

# Tax Literacy and Personal Investments for Post-Retirement Years



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## Abstract

Using our unique data taken from Japanese residents, we measure tax literacy separately from financial literacy and investigate the role of each in various investment decisions related to post retirement years by employing IV estimation and a web experiment.

We found that tax literacy plays a significant role in increasing the probability of having personal pension investments with tax benefits, while we found that tax literacy had no significant effect on accounts without any tax benefits.

## Introduction

Facing the decreasing benefits of the public pension system in an aging society, the Japanese government offers various tax advantages to encourage personal pension investments.

Ex: **iDeCo**: individual-type defined contribution pension plan (Similar to the traditional IRA in the US)  
**NISA/Tsumitate NISA**: Nippon (Japanese) individual savings account (Similar to the ISA in the UK)

**Personal pension insurance** (Provided by life insurance companies)

Though the effects of these tax breaks on individuals' decision-making depends on their level of **tax literacy**, the role of tax literacy has not been well investigated, unlike financial literacy.

It is challenging to deal with reverse causality when investigating the impact of financial/tax literacy on individual decisions regarding different types of investments.

It is well known that people make reasonable decisions in asset location under taxation (Poterba & Samwick 2002), but the driving factors have not been well investigated.

To bridge these gaps in the literature, we conduct an original web survey and a web experiment to investigate the role of tax literacy on personal investments.

## Data

### 1. General Information of our original web survey

|                      |  |
|----------------------|--|
| Time                 | March 2018   |
| Targeted respondents | 20 to 69 years old, Japanese residents (Monitor members of MyVoice Communications Inc.)  |
| Sample volume        | 1,000 (Distribution following Japanese population according to age, sex, and living area)  |
| Major questions      | 1. Quiz for measuring tax literacy / financial literacy<br>2. Current ownership status of investments (iDeCo/NISA/Personal pension insurance/General brokerage account)<br>3. Time and Risk preference, Quiz for measuring Numeracy, Junior high school grades on Japanese and math, Who make decision on investment/saving<br>4. Experiment (Explained below) |

### 2. Measuring tax literacy and financial literacy

We aggregate quiz responses for each literacy type using a weighted approach, **PRIDIT** (following Sekita 2013)

(1) Quiz for measuring **Financial Literacy** (correct choice underlined, distribution rate in the parenthesis)

1. Suppose you had 1 million yen in a savings account and the interest rate was 5% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?  
1. > 1.05 mil (59.0%) 2. = 1.05 mil (12.4%) 3. < 1.05 mil (11.4%) 4. Don't know (17.2%)

2. Suppose the current interest rate is 1 percent. What happens to the value of 10-year fixed-rate government bonds with a 1 percent interest rate if the interest rate rose to 3 percent in the future?  
1. Increases (15.7%) 2. No change (18.2%) 3. Decreases (27.2%) 4. Don't know (38.9%)

3. Assume you have 1,000 USD in your foreign currency account in Japan. What happens to the value of this saving when JPY depreciate toward USD?  
1. Increases (46.1%) 2. No change (5.8%) 3. Decreases (24.2%) 4. Don't know (23.9%)

4. Which is the less risky asset in terms of volatility, stock in one company or an index fund reflecting the Nikkei Stock Average (stock mutual fund)?  
1. One company (4.8%) 2. No difference (16.0%) 3. Mutual fund (36.4%) 4. Don't know (47.6%)

(2) Quiz for measuring **Tax Literacy** (correct choice underlined, distribution rate in the parenthesis)

1. Suppose income tax is 20%. How much does your income tax decrease when you put 100,000 JPY into a special account in which all the contributions are tax exempt in comparison to putting the same amount of money in an ordinary savings account with the same interest rate?  
1. Decreases 100,000 JPY (3.1%) 2. Decreases 80,000 JPY (4.3%) 3. Decreases 20,000 JPY (95.2%) 4. Does not decrease (12.9%) 5. Don't know (44.5%)

2. Suppose income tax is 20% and you buy a 100,000 JPY financial plan in which all the contributions get full tax exemption. How much is your net expenditure for the financial plan after considering the tax benefit?  
1. 100,000 JPY (9.6%) 2. 80,000 JPY (28.5%) 3. 20,000 JPY (10.0%) 4. 0 JPY (4.1%) 5. Don't know (47.8%)

3 ~ 6. Which of the following is correct about the tax advantages of ① iDeCo ② NISA ③ Tsumitate NISA ④ Personal pension insurance ⑤ General tax brokerage account?

Tax breaks on ... 1. Only contributions 2. Only profit 3. Contributions & profit 4. No tax benefit 5. Don't know

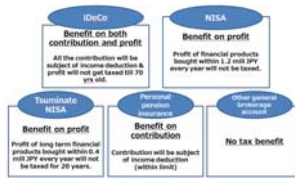
Correct choice (rate) Personal pension insurance (9.8%) NISA (14.9%) and Tsumitate NISA (12.0%) iDeCo (15.6%)

### 3. Experiment

**Step 1.**  
We show Fig 1 to half of the survey participants (randomly chosen).

**Step 2.**  
We ask all the participants, regardless of whether they see the tax advantage information in Step1 or not, if they would prefer having iDeCo/NISA/Personal pension insurance or a general brokerage account.

Fig 1. Tax benefit information



## Method

### 1. OLS and IV estimation

$$(1) Y = \beta_0 + \beta_1 \text{tax} + \beta_2 \text{fin} + X\gamma + \epsilon$$

Y: dummy variable taking the value of 1 if the individual has different types of investments (iDeCo, NISA, personal pension investment and individual brokerage accounts)

tax: tax literacy; fin: financial literacy

X: controls (age, sex, income, assets, education, time, & risk preference)

Endogeneity of tax and fin is a suspect for OLS model.

⇒ We employ 3 instrumental variables for the 2 endogenous variables (tax/financial literacy)

**1. Japanese language skill at the age of 15** (Following Sekita 2011)

**2. Mathematical skill at the age of 15**

**3. Numeracy** (Excluded in estimation of personal pension investment because of suspected over-identification)

※ We are interested in the impact of tax literacy but employ a multiple endogenous variable model to meet the exclusion restriction because all the instruments are expected to correlate with financial literacy as well.

### 2. Experiment: Measuring the treatment effect

$$(2) Y^w = \beta_0 + \beta_1 \text{tax} + \beta_2 \text{fin} + \beta_3 T + X\gamma + \epsilon$$

$$(3) Y^w = \beta_0 + \beta_1 \text{tax} + \beta_2 \text{fin} + \beta_3 T + \beta_4 \text{tax} \times T + X\gamma + \epsilon$$

Y<sup>w</sup>: dummy variable taking 1 if the individual wishes to have different types of investments (iDeCo, NISA, personal pension investment and individual brokerage accounts)

T: dummy variable taking 1 if the individual is in the treatment group (saw the information about tax benefit)

※ Both OLS and IV estimation conducted (tax and financial literacy treated as endogenous variables)

※ For all estimations, only those who are involved in making decision about savings/investments are included. (719/1000)

Since iDeCo is not available to everyone, only those who have access to iDeCo are included in the estimation for iDeCo (623/1000).

## Results

Table 1. OLS and IV estimation results

|                          | High tax literacy ⇒ High probability of having iDeCo and NISA (investment w/ tax benefits)<br>High financial literacy ⇒ High probability of having a general brokerage account (w/o tax benefits) |                     |                     |                     |                    |                   |                    |                   |        |
|--------------------------|---|---------------------|---------------------|---------------------|--------------------|-------------------|--------------------|-------------------|--------|
|                          | Model:  | OLS (1)             | OLS (2)             | OLS (3)             | OLS (4)            | IV (5)            | IV (6)             | IV (7)            | IV (8) |
| Y:                       | iDeCo   | NISA                | Personal insurance  | Stock               | iDeCo              | NISA              | Personal insurance | Stock             |        |
| tax (tax literacy)       | 0.09***<br>(0.0326)   | 0.23***<br>(0.0311) | 0.13***<br>(0.0310) | 0.0196<br>(0.029)   | 0.241*<br>(0.145)  | 0.496*<br>(0.265) | 0.108<br>(0.322)   | -0.214<br>(0.280) |        |
| fin (financial literacy) | -0.0177<br>(0.0182)   | 0.069**<br>(0.028)  | -0.0283<br>(0.0266) | 0.11***<br>(0.0302) | -0.168+<br>(0.114) | -0.152<br>(0.163) | 0.208<br>(0.239)   | 0.313*<br>(0.188) |        |
| N                        | 623   | 719                 | 719                 | 719                 | 623                | 719               | 719                | 719               |        |
| adj. R-sq                | 0.054   | 0.183               | 0.066               | 0.077               | -0.103             | 0.029             | -0.043             | -0.094            |        |
| KPW F stat               |   |                     |                     |                     | 35.0               | 38.8              | 47.5               | 38.8              |        |
| (max IV relative bias)   |   |                     |                     |                     | (<5%)              | (<5%)             | (<5%)              | (<5%)             |        |
| Hansen J stat            |   |                     |                     |                     | 1.29               | 1.50              | 4.13               | 3.24              |        |
| (p-value)                |   |                     |                     |                     | (0.73)             | (0.68)            | (0.13)             | (0.36)            |        |

Table 2. Experiment (Y<sup>w</sup> = willingness to have iDeCo)

|                          | tax × T ⇒ Willingness to have iDeCo |                   |                   |        |
|--------------------------|-------------------------------------|-------------------|-------------------|--------|
|                          | Model:                              | OLS (1)           | IV (2)            | IV (3) |
| T (treatment)            | 0.07**<br>(0.034)                   | 0.05+<br>(0.036)  | 0.05<br>(0.036)   |        |
| tax (tax literacy)       |                                     | -0.11<br>(0.359)  | 0.100<br>(0.304)  |        |
| tax × T                  |                                     | 0.30*<br>(0.178)  | 0.27+<br>(0.184)  |        |
| fin (financial literacy) |                                     | -0.075<br>(0.200) | -0.046<br>(0.175) |        |
| Controls                 | No                                  | No                | Yes               |        |
| N                        | 623                                 | 623               | 623               |        |
| adj. R-sq                | 0.005                               | -0.005            | 0.078             |        |
| KPW F stat               |                                     | 58.732            | 19.485            |        |
| (max IV relative bias)   |                                     | (<5%)             | (<5%)             |        |
| Hansen J stat            |                                     | 4.343             | 5.021             |        |
| (p-value)                |                                     | (0.63)            | (0.54)            |        |

Table 3. First stage estimation of Table 1

|                | Math skill & numeracy ⇒ tax/financial literacy |                    |                      |                    |
|----------------|--|--------------------|----------------------|--------------------|
|                | (1)  | (2)                | (3)                  | (4)                |
| tax            | fin  | tax                | fin                  |                    |
| (tax literacy) | (financial literacy)                           | (tax literacy)     | (financial literacy) |                    |
| Language       | 0.026<br>(0.028)                               | 0.009<br>(0.030)   | -0.029<br>(0.025)    | 0.011<br>(0.027)   |
| Math           | 0.07**<br>(0.031)                              | 0.045**<br>(0.023) | 0.06**<br>(0.03)     | 0.059**<br>(0.023) |
| Numeracy       | 0.2**<br>(0.045)                               | 0.033*<br>(0.033)  | 0.2**<br>(0.042)     | 0.3***<br>(0.033)  |
| N              | 623  | 623                | 719                  | 719                |
| SW F stat      | 49.64  | 43.84              | 57.34                | 51.68              |

Notes) Cluster robust SE in parenthesis in all the tables. (Clustered by 60 categories used to gathering samples to have population distribution of Japan (according to age, sex and living area). + p<0.15; \* p<0.1; \*\* p<0.05; \*\*\* p<0.01.  
 † Constant terms and control variables are not presented.

## Remarks

- Tax literacy has a significant impact on improving probability of having iDeCo and NISA. (Our findings do not contradict previous studies suggesting the importance of financial literacy, such as Lusardi & Mitchell 2011. As shown in the OLS and IV estimations, our results also show the importance of having a general brokerage account to improving probability, but not for investment with tax benefits.)
- Experiment results confirm that tax benefit information is more effective in improving willingness to have iDeCo in those who have tax literacy.
- Average tax literacy is low. (About 20% of people can calculate tax benefits correctly. About 16% know the tax benefits of iDeCo.)
- It is crucial to invest in tax literacy education and encourage people to improve their participation in investments with tax benefits. (Not only expanding the tax benefit.)
- Also, this study adds inputs on asset location studies, demonstrating that one of the key drivers for reasonable asset location is tax literacy.

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## References

- Clark, R.L., J.A. Maki and M.S. Morrill, 2014. Can simple informational nudges increase employee participation in a 401(k) plan? Southern Economic Journal 80, 677-701.
- Lusardi, A. and O.S. Mitchell, 2011. Financial literacy and planning: implications for retirement wellbeing. A. Lusardi and O.S. Mitchell eds., Financial Literacy: Implications for Retirement Security and the Financial Marketplace. Oxford University Press, Oxford.
- Meier, S., C. Sprenger, 2009. Present-biased preferences and credit card borrowing. American Economic Journal: Applied Economics 2, 193-210.
- Poterba J. M. and A. A. Samwick, 2002. Taxation and household portfolio composition: US evidence from the 1980s and 1990s. Journal of Public Economics 87, 5-38.
- Sekita, S., 2011. Financial literacy and retirement planning in Japan. Journal of Pension Economics and Finance 10, 637-65.
- Sekita, S., 2013. Financial literacy and wealth accumulation: evidence from Japan. Kyoto Sangyo University Discussion paper series No 2013-1.