                      |         |                | 0.423       | 2.444     | **  |
| cut4                               |                |         |                |           |                          |         |                | 1.517       | 8.559     | *** |
| Number of Sample                   |                | 985     |                | 985       |                          | 985     |                |             | 985       |     |
| Log Likelihood/ Adjusted R-squared |                | 0.128   |                | -1276.326 |                          | 0.072   |                |             | -1463.032 |     |

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



## 5.2 Determinants of Financial Knowledge

Sekita (2011) find that women, the young, and those with lower educational attainment have lower financial literacy by analyzing data from Japan. In this study, I employ data obtained from *The survey on financial and insurance knowledge and households' choices in Japan*. This survey covers not only insurance knowledge but also financial knowledge. If the results of financial knowledge is consistent with the results of Sekita (2011), then it follows results of insurance knowledge are not skewed and specific to the survey.

The survey asked respondents three questions by following Sekita (2011) and Lusardi and Mitchell (2014). For interest rate, the survey asked “*Suppose you had 10,000 yen in a savings account and the interest rate was 2 percent per year. After 5 years, how much do you think you would have in the account if you left the money to grow*” (1. more than, 2. exactly the same as, 3. less than today 4. do not know). Also, it asked “*Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After 1 year, would you be able to buy*” (1. more than 10,200 yen, 2. exactly 10200 yen, 3. less than 10,200, 4. do not know) for compound rate and *Do you think that the following statement is true or false? “Buying a single company stock usually provides a safer return than a stock mutual fund”* for diversified investment. The number of corrects answered are exhibited in Table 1.

Table 4 shows determinants of financial knowledge. The results of Table 4 contrasts with Table 3 in some points. That is, the sign of the coefficient on *Women* is significantly negative, which means that financial knowledge is significantly lower for women. Table 4 also indicate that higher education and age are positive and significantly associated with financial knowledge. These results are consistent with previous studies that employed Japanese data, such as Sekita (2011). Furthermore, Table 4 indicates that the marriage status are not significantly associated with financial knowledge, though it is significantly associated with insurance knowledge. The result highlights the difference on determinants of financial knowledge and insurance knowledge.

Thus, I find financial knowledge is lower for women and higher for older and the highly educated by using data from the survey in Japan. Therefore, I can point out that the results obtained through the survey are not specific to data.

Table 4 Determinants of Financial Knowledge

| Variables                         | OLS         |                    |            | Ordered Probit |                    |            |
|-----------------------------------|-------------|--------------------|------------|----------------|--------------------|------------|
|                                   | Coefficient | Standard Deviation | t-value    | Coefficient    | Standard Deviation | t-value    |
| Constant                          | 1.492       | 0.178              | 8.374 ***  |                |                    |            |
| Women                             | -0.353      | 0.073              | -4.860 *** | -0.352         | 0.073              | -4.819 *** |
| Education                         | -0.172      | 0.026              | -6.557 *** | -0.174         | 0.027              | -6.548 *** |
| Married                           | 0.135       | 0.088              | 1.533      | 0.140          | 0.088              | 1.589      |
| Age                               | 0.018       | 0.003              | 6.050 ***  | 0.018          | 0.003              | 5.969 ***  |
| Profession                        | -0.070      | 0.140              | -0.503     | -0.064         | 0.140              | -0.453     |
| Living Area                       | -0.071      | 0.071              | -0.996     | -0.072         | 0.071              | -1.010     |
| Family Size                       | -0.071      | 0.030              | -2.364 **  | -0.073         | 0.030              | -2.417 **  |
| cut 1                             |             |                    |            | -0.628         | 0.179              | -3.505 *** |
| cut 2                             |             |                    |            | -0.024         | 0.179              | -0.132     |
| cut 3                             |             |                    |            | 0.629          | 0.179              | 3.507 ***  |
| Number of Sample                  |             | 985                |            |                | 985                |            |
| Log Likelihood/Adjusted R-squared |             | 0.127              |            |                | -1285.796          |            |

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

### 5.3 Further Test on Life Insurance Knowledge

Table 2 shows that women's life insurance knowledge is slightly higher than men. In this subsection, I provide further empirical evidence on sex differences in life insurance knowledge.

Mahdavi and Horton (2014) examined alumnae from a highly selective U.S. women's liberal arts college. Even in this talented and well-educated group, women's financial literacy was found to be very low. In other words, even very well educated women are not particularly financially literate, which could imply that women may acquire financial literacy differently from men. On the contrary, Rinaldi and Todesco (2012) find significant gender differences in money attitudes, but not in financial literacy by using 1,635 students aged 12-14 years.

Jappelli (2010) finds that inhabitants of countries with more generous social security systems are generally less literate and interprets this result as suggesting that the incentives to acquire economic literacy are related to the amount of resources. Some sex differences may be rational, with specialization of labor within the household leading married women to build up life insurance knowledge because they are engaged in non-wage work. Thus, the economic incentives can be associated with life insurance knowledge for women in Japan. That is, it is possible that women in a lower income and married category have higher incentive to obtain insurance knowledge.

Therefore, I estimate the determinants of life insurance knowledge of married women and single women by splitting the sample. That is, I divide sample into four groups based on marriage status and individual income. For marriage, 52.5% of people are married<sup>5</sup>. For individual income level, the survey asked individual annual income and the answer consisted of the following choices: 1. 0 yen; 2. Less than 1 million yen; 3. 1 – 2 million yen; 4. 2 – 3 million yen; 5. 3 – 4 million yen; 6. 4 – 5 million yen; 7. 5 – 6 million yen; 8. 6 – 7 million yen; 9. 7 – 8 million yen; 10. 8 – 9 million yen; 11. 9 – 10 million yen; 12. 10 – 15 million yen; 13. More than 15 million yen<sup>6</sup>. According to the Comprehensive Survey of Living Conditions in 2019, 5.5 million yen per household, then I classify income above 5 million yen into the high income category and define income lower than 5 is as the lower income category<sup>7</sup>.

The first one consists of married and lower individual income group. The second one consists of married and higher income group. The third consists of single and lower income group and the forth consists of single and higher income group. The results presented in Tables 5 on *Women* and contrast in some points<sup>8</sup>. That is, although the coefficient of *Women* is positive and statistically

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<sup>5</sup> The unmarried status includes people who got divorced or a spouse died.

<sup>6</sup> The average is 4.079 and median is 4.

<sup>7</sup> I tested different classifications but the sign and significance of estimation does not change.

<sup>8</sup> Table 5 report the result of OLS, but the ordered probit model does not change the sign of

significant in Table 5 for *Married* × *Lower Income*, the other categories, such as *Married* × *Higher Income*, *Single* × *Lower Income* and *Single* × *Higher Income*, the coefficients of *Women* are not statistically significant. It was common that women quit their job when they get married or give birth in Japan. In fact, 30.1% of households in Japan as of 2018, wives are not engaged in earning money through works, according to Ministry of Health, Labor and Welfare White Paper in 2018. In such a situation, it is natural that women should have higher life insurance knowledge in the lower income and married category.

Taken together, the results in Tables 5 show that the coefficient of *Married* × *Higher Income*, *Single* × *Lower Income* and *Single* × *Higher Income* is not significantly associated with life insurance knowledge. In contrast, the results in Tables 5 show that the coefficient of *Married* × *Lower Income* is positively significantly associated with. The contrasting result between *Married* × *Lower Income* and the others may help in understanding why women choose to have or not to have life insurance knowledge. That is, the empirical results in this study may show one of the underlying mechanisms of consumers' insurance knowledge.

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coefficients and significance. Thus, I report the only result of OLS.

Table 5 Determinants of Life Insurance Knowledge by Groups

| Variables          | Married × Lower Income |                    |            | Married × Higher Income |                    |            |
|--------------------|------------------------|--------------------|------------|-------------------------|--------------------|------------|
|                    | Coefficient            | Standard Deviation | t-value    | Coefficient             | Standard Deviation | t-value    |
| Constant           | 1.445                  | 0.325              | 4.443 ***  | 1.892                   | 0.577              | 3.281 ***  |
| Women              | 0.251                  | 0.109              | 2.299 **   | -0.222                  | 0.308              | -0.719     |
| Education          | -0.036                 | 0.036              | -1.001     | -0.041                  | 0.084              | -0.483     |
| Age                | 0.016                  | 0.004              | 3.822 ***  | 0.013                   | 0.009              | 1.464      |
| Profession         | -0.124                 | 0.188              | -0.659     | -1.129                  | 0.395              | -2.855 *** |
| Living Area        | -0.118                 | 0.077              | -1.525     | 0.157                   | 0.144              | 1.088      |
| Family Size        | -0.123                 | 0.045              | -2.758 *** | -0.094                  | 0.077              | -1.213     |
| Number of Sample   |                        | 403                |            |                         | 114                |            |
| Adjusted R-squared |                        | 0.076              |            |                         | 0.050              |            |

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

Table 5 Determinants of Life Insurance Knowledge by Groups (Continued)

|                    | Single × Lower Income |                    |           | Single × Higher Income |                    |          |
|--------------------|-----------------------|--------------------|-----------|------------------------|--------------------|----------|
|                    | Coefficient           | Standard Deviation | t-value   | Coefficient            | Standard Deviation | t-value  |
| Constant           | 0.918                 | 0.245              | 3.748 *** | 1.695                  | 0.741              | 2.288 ** |
| Women              | -0.004                | 0.108              | -0.041    | -0.278                 | 0.330              | -0.842   |
| Education          | -0.078                | 0.039              | -2.008 ** | -0.188                 | 0.117              | -1.605   |
| Age                | 0.020                 | 0.004              | 4.521 *** | 0.015                  | 0.013              | 1.130    |
| Profession         | -0.351                | 0.221              | -1.589    | 0.058                  | 0.432              | 0.133    |
| Living Area        | 0.038                 | 0.085              | 0.449     | -0.170                 | 0.256              | -0.666   |
| Family Size        | -0.047                | 0.043              | -1.094    | 0.041                  | 0.110              | 0.373    |
| Number of Sample   |                       | 415                |           |                        | 53                 |          |
| Adjusted R-squared |                       | 0.055              |           |                        | 0.025              |          |

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

## 6. Conclusion

This study investigates the mechanism behind the determinants of insurance knowledge by using a unique dataset of 1,000 consumers who are from 20 years old to 69 years old in Japan. First, I find that women that have relatively higher life insurance knowledge for married and lower income. I also find that the other insurance knowledge is lower for women. Second, the analysis shows that consumers obtained higher education tend to have higher insurance knowledge. The results in this study are consistent with the results provided by previous studies in economics and finance education. Third, my empirical results indicate that people who are married have higher insurance knowledge than those who does not are married.

I also examine the determinants of financial knowledge to compare those of insurance knowledge by using the same data set. As a result, I find that financial knowledge is higher for men as the previous research have indicated. Also, I find that the marriage status is not significantly associated with financial knowledge, though the marriage status is positively associated with insurance knowledge. Thus, I confirm the fact that the evidence that life insurance knowledge is not caused by data characteristics.

On balance, the most important contribution of this study is that life insurance knowledge is higher, particularly for married and lower income women. The previous research have revealed the fact that financial knowledge is higher for men. However, my findings show that life insurance knowledge is particularly is higher for women, as Table 2 indicates. Although Lusardi and Mitchell (2014) covers a broader and wider range of the studies regarding financial knowledge and financial literacy, they do not list property liability insurance and life insurance as financial knowledge. My study clarifies determinants of consumers' insurance knowledge, particularly I stress on the determinants of life insurance knowledge differs.

To the best of my knowledge, this study is the first to focus on insurance knowledge and find that women's knowledge is higher for some cases. The results have several implications for future research in the insurance field.

First, although Lusardi and Mitchell (2008) shows that older women display very low levels of financial literacy and the large majority of women have not done any retirement planning calculations. In contrast, this study focuses mainly on insurance knowledge and find that life insurance knowledge is higher for women. Empirical evidence in this study can be interpreted as suggesting that women might recognize that they live longer and need money. The fact that financial knowledge and insurance knowledge are different between men and women need to be taken account into consideration when the curriculum is created.

Second, insurance knowledge could be tested using data from different countries, as studies

on financial knowledge regarding investment have done. Jappelli (2010) finds that the level of financial knowledge are different across countries with various background. The level of insurance knowledge are more different across countries because it can be more affected by their social security system. Therefore, investigating life insurance knowledge will be important and future fruitful research areas.

## References

- Asai, Yoshihiro (2019) “Why Do Small and Medium Enterprises Demand Property Liability Insurance?”, *Journal of Banking and Finance* 106, pp.298-314.
- Barber, Brad M. and Terrance Odean (2001) “Boys will be boys: gender, overconfidence and common stock investments”, *Quarterly Journal of Economics* 116, 261–289.
- Bertocchi, Graziella, Marianna Brunetti and Costanza Torricelli (2011) “Marriage and other risky assets: A portfolio approach”, *Journal of Banking & Finance* 35 pp.2902–2915.
- Bucher-Koenen, Tabea, Annamaria Lusardi, Rob Alessie and Maarten van Rooij (2017) “How Financially Literate Are Women? An Overview and New Insights”, *Journal of Consumer Affairs* 51(2), pp.255-283.
- Chen, Haiyang, and Ronald P. Volpe. (2002) “Gender Differences in Personal Financial Literacy among College Students.” *Financial Services Review* 11 (3): 289–307.
- Fonseca, Raquel, Kathleen J. Mullen, Gema Zamarro, and Julie Zissimopoulos (2012) “What Explains the Gender Gap in Financial Literacy? The Role of Household Decision Making.” *Journal of Consumer Affairs* 46(1) pp.90–106.
- Jappelli, Tullio (2010) “Economic Literacy: An International Comparison”, *Economic Journal* 120 (548): pp.429–51.
- Jappelli, Tullio, and Mario Padula (2013) “Investment in Financial Literacy and Saving Decisions”, *Journal of Banking and Finance* 37 (8), pp.2779–92.
- Lin, Chaonan, Hsiao, Yu-Jen and Yeh, Cheng-Yung (2017) “Financial literacy, financial advisors, and information sources on demand for life insurance”, *Pacific-Basin Finance Journal* 43 pp.218-237.
- Lusardi, Annamaria; Mitchell, Olivia S. (2008) “Planning and financial literacy: How do women fare?”, *American Economic Review: Papers & Proceeding* 98(2), pp.413–417.
- Lusardi, Annamaria and Olivia S. Mitchell (2011) “Financial literacy around the world: an overview”, *Journal of Pension Economics & Finance* 10(4), pp.497-508.
- Lusardi, Annamaria, Olivia S. Mitchell (2014) “The Economic Importance of Financial Literacy: Theory and Evidence”, *Journal of Economic Literature* 52(1), pp.5–44.



- Mahdavi, Mahnaz, and Nicholas Horton (2014) “Financial Knowledge among Educated Women: Room for Improvement”, *Journal of Consumer Affairs* 48(2), pp. 403-417.
- Rinaldi, Emanuela and Lorenzo Todesco (2012) “Financial Literacy and Money Attitudes: Do Boys and Girls Really Differ? A Study among Italian Preadolescents”, *Italian Journal of Sociology of Education* 2 pp.143-165.
- Tennyson, Sharon (2011) “Consumers’ Insurance Literacy: Evidence from Survey Data” *Financial Services Review* 20(3), pp.165-179.
- von Gaudecker, Hans-Martin (2015) “How Does Household Portfolio Diversification Vary with Financial Literacy and Financial Advice?”, *Journal of Finance* 70(2), pp. 489-507.
- Sekita, Shizuka (2011) “Financial literacy and retirement planning in Japan”, *Journal of Pension Economics & Finance* 10(4), pp. 637-656

## **Appendix**

These are questions conducted to respondents through *MyVoice* company.

1. It is often a good idea to buy less insurance for an old automobile than a new.
2. A larger deductible on an insurance policy is always a bad deal for the consumer because the insurer pays less of consumer’s losses.
3. Users of small motor vehicles do not need to buy compulsory liability insurance.
4. Life insurance has more value for a couple with young children than for a couple whose children are grown.
5. Public health insurance coverage in Japan covers high-cost medical expenses if the expenses exceed a certain amounts.
6. If you delay start of receiving pension, then amount of pension paid increases.
7. Consumers are protected against insurance company bankruptcies by the policyholder protection organization that pay some of the claims of bankrupt insurers.
8. Insurance that is bought at bank branches are partially protected against insurance policyholder protection organization.
9. Insurance premium is the same for the same insurance products even if different insurers sell them.
10. The main purpose of insurance is to reduce the financial risk faced by the consumer.