Financial Product Preferences of Japanese Households for Long-term Investments: Internet Choice Experiments*

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Abstract

We investigate financial product preferences of Japanese households by using choice experiments. We examine the preference for the risk and return relationship as well as other influencing factors for investment decisions, such as the existence of principal guarantee and countries invested in. We also consider personal characteristics, such as age, gender, and stock investment experience. Japanese households have approximately 19 trillion USD financial assets which make up of approximately 20% of all assets in developed countries. However, they have the fewest equity related products. Investigating Japanese household financial product preference is important because their decisions potentially have a large impact on global equity markets. We find three main results. First, the relationship between risk and expected return is clearly an important factor for choosing financial products. Households also have a strong preference for the existence of principal guarantee and for domestic investments. Second, households exhibit different preferences according to whether they have stock investment experience or not. Third, compared to working households, retired households require a larger increase of the expected return for a given increase of risk, and have a stronger preference for principal guarantee, domestic investments, and shorter investment time horizon of products. If financial institutions can offer the financial products which satisfy those preferences, the investment behavior of Japanese households may change considerably.

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1. Introduction

Traditional finance theory states that households will decide the optimal investment by considering the relationship between risk and the expected return of investments (Markowitz (1952)). Recently, many additional factors by which investor's choices are differentiated have been found. For example, Bodie et al. (2002), and Campbell and Viceira (2002) demonstrated that the amount of human capital, which is the present value of the future labor income streams, affects portfolio choices in a theoretical life cycle model. Empirical literature such as Barber and Odean (2001), Bertaut and Starr-McCluer (2002), Agnew et al. (2003), Ameriks and Zeldes (2004), Shum and Faig (2006), Campbell(2006), Iwaisako (2009), and Kitamura and Nakashima (2010) found that age, marital status, race, education, income, amount of financial assets held, position in occupation, over-confidence, knowledge of finance and economics, investment experience and so on, affect household investment decisions. Benartzi and Thaler (1995), Thaler et al. (1997), and Gneezy and Potters (1997) demonstrated that household asset allocation for risky investments may be lower than the prediction of traditional finance theory due to myopic loss aversion, which is a result of a combination of mental accounting (Thaler (1985)) and loss aversion (Kahneman and Tversky (1979)). Investors seem to make their financial product choices based on many factors which are related to their life cycle, investment markets,[1] statistical distributions of return, and/or the characteristics of financial products, in addition to risk and the expected return of investments. The objective of this paper is to investigate the financial product preferences for long-term investments for both Japanese working households and retired households, considering the trade-off of those factors. Working households are accumulating wealth in preparation for retirement, while retired households are withdrawing wealth for consumption and trying to maintain the value of their financial assets. This study uses a choice

[1] For example, countries or industries invested in, or the style of investments such as growth or value, and the size of stock such as large stock or small stock (Fama and French (1993)), etc.

experiment (McFadden (1974) and Train (2009)), which is the one of the stated preference methods. In other words, we examine what kind of factors (or attributions) of financial products households attach a relatively large importance to, and what kind of individual characteristics affect investment choices.[2] We consider not only the attributions that traditional finance theory is based on such as risk and expected return, but also other attributions, such as existence of principal guarantee and countries invested in, as well as individual characteristics, such as stock investment experience, age, gender, and amount of financial asset holdings.

Investigating the financial product preferences of Japanese households is important for the following reasons. According to the Bank of Japan (2011),[3] total household financial assets in Japan are approximately 19 trillion USD (1,491 trillion JPY), that of US households are approximately 49 trillion USD, and that of the Euro zone are approximately 25 trillion USD (19 trillion EURO). Japanese households hold about 20 % of the total financial assets of these three regions, which indicates that the investment decisions of Japanese households may have a large impact on the global capital markets. In addition, the average asset allocation to the equity and the investment trust funds of Japanese households is about 9.5%. That of US households is about 44.2% and that of Euro zone households is about 24.1%. Japanese households have the lowest investment weight in equity related financial products of the three regions. One possible explanation for this may be that the financial products which are currently available in Japan may not meet all of the preferences of investors. If financial institutions can offer financial products which satisfy the preferences of Japanese households, the average asset allocation of Japanese investor to equity might increase. This should have a significant impact on global equity markets.

We apply the choice experiment to investment behavior because we can investigate the

[2] In finance studies the term “factors” seems to be most suitable. However, we use the term “attributions” following the common practice in the choice experiment literature in this paper.

[3] Bank of Japan (2011) uses “Flow of Funds Accounts of the United States” from FRB (2011) for US data, and “Euro Area Accounts” from ECB(2011) for Euro zone data.

preferences considering the trade-off of attributions.[4] When there is a trade-off among attributions, there is no financial product which satisfies all preferences of households. Households may have to give up an attribution in order to obtain others. For example, if households want to have a higher expected return on investments, they have to take higher risks, which mean that households may incur huge losses. In this study, subjects are shown two hypothetical risky financial products, which are close to the those in real retirement markets, and they have to choose one of them to invest in. They repeat this decision 8 times for the different pairs of financial products. From the result of subject choices, we can estimate the marginal rate of substitution, which is the rate of change for an attribution with respect to the change of the base attribution, such that subjects require how much increase of the expected return is needed for a given 1% increase of risk

The choice experiment is a type of stated preference method (Louviere et al. (2000)), similar to the contingent valuation method and the conjoint analysis, which measures the consumer's preference for goods or services. Moreover, the choice experiment is useful for effectively overcoming certain biases (e.g., strategic bias, compliance bias, and warm glow bias), which the data in the contingent valuation method usually possesses.[5] There is ample literature in which choice experiments are used in the field of environmental economics, medical economics , and food economics (Jin et al. (2006), Nakatani et al. (2007), Hole (2008), Arana et al. (2008), Wielgus et al. (2009), Azucena et al. (2009), Aoki et al. (2010)). However, in the finance study, the use of choice experiments is limited. Bateman et al. (2010a), and Bateman et al. (2010b) analyzed Australian household risk and return preferences via choice experiments. They found that risk and return preference differed across age and income level, and investors became more risk averse during the recent crisis conditions in the capital markets. In contrast, our contributions

[4] It may be difficult to consider the trade-off among attributions when we directly ask households what kind of the financial products they prefer.
[5] For more details, see Louviere et al. (2000).

in this paper are that we investigate financial product preferences for not only the risk and expected return relationship, but also for other influencing attributions on investment decisions such as investment time horizon, annual accumulation amount (for working households), annual distribution payouts (for retired households), existence of principal guarantee, countries invested in, fee for products, as well as individual characteristics such as life cycle stage of households (which means whether households are working or retired), experience of stock investment. Those attributions and characteristics have not been investigated in detail before. We also examine the relation between financial product choices and the risk tolerance parameter, which is considered in recent experimental economics literature.

We find three main results. First, for both groups of households, the relationship between risk and expected return is clearly an important factor for choosing financial products. In addition, households have a strong preference for the existence of principal guarantee and for domestic investments. Investment time horizon, annual accumulation amount to financial product, distribution payments, and investment fees have relatively small impacts on investment decisions. Second, comparing individual characteristics within households, working households who have stock investment experience have a preference for a higher expected return, and households who have more financial assets tend to incorporate high risk financial products into their portfolio. Female investors tend to prefer less risky products. On the contrary, retired households who have stock investment experience tend not to care about high risks and expensive fees of financial products. Third, comparing the two household groups, retired households require a higher increase of the expected return for a given increase of risk, and have a stronger preference for principal guarantee, domestic investments, and a shorter investment time horizon of products.

The paper is organized as follows. We will present the experimental design in Section 2. The results are in Section 3. The paper concludes in Section 4.

2. Experimental design

2.1. Subject groups and attributions

Working households (WH) who have relatively few financial assets are presumed to be interested in financial products by which they can accumulate wealth in preparation for retirement, while retired households (RH) who have relatively adequate financial assets are presumed to be interested in financial products by which they can periodically withdraw wealth for consumption and maintain the value of assets. The financial product preferences of those types of household are considered to be different. Therefore, we examine financial product preferences of these two groups separately by using sets of financial products whose characteristics partly differ. In this paper, we define working households (WH) to be those whose age is greater than 30 years old and less than 60 years old, and retired households (RH) to be those whose age is greater or equal to 60 years old. In addition, Ameriks and Zeldes, and Shum and Faig, investigating US households, and Iwaisako, and Kitamura and Nakashima, investigating Japanese households, show that the factors explaining whether investors own the stock or not are different from the factors explaining how much stock weight (in other words, stock share) they want to invest in their portfolio once they already hold stock. Households who invest in stock and those who do not invest in stock may have different preferences for financial products. Therefore, we further sub-divide subjects into two groups for each household group; one group for subjects who have stock investment experience, and the other group for subjects who do not have stock investment experience.

The characteristics of financial products are represented by attributions and their levels. Column (1) of Table 1 shows the attributions and their levels for the financial products which are shown to WH. We use seven main attributions which are considered to affect the investment decision of WH. Those main attributions are risk, expected return, time horizon of investment,

annual accumulation amount contributed to the financial product, existence of principal guarantee, countries invested in, and investment fee. First, the level of risk is 3%, 10%, or 20%, and the level of the expected return is 1%, 4%, or 6%. The combination of 3% risk and 1% expected return is akin to that of the domestic bond funds. The combination of 20% risk and 6% expected return, and 10% risk and 4% expected return, are akin to those of equity funds and balanced funds respectively.[6] Second, because WH are expected to prefer a relatively longer investment time horizon, the level of the time horizon of investment for WH is 10 years, 20 years, or 30 years. Time horizon of investments is related to amounts of human capital which Bodie et al. demonstrated to be important factors for investment decisions. Third, considering that WH are accumulating wealth in preparation for retirement, we use an annual accumulation amount contributed to the financial product for one of attributions, and its level is 120,000 JPY, 300,000 JPY, or 600,000 JPY.[7] Agnew et al., Shum and Faig, and Campbell show that liquidity factors such as amount of financial asset holding and labor incomes affect investment decisions. The annual accumulation amount is related to these liquidity constraints. Fourth, the level of the principal guarantee is either no principal guarantee or 70% principal guarantee. Fifth, considering the similarity of the investment opportunities, the level of the countries invested in is either domestic or international developed countries. Lastly, generally, there are many fees which an investor may incur such as front fee, management fee, and mid-term redemption fee.[8] In this paper, we represent the investment fee by the mid-term redemption fee which is paid only on the midterm cancelation of the contract. The level of the fee is either no fee or 300,000 JPY.

Column (2) of Table 1 shows the attributions and their levels for the financial products which are shown to RH. The attributions and their levels for risk, expected return, principal guarantee, countries invested in, and fee are the same those of WH, whereas, considering RH

[6] There are other combinations which may be inferior risk and return relationship to above in order to examine risk preferences.
[7] Monthly accumulation amounts are also shown to subjects. JPY indicates Japanese Yen. 100 JPY is about 1.25 USD (as of December 2011)
[8] In other words, surrender fee, or mid-term cancelation fee.

prefer a relatively shorter investment time horizon because of age, the level of the time horizon of investment for RH is 5 years, 10 years, or 15 years. In addition, RH, who have already accumulated adequate amounts of wealth, are expected to prefer financial products which they can periodically withdraw for consumption while preserving the long term value of assets. Therefore, we assume the initial investment amount in a financial product is 5 million JPY (62,500 USD), and we use annual distribution payouts from a financial product for one of the attributions instead of the accumulations. Its level is 60,000 JPY, 150,000 JPY, or 300,000 JPY.[9] It is highly unrealistic in the current low level of bond yield in Japan to pay such high amount of distributions relative to the initial investments from income gains.[10] We assume those periodical distributions are paid from the initial investment, which means that investors get back their money from their principal periodically.

[Table 1 is around here]

The particular attribution and its level may affect the asset pricing of financial products, or the expected return of products. For example, the principal guarantee is a kind of put option. Investors who buy the financial product with a put option have to pay a positive premium for it, or the expected return must be lowered. When investors compare the financial product with the put option or without it, given that other attributions are the same and both products have the same price, they properly choose the one with the put option. The reason for this is that the financial product with the put option is relatively cheaper. However, this might not mean that they prefer the principal guarantee over the one without it. Therefore, with the exception of risk and the expected return, we set the level of attributions to affect the pricing of financial products

[9] Monthly distribution amounts are also shown to subjects. The distributions mean the dividends paid from financial products.
[10] The 10 year Japanese government bond yield is less than 1% at the time of experiments.

as little as possible. First, the time horizon of investment, accumulation and distribution are related to the cash inflow and outflow of the financial products. If households can dissolute or sell the financial product when they need the cash, those attributions are supposed not to affect the pricing of the financial products. Second, we set the level of the principal guarantee at either the 70% principal guaranteed or no guarantee. According to the Black-Sholes model, the option premium for the put option with strike price of 70% of current stock, 20% of volatility, 1% risk free rate, no dividends and 30 years of maturity is almost zero.[11] It is true that we are not able to apply the Black-Scholes model directly to our financial products, because we have to consider distributions, accumulations, and mid-term redemption. However, we can suppose the value of the 70% principal guarantee is considerably low. Third, we also suppose the investment characteristics between domestic equity and equity of international developed countries are quite similar. Small differences in risk and return characteristics for both investments can be assumed. Therefore, the difference of investment countries is not considered to heavily affect the pricing of financial products. Lastly, the mid-term redemption fee of 300,000 JPY is also assumed to be relatively small compared to the initial investment amount of 5 million JPY for RH, or the long term accumulating amount for WH. We can consider the impact of the fee for pricing to be small. In sum, in terms of the asset pricing of the financial products, households should choose the financial products considering mainly the risk and expected return relationship. There should not be large preferences for the time horizon of investment, attributions, distributions, principal guarantee, countries invested in, and fee.

On the contrary, different results can be expected according to different theories or empirical studies. First, if the household's investment decision is constrained by the liquidities which can be represented by the amount of income or financial assets, the liquidity needs will

[11] Suppose the underling asset price is 100, strike price of put option is 70, volatility of underling asset is 20%, time of expiration of option is 30 years, risk free rate is 1%, and dividend yield is 0%. The Black-Scholes put option price is almost zero.

affect the preference for accumulation or distribution. Second, if households exhibit loss aversion, which is the tendency to weigh losses more than gains, they prefer a principal guarantee in order to avoid huge losses. Third, according to international finance theory, investors can reduce certain amount of risk if international investments are included in their portfolio (Levy and Sarnat (1970), Solnik (1974)). However, in actual investments, investors tend to increase domestic investments because of the existence of investment cost or information asymmetries (Cooper and Kaplanis (1994), Caval and Moskowits (1999), Ahearne, et al. (2004)). The tendency is often called the home asset bias. If households have this bias, they tend to prefer domestic investments over international investments.

We only consider risky financial products in our experiments. The reason for this is as follows. When both risky financial product and riskless product such as bank accounts or domestic short term bonds are shown to subjects, most Japanese households are expected to choose the riskless product. The preference for low risk products is expected to dominate other attributions and we might not be able to investigate the preferences for risky products. Therefore, we exclude riskless products and concentrate our analysis on preferences of risky financial products in this paper. Furthermore, we examine financial product preferences by web based choice experiments. There might be a bias such that the number of stock investors among internet users tends to be higher than that of non-internet users. However, subjects are recruited separately according to whether they have stock investment experience or not in order to compare both group's financial product preferences, but not to analyze the statistical distribution of subjects. The effect of this bias seems to be negligible for our experiments.

2.2. Construction of choice sets and recruitment of subjects

There are seven main attributions for the financial products which are shown to WH, and there are three levels or two levels depending on the attributions. The total combinations of the

attributions and their levels are 648 (=3^4*3^2). For RH, the attribution of annual accumulations is replaced by that of distributions. The number of attributions and their levels as well as the number of total combinations are the same as those of WH. First, we exclude the three favorable combinations in terms of risk and the expected return relationship which seem to be highly unrealistic. Specifically, we exclude the three combinations. Those are; when risk is 3% and the expected return is 4%, when risk is 3% and the expected return is 6%, and when risk is 10% and the expected return is 6%. These combinations have a relatively low risk and high expected return relation. As a result of this, we can represent 432 combinations of financial products by the attributions and their levels. Second, it is unrealistic to ask a subject to choose whether he wants to invest in for all 432 financial products or not. Therefore, we obtain a sample of 96 financial products for each WH and RH, by using the D-optimal design which is one of the standard experimental methodologies in choice experiments.[12] We construct 48 choice sets (choice opportunities), each consisting of two products. These 48 choice sets are further divided into 6 blocks, which means that there are 8 choice sets in each block (for convenience, we assume block 1 to block 6 are the financial products for RH, and block 7 to block 12 are that of WH). In other words, a subject is shown a choice set, which is consists of two risky financial products, and he has to choose one of the two products to invest in. The subject repeats this decision 8 times for different choice sets.

Panel A of Appendix A shows the translation of the experimental instructions and a sample choice set for WH. Before the choice sets are shown, it is explained to subjects that they are deciding to invest in the financial products (funds) for long-term investment in preparation for retirement. Terminology and the current level of bank saving yield as well as the past performance of the domestic equity index and that of international equity index are also shown. If

[12] We used Design Expert 8 (Stat-Ease Inc.) with parameters of numeric factor=14, Optimaity=D, Liner model, Blocks=6, Model points=25, To estimates lack of fits=23, Replicates=0, Additional Center points=0, and constraints for risk and the expected return explained above.

subjects are not familiar with finance or statistics, they may not understand meaning term such as "20% standard deviation". Therefore, we show subjects the mean plus or minus 1.28 standard deviations (about 80% confidence intervals) as a way of explaining risk. We also show the supplemental information to subjects so that they can easily understand the characteristics of products. For WH, we show the total amount of "investment principal at maturity" of the fund as the results of yearly accumulations. When there is a 70% principal guarantee, we show the actual guaranteed amount, which is the investment principal at maturity, times 70%. We also show the "expected redemption amount at maturity" and its range (80% confidence intervals). We show this because subjects may not understand impacts on wealth according to risk and annual accumulations, when they are shown only the percentage of returns. This expected redemption amount at maturity and its range are computed by the monte carlo simulations based on the risk, the expected return, periodical accumulation amounts, and the principal guarantee, assuming that the return of financial products is normal. Panel A of Appendix B shows all of choice sets for WH which we use in the experiments. Panel B of Appendix A shows the translation of experimental instructions and a sample choice set for RH. The distribution amounts are shown instead of the accumulation amounts. For RH, we assume that the distributions are paid from the investor's principal. In order to understand this easily, we show the investment principal amount at maturity, the expected redemption amount at maturity and its range, considering the payout of the distributions. Others are similar to choice sets of WH. Panel B of Appendix B shows all of the choice sets for RH.

Holt and Laury (2002) elicited the risk aversion of subjects by sequential lottery choice experiments. We include similar questions in our experiment to examine the correlation between Holt and Laury's risk tolerance test and risk preferences of subjects. Appendix C shows our version of Holt and Laury's risk tolerance test used in this experiment. Subjects are asked to choose 10 sequential choices between two lotteries; one "safe" option A (with hypothetical payoff

of 2,000,000 JPY and 1,600,000 JPY) and “risky” option B (with hypothetical payoff of 3,850,000 JPY and 10,000 JPY). In both options, the probability of the first of the 10 decisions is 10% for the higher payoff and 90% for the lower payoff. In decision 1, the expected payoff for option A is greater than that of option B, and the risk of option A is lower than that of option B. Most subjects are expected to choose option A in decision 1. As the probability of the higher payoff increases, option B becomes more attractive. At some point, subjects switch their decision from option A to option B. In decision 10, option B is expected to be chosen because it has higher expected return with no risk. The number of choices for option B is considered to be risk tolerance of subjects.

Subjects are recruited from the registered member of My Voice Com inc., which is an internet based research and marketing companies in Japan. First, we conducted preliminary research to ascertain whether or not subjects have stock investment experience, and personal characteristics, such as age and gender on September 2010. Second, for WH, we recruited subjects for our main experiments randomly by using the 2*3 design: whether subjects have stock investment experience or not, and subjects’ age is 30s years old, 40s years old, or 50s years old from the persons who answered the preliminary research. For each cell of the design, we assign randomly the choice sets of block 7 to block 12 while controlling the number of subjects of each block to be almost equal. Similarly, for RH, we recruited subjects randomly by using the 2*2 design: whether subjects have stock investment experience or not, and subjects’ age is between 60 and 65 years old, or the age is more than 65 years old. We randomly assign the choice sets of block 1 to block 6. The subjects are invited to answer to our main experiments about one or two weeks after the preliminary research. The total number of subjects for WH is 627 persons including 313 subjects who have stock investment experience, and that of RH is 620 persons including 310 subjects who have stock investment experience. The reward for subjects is a fixed

amount of the research company's points which can be redeemed at a later time.[13]

3. Experimental Results

We examine financial product preferences using the conditional logit model which is one of the standard models in choice experiments: [14]

$$\Pr(Y=1) = F\{X \cdot \beta + \varepsilon\},$$

where $F(z) \equiv \exp(z)/(1+\exp(z))$, and the dependent variable $Y=1$ if the particular financial product in the choice set is chosen by the subject and zero otherwise. X is variable related to attributions, and β is the coefficient of the variable. ε is the residual of the regression. Table 2 shows the definition of variables and their descriptive statistics. Panel A of Table 2 shows the definition of variables related with main attributions; RISK, RETURN, TIME, ACCUMULATIONS (for working households), DISTRIBUTIONS (for retired households), GUARANTEE, INTERNATIONAL, and FEE. We show supplemental information to subjects such as the investment principal at maturity and the expected redemption amount at maturity. These variables are redundant and can be computed from the main attributions and their levels. However, subjects may take these variables into account more than others when they choose the financial products. Therefore, we also include the variable PRINCIPAL which represents the investment principal amounts at maturity, and the variable 10PERCENTILE which represents the lower value of the confidence interval of the expected redemption amount as independent variable. Panel A of Table 2 also shows the mean and standard deviation according to whether the households have stock investment experience (STOCK=1) or not (STOCK=0), and the particular financial product is chosen (Y=1) or not (Y=0).

[13] Actual payment amount is available upon request to the authors

[14] Appendix D shows the detail of the conditional logit model (c-logit), which is sometimes referred as the fixed effect logit model. We use STATA/SE (v.11.2) to estimate models.

For the working households (WH), if subjects have no stock investment experience (STOCK=0), then the mean RISK of the chosen product (Y=1) is 13.8% and that of non-chosen product (Y=0) is 14.2%. The difference is -0.4%, which is statistically significant at $P<0.05$ level. The mean RETURN of chosen product is 3.7% and that of non-chosen product 3.6%. The difference is also statistically significant. Subjects tend to choose lower risk and higher expected return products. In addition, the chosen products tend to be characterized by a shorter TIME horizon, smaller ACCUMULATIONS, having principal GUARANTTEE, non-INTERNATIONAL (which means domestic investments), lower FEE, a lower PRINCIPAL, and a lower 10PERCENTILE. Subject preferences for lower PRINCIPAL or lower 10PERCENTILE seem to indicate that subjects choose products with lower accumulation amounts. Next, WH subjects who have stock investment experience (STOCK=1) have the same tendency as no stock investment experience subjects, except the difference of RISK between the chosen and non-chosen product is not statistically significant. For the retired households (RH), no stock investment experience (STOCK=0) subjects tend to chose a smaller DISTRIBUTIONS, a higher PRINCIPAL, and a higher 10PERCENTILE. However, there is no statistical difference for RETURN between the chosen and non-chosen product. The tendency of other attributions is the same as that of WH. The RH subjects who have stock investment experience (STOCK=1) have the same tendency as that of STOCK=0 subjects except RETURN of the chosen product is higher. Panel B of Table 2 shows the definition of variables related to individual characteristics and their mean and standard deviation, which consist of AGE including age dummy variables, FEMALE, ASSETS, INCOME, and HOLT&LAURY.

[Table 2 is around here]

The preferences for each particular attribution can be examined by Panel A of Table 2.

However, we cannot know the financial product preferences considering all attributions at the same time, and we also cannot know which attributions households attach relatively high importance to. Therefore, we investigate the preferences by using a panel regression model. Table 3 shows the results of the conditional logit model for WH. First, column (1) shows the estimates obtained from using main attributions and the cross products of main attribution and STOCK dummy. [15] The coefficients of all main attributions are statistically significant at $P<0.01$ level. The coefficient of RISK is negative, and that of RETURN is positive. We confirm that the financial products which have a lower risk and a higher expected return have a grater chance to be chosen. This indicates that households in Japan rationally decide investments in terms of the risk and return relationship. The coefficient of TIME is negative. This means that the financial products whose maturity is shorter tend to be chosen. The coefficient of ACCUMULATIONS is negative. Households tend to choose investments which allow a smaller yearly amount of accumulation. The coefficient of GUARANTEE is positive. Households tend to invest in financial products in which the investment principal is guaranteed, even if those guarantees are only 70% of principal and the value of these guarantees seems to be quite small. The coefficient of INTERNATIONAL is negative. We confirm that households have the home asset bias and are likely to invest domestically. The coefficient of FEE is negative. This means that households tend to choose the products which have fewer fees. Regarding the cross products of main attribution and STOCK, the coefficient of STOCK*RETURN is positive and significant at 5% level. This indicates that households who have experience in stock investments tend to choose the financial products which have a higher expected return. The other coefficients of the cross products are not significant. Second, column (2) shows the estimates obtained from using PRINCIPAL and STOCK*PRINCIAL instead of TIME, ACCMULATIONS and their cross products with STOCK.

[15] Individual attributions such as STOCK have to be used to interact with main attributions in the conditional logit model because of the parameter identification problem (see chapter 2 of Train (2009)).

PRINCIPAL, which is the accumulated principal amount at maturity, can be considered as the proxy of TIME and ACCUMULATIONS. The coefficient of PRINCIPAL is negative and statistically significant, and that of STOCK*PRINCIPAL is not statistically significant. These results show the same tendency as those in column (1). Third, column (3) shows the estimates obtained from using 10PERCENTILE and STOCK*10PERCENTILE, instead of RISK and STOCK*RISK. 10PERCENTILE, which is the lower value in the range of the expected redemption amount at maturity, can be considered as the proxy of RISK. The coefficient of 10PERCENTILE is positive and statistically significant. Households tend to choose financial products which have a higher 10PERCENTILE. This indicates that households prefer the higher redemption amount of low end of the range, in other words, households have a preference to avoid risk. The coefficient of STOCK*10PERCENTILE is not statistically significant. These results also show the same tendency as those in column (1). Fourth, column (4) shows the estimates obtained from adding the cross product of individual attributions, which are ASSETS*RISK, FEMALE*RISK, and INCOME*ACCUMULATIONS to the independent variables of column (1). The variable ASSETS and FEMALE are considered to be related to the risk aversion of households. The coefficient of ASSETS*RISK is positive and statistically significant. This indicates that households who have more financial assets tend to tolerate riskier products. This result is consistent with the empirical literature. The coefficient of FEMALE*RISK is negative and statistically significant. We confirm that females tend to choose lower risk products, which is in line with the results of Barber and Orden (2002). The coefficient of INCOME*ACCUMULATIONS is positive and statistically significant. This indicates that households who have larger labor incomes have a tendency to choose financial products in which households can invest larger contribution amounts. The results of the other variables are similar to those in column (1). Lastly, column (5) shows the estimates obtained from adding HOLT&LAURY*RISK to represent risk attitude of households instead of ASSETS*RISK and

FEMALE*RISK in column (5). The coefficient of HOLT&LAURY*RISK is positive and statistically significant. We confirm that households who can tolerate risk in terms of the Holt and Laury's test tend to chose riskier financial products.

[Table 3 is around here]

Table 4 shows the results of the conditional logit model for RH. The combinations of independent variables for column (6) to column (10) are the same as column (1) to column (5) in Table 3 respectively, except that ACUMULATIONS and its cross products with STOCK are replaced by DISTRIBUTIONS. The coefficients of RISK, RETURN, TIME, GUARANTEE, INTERNATIONAL, and FEE are statistically significant, and have the same sign as those of WH. The coefficient of DISTRIBUTIONS is negative and statistically significant. Households tend to choose financial products that pay lower distributions, which contradicts the general perception about the distributions in the investment trusts markets in Japan. In this paper, as explained earlier, we assume that the distributions are paid from the investment principal because of the current low interest rate. This result indicates that RH do not want to have higher distributions when they are paid from the principal, in other words, when the redemption amounts at maturity are reduced. Regarding the cross products of main attributions with STOCK, the coefficients of both STOCK*RISK and STOCK*FEE are positive and statistically significant. These results mean that, when households have stock investment experience, they are willing to choose products even though those products are more risky and more expensive in terms of fees. We found the coefficient of RISK is negative, that of STOCK*RISK is positive, and the absolute value of these coefficients are almost the same. These results indicate that households who have no stock investment experience have a preference for low risk financial products, however, on the contrary, households who have stock investment experience do not attach significant importance to the risk

of the products. We can also interpret the results for FEE and STOCK*FEE similarly. Households who have stock investment experience tend to be indifferent to whether the fee of financial products is high or not. The other cross products are not significant. In column (7), the coefficient of PRINCIPAL is positive and statistically significant, which means that households tend to prefer smaller amount of distribution payments when these are paid from the principal. In column (8), the coefficient of 10PERCENTILE is positive and statistically significant, which means that households tend to chose lower risk products. Both results show similar tendencies as those in column (6). In column (9), the coefficients of ASSETS*RISK, FEMALE*RISK, and INCOME*DISTRIBUTIONS are not statistically significant, which is different from those of WH. For RH, amounts of financial assets, gender, and labor income seem to have a smaller contribution to financial product choice decisions in the situations that we are considering in this paper, such as 5 million JPY of initial investments, and investing traditional assets like stock and bond. However, in column (10), the coefficient of HOLT&LAURY*RISK is positive and statistically significant. We confirm that the risk tolerance which is induced by the Holt and Laury's test will affect the financial product choice decisions, which is the same tendency as in WH.

[Table 4 is around here]

Table 5 shows the marginal rate of substitutions ($MRS \equiv \partial X_i / \partial X_{RETURN}$: the infinitesimal rate of change of an attribution i with respect to the change of the expected return given a constant utility level).[16] As seen in Appendix C, the MRS is the ratio of a coefficient of attribution to that of RETURN, and it is comparable among attributions or household groups. Column (11) is the MRS for WH which is computed from column (1) in Table 3. The MRS of

[16] In other words, cross-elasticity or factor returns

RISK is 0.2248 (=-(-1.683)/7.485), which means that WH require 0.2248% increase of RETURN to compensate for a 1% increase of RISK given a constant level of utility. The absolute value of the MRS of RISK is the largest. This indicates that the risk and the expected return relation is one of the important factors for households in choosing financial products. Other than RISK, WH have relatively large absolute values of MRS for GUARANTEE and INTERNATIONAL, compared to that of TIME, ACCUMULATIONS, and FEE. The MRS of GUARANTEE is -0.0552, which means that households require a 5.52% increase of the expected return of the financial product when it changes from 70% principal guarantee to no principal guarantee, given that other attributions are fixed. This indicates that households are expected to require a far larger increase of the expected return for the financial product when it changes from a 100% principal guarantee to no principal guarantee. The MRS of INTERNATIONAL is 0.0684, which means that households require a 6.84% increase of the expected return when they decide to invest internationally. This shows that households have a strong home asset bias. Interestingly, the absolute value of MRS for GUARANTEE and INTERNATIONAL are close in value. It seems that the preference of households for financial products which invest domestically is almost the same as the one which invest internationally with a 70% principal guarantee. The absolute values of MRS for TIME, ACCUMULATIONS, and FEE are relatively small, though these are statistically significant. Column (12) is the MRS for RH which is computed from column (6) in Table 4. Similar to WH, the absolute value of MRS for RISK is the largest, those of GUARANTEE and INTERNATIONAL are also relatively large, and those of TIME, DISTRIBUTIONS, and FEE are relatively small. In particular, the distributions which are paid from the investment principal are highly possible considering current low level of interest rate in Japan, if investment management companies want to attract investors by paying the constant high level of distributions. However, the MRS for DISTRIBUTIONS is not so large compared to the other attributions. This indicates that the RH seem to attach importance to the total return of the

fund, and they do not give a large preference to the annual distributions when those are paid from the investment principal.

Comparing the MRS between household groups, column (13) shows the MRS ratio, which is defined as the particular MRS for RH divided by that of WH minus one. First, the MRS ratio of RISK is 16.7%, which means that RH require a larger increase of the expected return than WH. RH seem to be more risk averse than WH. However, this ratio is the smallest among other attributions, which indicates that the preference difference about risk seems to be relatively small between two household groups. Second, the ratio for GUARANTEE is 68.9% and that of INTERNATIONAL is 34.8%. These results mean that RH exhibit more loss aversion and prefer principal guaranteed products to hedge the large loss of investments. RH also have a large home asset bias and the stronger preference for domestic investments. Third, the ratio for FEE is 26.8%. This shows that RH tend to prefer the low fee financial products compared to WH. Lastly, the MRS of TIME for both household groups seems to have a small impact on investment decisions. However, the MRS ratio for TIME is 480.9%, which is the largest among all other attributions. This indicates that the investment time horizon seems to be more important for RH than WH.[17]

[Insert Table 5 here]

4. Conclusion

In this paper, we investigate the financial product preferences for both working households (WH) and retired households (RH) by using choice experiments. We find three main results. First, for both group of households, we confirm that the relationship between risk and

[17] We assume IIA (independence of irrelevant alternatives) for residuals when using the conditional logit model (c-logit). This assumption can be relaxed when using the random parameter logit model (RPL). We present the details of RPL in Appendix D. Appendix E shows the main estimates and Appendix E shows MRS using RPL. Both results using c-logit and RPL seem to exhibit the same tendency. In choice experiment literature, RPL may be preferred. However, in finance study, a simpler model tends to be preferred. Therefore, we use c-logit for our main results.

expected return is clearly an important factor for choosing financial products. This result indicates that Japanese households tend to chose financial products reasonably in terms of risk and return. In addition, the existence of principal guarantee and the countries invested in are also important attributions. Both households have strong preferences for principal guarantee and domestic investment. Other attributions such as investment time horizon, annual accumulation amounts, annual distribution amounts, and midterm redemption fee have a relatively small impact on the financial product preferences. Second, comparing individual characteristics within households, WH who have stock investment experience show a preference for products which have a higher expected return. Households who have more financial assets tend to incorporate the high risk financial products into their portfolio, and females tend to prefer lower risk products. We also find that households who have a higher income tend to accommodate larger amounts of accumulations. RH who have stock investment experience show a preference for products which have higher risk and higher fee products. For RH, financial assets, income, and gender have no impact on the financial product preferences. For both households, risk tolerance elicited by the Holt and Laury test affects investment decisions. Third, comparing the two household groups, RH require a larger increase of the expected return for a given increase of risk, and have a stronger preference for principal guarantee, domestic investments, and a shorter investment time horizon of financial products.

Our results show that Japanese household investors have a strong preference for principal guarantee and domestic investments. It seems that the bank oriented personal finance service customs and the long term appreciation of currency cause these biases. However, this does not mean that Japanese investors will not invest in international equity markets. If the expected return for those investments increases adequately, those investors may invest in such markets. Our results show that both household groups invest in international markets when the expected return increases more than 10% compared with domestic investments. However, it

seems to be difficult to obtain an increase of more than 10% of the expected return when investing in conventional international equity indexes due to the similarity of economic and demographic conditions between international developed countries and Japan. Our results also show that households who have stock investment experience are willing to invest in funds in which the risk investment fee of the fund is even higher. We suggest that the emerging markets and/or the alternative asset classes can be a candidate for the international investments for Japanese investors, especially for retired households who have stock investment experience. Those alternative asset classes may include commodities, real estate, private equities and hedge funds. These actively managed funds can also be candidates if they can attain a higher expected return than that of index funds. In addition, if some level of principal guarantee is possible, the preference for international financial products seems to increase significantly for both working and retired households regardless of stock investment experience. However, we have not examined yet the preferences for those asset classes and levels of the principal guarantee. This will be part of our future research.

Recently, investment trust funds which invest in international government bonds and/or high yield bonds have been introduced in Japanese retail finance markets with much popularity. These funds are appealing due to higher distribution payments to investors compared with the domestic bonds fund. Those high distribution funds are now having difficulty to pay high distributions to investors, because the interest rate of those international markets has decreased and the Japanese Yen has appreciated since the last financial crisis. It seems that some funds pay distributions to investors from the principal in order to keep their appeal of high distribution payments. Our results show that the preference for distributions is relatively smaller, especially when the distributions are paid from the principal. This kind of fund seems to distort consumer investment markets in Japan.

Table 1: Attribution and level used in the experiments

Attribution	(1) Level for WH	(2) Level for RH
Risk	3.0%	3.0%
	10.0%	10.0%
	20.0%	20.0%
Expected return	1.0%	1.0%
	4.0%	4.0%
	6.0%	6.0%
Time horizon of investment	10 years	5 years
	20 years	10 years
	30 years	15 years
Annual accumulation amounts	120,000 JPY	
	300,000 JPY	
	60,0000 JPY	
Annual distribution amounts		60,000 JPY
		150,000 JPY
		300,000 JPY
Principal guarantee	No Guarantee	No Guarantee
	70% of Principal	70% of Principal
Country invested in	Domestic	Domestic
	International	International
Mid-term redemption fee	No fee	No fee
	300,000 JPY	300,000 JPY

Table 2: Definition of variables and descriptive statistics
Panel A: Definition of variables, mean and standard deviation for financial product attributions

Variable	Definition of variable	Working households (WH)						Retired households (RH)					
STOCK	=1 if subject has stock investment experience, or zero otherwise	STOCK=0			STOCK=1			STOCK=0			STOCK=1		
Y	=1 if the financial product is chosen, or zero otherwise	Y=1	Y=0	Diff.	Y=1	Y=0	Diff.	Y=1	Y=0	Diff.	Y=1	Y=0	Diff.
RISK	Risk (#)	13.8%	14.2%	−0.4% **	14.1%	14.0%	0.1%	13.8%	14.2%	−0.5% **	14.3%	13.8%	0.5% ***
		(6.7%)	(6.3%)		(6.6%)	(6.4%)		(6.8%)	(6.2%)		(6.7%)	(6.4%)	
RETURN	Expected return (#)	3.7%	3.6%	0.2% ***	3.9%	3.5%	0.4% ***	3.7%	3.6%	0.1%	3.8%	3.5%	0.3% ***
		(2.1%)	(2.0%)		(2.0%)	(2.0%)		(2.1%)	(2.0%)		(2.1%)	(2.0%)	
TIME	Time horizon of investment (#)	19.7	20.4	−0.7 ***	19.7	20.3	−0.7 ***	9.5	10.5	−0.9 ***	9.5	10.5	−0.9 ***
		(7.9)	(8.4)		(7.9)	(8.4)		(3.8)	(4.3)		(3.9)	(4.2)	
ACCUMULATIONS	Annual accumulation amounts (#)	30.8	37.2	−6.4 ***	30.8	37.2	−6.3 ***						
		(19.0)	(20.1)		(19.0)	(20.1)							
DISTRIBUTIONS	Annual distribution amounts (#)							15.7	18.3	−2.6 ***	15.6	18.4	−2.8 ***
								(9.6)	(10.0)		(9.6)	(10.0)	
GUARANTEE	=1 if there is the principal guarantee, or zero otherwise	0.56	0.44	0.12 ***	0.55	0.45	0.10 ***	0.58	0.43	0.15 ***	0.57	0.43	0.14 ***
		(0.50)	(0.50)		(0.50)	(0.50)		(0.49)	(0.49)		(0.50)	(0.50)	
INTERNATIONAL	=1 if the country invested in is international, or zero otherwise	0.43	0.57	−0.14 ***	0.44	0.56	−0.12 ***	0.43	0.56	−0.13 ***	0.44	0.56	−0.12 ***
		(0.50)	(0.50)		(0.50)	(0.50)		(0.50)	(0.50)		(0.50)	(0.50)	
FEE	Mid-term redemption fee (#)	12.4	17.6	−5.3 ***	12.9	17.2	−4.3 ***	12.6	17.4	−4.8 ***	13.6	16.4	−2.8 ***
		(14.8)	(14.8)		(14.8)	(14.8)		(14.8)	(14.8)		(14.9)	(14.9)	
PRINCIPAL	Expected amount of investment principal at maturity	619.3	765.3	−146.0 ***	618.1	765.8	−147.7 ***	349.4	304.3	45.1 ***	351.7	302.7	48.9 ***
		(507.0)	(565.4)		(504.4)	(567.0)		(120.5)	(145.3)		(117.8)	(146.7)	
10PERCENTILE	Lower value of range of expected redemption amount at maturity	558.0	679.8	−121.8 ***	562.8	674.6	−111.8 ***	274.3	230.6	43.8 ***	272.8	232.3	40.5 ***
		(490.8)	(546.6)		(500.1)	(539.2)		(115.1)	(131.5)		(112.2)	(134.5)	
Num. of observations		2,512	2,512		2,504	2,504		2,480	2,480		2,480	2,480	

Note: The values inside parenthesis are the standard deviation. (#) indicates that the corresponding levels in Table 1 are used. *** indicates significance at 1 % for the mean comparison test with unequal variance using Welch's formula for the degree of freedom. ** indicates significance at 5 %.

Panel B: Definition of variables, mean and standard deviation for respondent characteristics

Variable	Definition of variable	Working households (WH)			Retired households (RH)		
		STOCK=0	STOCK=1	Diff.	STOCK=0	STOCK=1	Diff.
AGE	Age of subjects	44.7	44.5	0.21	65.1	65.3	−0.15
		(7.8)	(8.3)		(4.6)	(4.7)	
FEMALE	=1 if subject is female, or zero otherwise	0.45	0.31	0.15 ***	0.51	0.46	0.04 ***
		(0.50)	(0.46)		(0.50)	(0.50)	
ASSETS	Amounts of financial assets holding (10,000 JPY)	453.0	1,194.6	−741.5 ***	782.3	2,021.1	−1,238.9 ***
		(701.3)	(1104.4)		(975.2)	(1242.9)	
INCOME	Annual family income (10,000 JPY)	588.4	805.9	−217.5 ***	406.9	632.3	−225.3 ***
		(474.7)	(505.6)		(287.5)	(485.1)	
HOLT&LAURY	The number of choice (B) in Holt and Laury risk tolerance test shown in Appendix D	2.81	3.22	−0.41 *	3.00	3.23	−0.23
		(2.75)	(2.63)		(3.01)	(2.63)	
AGE40	=1 if subject age is between 40 and 49 years old, or zero otherwise	0.33	0.34	−0.00			
		(0.47)	(0.47)				
AGE50	=1 if subject age is between 50 and 59 years old, or zero otherwise	0.33	0.34	−0.00			
		(0.47)	(0.47)				
AGE65	=1 if subject age is more than 65 years old, or zero otherwise				0.50	0.50	0.01
					(0.50)	(0.50)	
Num. of subjects		314	313		310	310	

Note: The values inside parenthesis are the standard deviation.
*** indicates significance at 1% for the mean comparison test with unequal variance using Welch's formula for the degree of freedom. ** indicates significance at 5%. * indicates significance at 10%.

Table 3: Results of conditional logit models for working households (WH)

Coefficient/(Ste.Err.)	(1)		(2)		(3)		(4)		(5)	
RISK	−1.683	(0.535) ***	−1.658	(0.531) ***			−1.351	(0.638) **	−2.445	(0.632) ***
RETURN	7.485	(1.812) ***	7.734	(1.782) ***	4.211	(1.551) ***	7.480	(1.813) ***	7.502	(1.813) ***
TIME	−0.015	(0.004) ***			−0.023	(0.005) ***	−0.009	(0.005) *	−0.009	(0.005) *
ACCUMULATIONS	−0.011	(0.001) ***			−0.015	(0.002) ***	−0.013	(0.002) ***	−0.013	(0.002) ***
GUARANTEE	0.413	(0.058) ***	0.397	(0.058) ***	0.421	(0.058) ***	0.416	(0.058) ***	0.414	(0.058) ***
INTERNATIONAL	−0.512	(0.058) ***	−0.509	(0.058) ***	−0.504	(0.058) ***	−0.512	(0.058) ***	−0.513	(0.058) ***
FEE	−0.020	(0.002) ***	−0.021	(0.002) ***	−0.020	(0.002) ***	−0.020	(0.002) ***	−0.020	(0.002) ***
STOCK*RISK	0.417	(0.756)	0.416	(0.751)			−0.589	(0.801)	0.323	(0.758)
STOCK*RETURN	5.365	(2.562) **	5.355	(2.522) **	6.044	(2.193) ***	5.453	(2.566) **	5.426	(2.565) **
STOCK*TIME	0.001	(0.005)			−0.002	(0.008)	0.001	(0.005)	0.001	(0.005)
STOCK*ACCUMULATIONS	−0.0001	(0.0021)			−0.001	(0.003)	−0.001	(0.002)	−0.001	(0.002)
STOCK*GUARANTEE	−0.043	(0.082)	−0.044	(0.082)	−0.040	(0.082)	−0.051	(0.082)	−0.046	(0.082)
STOCK*INTERNATIONAL	0.110	(0.082)	0.109	(0.081)	0.108	(0.082)	0.113	(0.082)	0.112	(0.082)
STOCK*FEE	0.003	(0.003)	0.003	(0.003)	0.003	(0.003)	0.003	(0.003)	0.003	(0.003)
PRINCIPLE			−0.0004	(0.0001) ***						
STOCK*PRINCIPAL			−0.00001	(0.00008)						
10PERCENTTILE					0.0002	(0.0001) **				
STOCK*10PERCENTILE					0.0001	(0.0002)				
ASSETS*RISK							0.0011	(0.0003) ***		
FEMALE*RISK							−1.783	(0.661) ***		
INCOME*ACCUMULATIONS(#)							0.044	(0.021) **	0.044	(0.021) **
HOLT&LAURY*RISK									0.265	(0.118) **
AGE40*TIME							−0.007	(0.006)	−0.007	(0.006)
AGE50*TIME							−0.011	(0.006) *	−0.011	(0.006) *
Num of observations	10,032		10,032		10,032		10,032		10,032	
Num of choice sets	5,016		5,016		5,016		5,016		5,016	
LR chi^2	732.39 ***		698.24 ***		727.92 ***		757.24 ***		744.94 ***	
Pseudo R^2	0.062		0.059		0.061		0.064		0.063	

Note: The values inside parenthesis are the standard error. (#) indicates that the values of the coefficient and standard error are multiplied by 10,000. *** indicates significance at 1%, ** indicates significance at 5%. * indicates significance at 10%.

Table 4: Results of conditional logit models for retired households (RH)

Coefficient/(Ste.Err.)	(6)		(7)		(8)		(9)		(10)	
RISK	−1.532	(0.542) ***	−1.301	(0.538) **			−1.366	(0.682) **	−2.224	(0.642) ***
RETURN	5.837	(1.829) ***	4.649	(1.797) ***	4.304	(1.610) ***	5.832	(1.829) ***	5.858	(1.829) ***
TIME	−0.069	(0.007) ***			−0.052	(0.009) ***	−0.070	(0.009) ***	−0.070	(0.009) ***
DISTRIBUTIONS	−0.014	(0.003) ***			−0.003	(0.005)	−0.014	(0.004) ***	−0.014	(0.004) ***
GUARANTEE	0.544	(0.058) ***	0.517	(0.058) ***	0.499	(0.061) ***	0.545	(0.058) ***	0.544	(0.058) ***
INTERNATIONAL	−0.538	(0.059) ***	−0.509	(0.058) ***	−0.537	(0.059) ***	−0.538	(0.059) ***	−0.537	(0.059) ***
FEE	−0.019	(0.002) ***	−0.018	(0.002) ***	−0.020	(0.002) ***	−0.020	(0.002) ***	−0.019	(0.002) ***
STOCK*RISK	1.585	(0.762) **	1.550	(0.757) **			1.857	(0.840) **	1.530	(0.762) **
STOCK*RETURN	4.018	(2.576)	4.360	(2.536) *	6.227	(2.271) ***	4.018	(2.576)	3.999	(2.577)
STOCK*TIME	0.005	(0.010)			−0.005	(0.013)	0.005	(0.010)	0.004	(0.010)
STOCK*DISTRIBUTIONS	−0.005	(0.004)			−0.010	(0.007)	−0.005	(0.004)	−0.005	(0.004)
STOCK*GUARANTEE	−0.041	(0.082)	−0.044	(0.082)	−0.020	(0.086)	−0.042	(0.082)	−0.041	(0.082)
STOCK*INTERNATIONAL	0.097	(0.083)	0.090	(0.082)	0.094	(0.083)	0.097	(0.083)	0.095	(0.083)
STOCK*FEE	0.008	(0.003) ***	0.007	(0.003) ***	0.009	(0.003) ***	0.008	(0.003) ***	0.008	(0.003) ***
PRINCIPLE			0.0021	(0.0002) ***						
STOCK*PRINCIPAL			0.0003	(0.0003)						
10PERCENTTILE					0.0013	(0.0005) ***				
STOCK*10PERCENTILE					−0.0007	(0.0007)				
ASSETS*RISK							−0.0002	(0.0003)		
FEMALE*RISK							0.011	(0.641)		
INCOME*DISTRIBUTIONS(#)							0.004	(0.054)	0.003	(0.054)
HOLT&LAURY*RISK									0.230	(0.114) **
AGE65*TIME							0.003	(0.010)	0.004	(0.010)
Num of observations	9,920		9,920		9,920		9,920		9,920	
Num of choice sets	4,960		4,960		4,960		4,960		4,960	
LR chi^2	784.51 ***		753.94 ***		785.79 ***		785.21 ***		788.69 ***	
Pseudo R^2	0.067		0.064		0.067		0.067		0.067	

Note: The values inside parenthesis are the standard error. (#) indicates that the values of the coefficient and standard error are multiplied by 10,000. *** indicates significance at 1%, ** indicates significance at 5%. * indicates significance at 10%.

Table 5: Marginal rate of substitution with respect to the expected return

	(11) Working households		(12) Retired households		(13) Ratio
	Coef.	Std. Err.	Coef.	Std. Err.	(12)/(11)−1
RISK	0.2248	(0.0632) ***	0.2625	(0.0857) ***	16.7%
RETURN	−1.0000		−1.0000		
TIME	0.0020	(0.0007) ***	0.0117	(0.0038) ***	480.9%
ACCUMULATIONS	0.0014	(0.0004) ***			
DISTRIBUTIONS			0.0023	(0.0010) **	
GUARANTEE	−0.0552	(0.0152) ***	−0.0931	(0.0305) ***	68.9%
INTERNATIONAL	0.0684	(0.0188) ***	0.0922	(0.0314) ***	34.8%
FEE	0.0026	(0.0007) ***	0.0033	(0.0011) ***	26.8%

Note: Column (11) is calculated from the column (1) of Table 1, column (12) is calculated from the column (6) of Table 1. The standard error is computed by delta method (we use the “nlcom” command of STATA). *** indicates significance at 1%, ** indicates significance at 5%.

5. Appendices

5.1. Appendix A: Experimental instructions and examples of choice sets

5.1.1. Panel A: Experimental instructions and example of choice set for working households (WH)

Suppose you are about to decide invest in a financial product (fund) as a long term periodic investment in order to build your wealth and prepare for your retirement. After reading the following the explanation of terms and the recent capital market trends, choose either fund A or fund B on the screen for the above stated purpose of investing. In some cases, neither of the choice may seem to suit your needs. Nonetheless, choose the best one on a relative basis.

Explanation of terms

Initial investments	There is no initial amount of investment, which means that you do not have to pay lump sum investments.
Investment time horizon until maturity	The term of the contract. You will periodically contribute to the fund until maturity. At maturity, you will get back the redemption amounts.
County invested in	This shows the country you invest in.
Expected return	This shows the long term average rate of return from the investments
Risk	Because the capital markets fluctuate, you may not be sure your rate of return of investment. This shows the range of your return.
Annual accumulation amount	Your predetermined annual investment amount to the fund.
Investment principal at maturity	This shows the accumulated amount of your investment principal.
Principal guarantee at maturity	This shows whether your investment principal at maturity is guaranteed at the specified level or not. Yet, there is no principal guarantee if you terminate the contract before maturity.
Mid-term redemption fee	This is the fee you would pay if you want to terminate the contract and get back your money before fund maturity.
Expected redemption amounts at maturity	The money you will get from the investment is uncertain because of capital market fluctuations. This shows the expected amount and its range that you will have at the maturity of the fund.

Capital market trends

- Yield of one year fixed term bank deposit is 0.05%.
- Rate of return for equity investments are as follows.

	Mean 2009 Annual	Mean of past 30 years between 1979 and 2009	The maximum annual loss for past 30 years
Domestic	About 8%	About 3% per year	-41%
International developed countries	About 30%	About 8% per year	-49%

Question

Which of the following would you prefer to invest in as preparation for your retirement, fund A or fund B?

	Fund A	Fund B
Initial investment	No initial investment	No initial investment
Investment time horizon until maturity	30 years	20 years
County invested in	International developed countries	Domestic
Expected return	About 4 % per year	About 4 % per year
Risk	Between -9% to +16% depending on capital market fluctuations	Between -9% to +16% depending on capital markets fluctuations
Annual accumulation amount	30,000 JPY (25,000 JPY monthly)	30,000 JPY (25,000 JPY monthly)
Investment principal at maturity	9 million JPY	6 million JPY
Principal guarantee at maturity	No guarantee	Yes, 70% of your principal (4.2 million JPY) is guaranteed
Mid-term redemption fee	No fee	No fee
Expected redemption amount at maturity	Mean 16.5 million JPY. Between 10.6 to 26.3 million JPY depending on capital market fluctuations	Mean 8.9 million JPY. Between 6.3 to 13.0 million JPY depending on capital market fluctuations
Your choice	☐Fund A	☐Fund B

Note: Risk and expected redemption amount at maturity may exceed the range of value stated above due to capital market fluctuations. There is no principal guarantee for the mid-term cancelation of the contract.

[*A subject repeated the above question for different choice sets eight times. Panel A of Appendix B shows all choice sets which are used in this experiments.*]

5.1.2. Panel B: Experimental instructions and example of choice set for retired households (RH)

Suppose you are about to decide to invest in a financial product (fund) in order to compensate for a shortage in your public pension, using 5 million JPY that you have. After reading the following the explanation of terms and the recent capital market trends, choose either fund A or fund B on the screen for the above stated purpose of investing. In some cases, neither of the choice may seem to suit your needs. Nonetheless, choose the best one on a relative basis.

Explanation of terms

[*Same as WH except the following*]

Initial investment	The lump sum initial investment amount is 5 million JPY.
Annual distribution amount	This shows the predetermined annual distributions (dividends) from the fund. These distributions are paid from your initial investment. When you get more distribution, your principal amount will decrease.
Investment principal at maturity	This shows your investment principal after considering the deduction of the distributions.
Expected redemption amount at maturity	The money you will get from the investments is uncertain because of capital market fluctuations. This shows the expected amount and its range that you will have at the maturity of the funds, after considering the deduction of the distributions.

[*Annual accumulation amounts in the working generation is replaced by above annual distribution amounts*]

Capital market trends

[*Same as WH*]

Question

Which of the following would you prefer to invest in for your long-term investment, fund A or fund B?

	Fund A	Fund B
Initial investment	5 million JPY	5 million JPY
Investment time horizon until maturity	10 years	15 years
County invested in	Domestic	International developed countries
Expected return	About 1 % per year	About 4 % per year
Risk	Between -12% to +13% depending on capital market fluctuations.	Between -9% to +16% depending on capital market fluctuations
Annual distribution amount	300,000 JPY (25,000 JPY monthly) for each 5 million JPY invested.	30,000 JPY (25,000 JPY monthly) for each 5 million JPY invested.
Investment principal at maturity	Your distribution is paid from your initial investment, and your principal becomes 2 million JPY at maturity.	Your distribution is paid from your initial investment, and your principal becomes 500,000JPY at maturity.
Principal guarantee at maturity	Yes, 70% of your principal (1,4 million JPY) is guaranteed.	Yes, 70% of your principal (350,000JPY) is guaranteed.
Mid-term redemption fee	300,000JPY	300,000JPY
Expected redemption amount at maturity	Mean 2.2 million JPY Between 1.4 to 4.2 million JPY depending on capital market fluctuations.	Mean 2.6 million JPY Between 0.4 to 6.3 million JPY depending on capital market fluctuations.
Your choice	☐Fund A	☐Fund B

Note: Risk and expected redemption amounts at maturity may exceed the range of value stated above because of capital market fluctuations. There is no principal guarantee for the mid-term cancelation of the contract.

[*Subjects repeated the above question for different choice sets eight times. Panel B of Appendix B shows all choice sets which are used in this experiments.*]

5.2. Appendix B: Choice sets

5.2.1. Panel A: All choice sets for working households (WH)

	Fund A									Fund B								
Block	RISK	RETURN	TIME	ACCU	GUAR	INTER	FEE	PRIN	10PER	RISK	RETURN	TIME	ACCU	GUAR	INTER	FEE	PRIN	10PER
Block 7	20%	1%	10	12	0	0	0	120	70	3%	1%	30	12	1	0	0	360	370
Block 7	20%	6%	20	30	1	1	0	600	490	10%	4%	20	30	0	0	30	600	630
Block 7	20%	4%	10	30	1	0	30	300	210	20%	1%	10	60	0	1	30	600	360
Block 7	10%	4%	30	60	1	1	30	1,800	2,120	10%	4%	20	30	1	1	0	600	630
Block 7	20%	6%	10	12	1	1	0	120	90	20%	6%	10	60	1	0	30	600	460
Block 7	10%	4%	30	60	0	1	30	1,800	2,120	10%	4%	20	12	0	1	30	240	250
Block 7	20%	6%	20	60	0	0	0	1,200	970	20%	6%	30	30	0	0	0	900	790
Block 7	3%	1%	10	12	0	1	30	120	120	20%	1%	10	12	1	1	0	120	84
Block 8	20%	6%	20	30	1	0	30	600	490	20%	6%	20	30	1	1	30	600	490
Block 8	20%	6%	30	60	0	0	30	1,800	1,580	20%	6%	30	12	0	0	0	360	320
Block 8	10%	4%	30	30	0	0	30	900	1,060	20%	6%	20	12	1	0	30	240	190
Block 8	10%	4%	20	60	0	1	0	1,200	1,250	20%	6%	30	30	0	1	0	900	790
Block 8	10%	4%	20	30	0	1	30	600	630	20%	6%	10	30	0	0	0	300	230
Block 8	10%	4%	20	12	1	1	0	240	250	20%	6%	10	30	0	1	30	300	230
Block 8	20%	6%	20	30	1	0	0	600	490	10%	4%	20	30	1	1	30	600	630
Block 8	20%	6%	10	60	1	0	0	600	460	20%	6%	30	12	1	1	0	360	320
Block 9	10%	4%	30	30	0	1	0	900	1,060	10%	4%	20	30	1	0	0	600	630
Block 9	10%	4%	20	30	1	1	0	600	630	20%	6%	20	30	1	0	30	600	490
Block 9	10%	1%	20	60	1	0	30	1,200	920	10%	4%	30	60	1	1	30	1,800	2,120
Block 9	20%	1%	10	60	0	1	30	600	360	20%	6%	10	12	0	0	30	120	90
Block 9	3%	1%	10	60	1	0	0	600	590	20%	1%	10	12	0	0	30	120	70
Block 9	20%	4%	20	12	0	0	30	240	160	3%	1%	20	30	1	1	0	600	600
Block 9	20%	6%	10	12	1	1	30	120	90	10%	1%	30	60	1	1	0	1,800	1,330
Block 9	20%	6%	30	12	0	0	0	360	320	20%	4%	30	60	0	1	30	1,800	1,180
Block 10	10%	1%	30	30	0	1	0	900	660	10%	4%	30	60	0	0	30	1,800	2,120
Block 10	20%	6%	30	60	1	0	30	1,800	1,580	20%	1%	30	60	1	0	0	1,800	1,260
Block 10	20%	6%	20	12	1	0	30	240	190	20%	6%	10	12	0	1	0	120	90
Block 10	10%	4%	10	30	0	0	30	300	280	10%	4%	20	12	1	0	0	240	250
Block 10	10%	4%	30	12	0	1	30	360	420	3%	1%	10	60	0	1	30	600	590
Block 10	3%	1%	10	12	1	1	0	120	120	10%	4%	30	60	0	0	0	1,800	2,120
Block 10	20%	1%	30	60	0	1	0	1,800	800	20%	1%	10	60	1	1	30	600	420
Block 10	3%	1%	20	30	0	0	0	600	600	20%	6%	30	12	0	1	30	360	320
Block 11	20%	1%	30	12	1	1	30	360	252	20%	1%	30	60	0	0	0	1,800	800
Block 11	3%	1%	30	12	1	0	0	360	370	20%	6%	10	60	0	1	30	600	460
Block 11	10%	4%	30	30	0	0	0	900	1,060	20%	6%	20	30	0	0	0	600	490
Block 11	20%	6%	20	30	1	0	0	600	490	10%	4%	20	30	1	0	30	600	630
Block 11	20%	6%	10	12	0	0	30	120	90	3%	1%	10	60	1	0	30	600	590
Block 11	10%	4%	10	30	0	1	0	300	280	10%	4%	20	12	1	1	30	240	250
Block 11	10%	1%	10	60	1	1	0	600	480	3%	1%	20	12	0	0	0	240	240
Block 11	10%	1%	30	60	0	1	30	1,800	1,330	3%	1%	20	12	1	1	0	240	240
Block 12	3%	1%	10	60	1	1	30	600	590	10%	4%	30	30	1	0	0	900	1,060
Block 12	10%	4%	20	30	1	1	0	600	630	20%	6%	20	30	1	1	30	600	490
Block 12	3%	1%	20	30	0	0	30	600	600	20%	4%	30	60	0	1	0	1,800	1,180
Block 12	10%	4%	10	12	0	0	0	120	110	20%	4%	10	60	0	0	30	600	420
Block 12	20%	6%	10	60	0	1	30	600	460	3%	1%	10	30	1	0	0	300	290
Block 12	20%	1%	30	12	1	0	30	360	252	3%	1%	10	12	0	1	0	120	120
Block 12	20%	6%	20	60	1	1	30	1,200	970	10%	4%	30	60	0	0	30	1,800	2,120
Block 12	20%	6%	30	12	1	0	0	360	320	20%	1%	10	12	1	1	0	120	84

Note: ACCU, GUAR, INTER, PRIN, 10PER above indicate ACCUMULATIONS, GUARANTEE, INTERNATIONAL, PRENCIPAL, and 10PERCENTILE, respectively.

5.2.2. Panel B: All choice sets for retired households (RH)

	Fund A									Fund B								
Block	RISK	RETURN	TIME	DIST	GUAR	INTER	FEE	PRIN	10PER	RISK	RETURN	TIME	DIST	GUAR	INTER	FEE	PRIN	10PER
Block 1	20%	1%	5	6	0	0	0	470	240	3%	1%	15	6	1	0	0	410	410
Block 1	20%	6%	10	15	1	1	0	350	250	10%	4%	10	15	0	0	30	350	320
Block 1	20%	4%	5	15	1	0	30	425	300	20%	1%	5	30	0	1	30	350	150
Block 1	10%	4%	15	30	1	1	30	50	40	10%	4%	10	15	1	1	0	350	320
Block 1	20%	6%	5	6	1	1	0	470	330	20%	6%	5	30	1	0	30	350	250
Block 1	10%	4%	15	30	0	1	30	50	40	10%	4%	10	6	0	1	30	440	410
Block 1	20%	6%	10	30	0	0	0	200	60	20%	6%	15	15	0	0	0	275	140
Block 1	3%	1%	5	6	0	1	30	470	450	20%	1%	5	6	1	1	0	470	330
Block 2	20%	6%	10	15	1	0	30	350	250	20%	6%	10	15	1	1	30	350	250
Block 2	20%	6%	15	30	0	0	30	50	0	20%	6%	15	6	0	0	0	410	260
Block 2	10%	4%	15	15	0	0	30	275	280	20%	6%	10	6	1	0	30	440	310
Block 2	10%	4%	10	30	0	1	0	200	170	20%	6%	15	15	0	1	0	275	140
Block 2	10%	4%	10	15	0	1	30	350	320	20%	6%	5	15	0	0	0	425	280
Block 2	10%	4%	10	6	1	1	0	440	410	20%	6%	5	15	0	1	30	425	280
Block 2	20%	6%	10	15	1	0	0	350	250	10%	4%	10	15	1	1	30	350	320
Block 2	20%	6%	5	30	1	0	0	350	250	20%	6%	15	6	1	1	0	410	290
Block 3	10%	4%	15	15	0	1	0	275	280	10%	4%	10	15	1	0	0	350	320
Block 3	10%	4%	10	15	1	1	0	350	320	20%	6%	10	15	1	0	30	350	250
Block 3	10%	1%	10	30	1	0	30	200	140	10%	4%	15	30	1	1	30	50	40
Block 3	20%	1%	5	30	0	1	30	350	150	20%	6%	5	6	0	0	30	470	320
Block 3	3%	1%	5	30	1	0	0	350	330	20%	1%	5	6	0	0	30	470	240
Block 3	20%	4%	10	6	0	0	30	440	220	3%	1%	10	15	1	1	0	350	340
Block 3	20%	6%	5	6	1	1	30	470	330	10%	1%	15	30	1	1	0	50	40
Block 3	20%	6%	15	6	0	0	0	410	260	20%	4%	15	30	0	1	30	50	0
Block 4	10%	1%	15	15	0	1	0	275	140	10%	4%	15	30	0	0	30	50	40
Block 4	20%	6%	15	30	1	0	30	50	40	20%	1%	15	30	1	0	0	50	40
Block 4	20%	6%	10	6	1	0	30	440	310	20%	6%	5	6	0	1	0	470	320
Block 4	10%	4%	5	15	0	0	30	425	380	10%	4%	10	6	1	0	0	440	410
Block 4	10%	4%	15	6	0	1	30	410	420	3%	1%	5	30	0	1	30	350	330
Block 4	3%	1%	5	6	1	1	0	470	450	10%	4%	15	30	0	0	0	50	40
Block 4	20%	1%	15	30	0	1	0	50	0	20%	1%	5	30	1	1	30	350	250
Block 4	3%	1%	10	15	0	0	0	350	340	20%	6%	15	6	0	1	30	410	260
Block 5	20%	1%	15	6	1	1	30	410	290	20%	1%	15	30	0	0	0	50	0
Block 5	3%	1%	15	6	1	0	0	410	410	20%	6%	5	30	0	1	30	350	210
Block 5	10%	4%	15	15	0	0	0	275	280	20%	6%	10	15	0	0	0	350	200
Block 5	20%	6%	10	15	1	0	0	350	250	10%	4%	10	15	1	0	30	350	320
Block 5	20%	6%	5	6	0	0	30	470	320	3%	1%	5	30	1	0	30	350	330
Block 5	10%	4%	5	15	0	1	0	425	380	10%	4%	10	6	1	1	30	440	410
Block 5	10%	1%	5	30	1	1	0	350	250	3%	1%	10	6	0	0	0	440	430
Block 5	10%	1%	15	30	0	1	30	50	0	3%	1%	10	6	1	1	0	440	430
Block 6	3%	1%	5	30	1	1	30	350	330	10%	4%	15	15	1	0	0	275	280
Block 6	10%	4%	10	15	1	1	0	350	320	20%	6%	10	15	1	1	30	350	250
Block 6	3%	1%	10	15	0	0	30	350	340	20%	4%	15	30	0	1	0	50	0
Block 6	10%	4%	5	6	0	0	0	470	420	20%	4%	5	30	0	0	30	350	180
Block 6	20%	6%	5	30	0	1	30	350	210	3%	1%	5	15	1	0	0	425	410
Block 6	20%	1%	15	6	1	0	30	410	290	3%	1%	5	6	0	1	0	470	450
Block 6	20%	6%	10	30	1	1	30	200	140	10%	4%	15	30	0	0	30	50	40
Block 6	20%	6%	15	6	1	0	0	410	290	20%	1%	5	6	1	1	0	470	330

Note: DIST, GUAR, INTER, PRIN, 10PER above indicate DISTRIBUTIONS, GUARANTEE, INTERNATIONAL, PRENCIPAL, and 10PERCENTILE, respectively.

5.3. Appendix C: Holt and Laury risk tolerance test

Decision	Option A				Option B			
	Prob. p	payoff (10,000 JPY)	Prob. (1−p)	payoff (10,000 JPY)	Prob. p	payoff (10,000 JPY)	Prob. 1−p	payoff (10,000 JPY)
1	10%	200	90%	160	10%	385	90%	1
2	20%	200	80%	160	20%	385	80%	1
3	30%	200	70%	160	30%	385	70%	1
4	40%	200	60%	160	40%	385	60%	1
5	50%	200	50%	160	50%	385	50%	1
6	60%	200	40%	160	60%	385	40%	1
7	70%	200	30%	160	70%	385	30%	1
8	80%	200	20%	160	80%	385	20%	1
9	90%	200	10%	160	90%	385	10%	1
10	100%	200	0%	160	100%	385	0%	1

Note: Subjects have to choose either option A or option B for the hypothetical reward of the project for decisions 1 through10.

5.4 Appendix D: Models

5.4.1. Conditional logit (C-logit) model and marginal rate of substitution

Suppose decision maker $n = 1, \cdots, N$ is faced with choosing a product $j = 1, \cdots, J$ in the choice opportunities (choice sets) $t = 1, \cdots, T$. The product j is represented by the attribution $k = 1, \cdots, K$. Let the utility that the decision maker n chooses product j in the choice set be U_{ntj}. The decision maker n chooses product i in the choice set t if and only if $U_{nti} > U_{ntj} \forall j \neq i$. In this paper, we suppose the random utility model :

$$U_{ntj} = \beta \cdot x_{ntj} + \varepsilon_{ntj}$$

where x_{ntj} is a vector of attribution related to the product j in choice set t faced by decision maker n. β is the coefficient of variables. ε_{ntj} is the residual which capture the factors that affect utility, but are not represented by $\beta \cdot x_{ntj}$. Assuming ε_{ntj} being independently and identically distributed extreme value, the probability that decision maker n chooses product i in the choice set t has the closed form expression:

$$P_{nti} = \frac{\exp(\beta \cdot x_{nti})}{\exp\left(\sum_{j=1}^{J} \beta \cdot x_{ntj}\right)}.$$

The parameter β can be estimated using the maximum likelihood estimation. The probability of decision maker n choosing product j in choice set t, based on actual subject choices, can be expressed as

$$\prod_{j=1}^{J} \left(P_{ntj}\right)^{y_{ntj}},$$

where $y_{ntj} = 1$ if the decision maker choose the product, and zero otherwise. Assuming that each decision maker choice is independent of that of other decision makers among choice sets, the probability that each decision maker in the experiment chooses the product i in choice set t that he actually faces is

$$L(\beta) = \prod_{n=1}^{N}\prod_{t=1}^{T}\prod_{j=1}^{J}\left(P_{ntj}\right)^{y_{ntj}} .$$

where β is a vector contained in the probability. The log likelihood function is

$$LL(\beta) = \sum_{n=1}^{N}\sum_{t=1}^{T}\sum_{j=1}^{J} y_{njt} \cdot \ln P_{njt}.$$

McFadden(1974) show that $LL(\beta)$ is globally concave for liner utility function. The estimators are solutions satisfying the following first order condition:

$$\frac{dLL(\beta)}{d\beta} = 0 .$$

The total derivative of utility with respect to each attribution is

$$dU = \sum_{k=1}^{K} \beta_k \cdot dx_\kappa .$$

Now, we concentrate on two attributions x_l and x_m. When the utility is fixed at the present level ($dU = 0$), and the attributions other than x_l and x_m are also fixed ($dx_k = 0 : \forall k \neq l, m$), then, the marginal substitution of attribution l with respect to attribution m is can be found from $0 = \beta_l dx_l + \beta_m dx_m$:

$$MRS_l = \frac{dx_m}{dx_l} = -\frac{\beta_l}{\beta_m} .$$

In the choice experiment literature, the price of products is used for the base attribution m and MRS_l is called the "willingness to pay for attribution l". In this paper, the expected return is used for the base attribution m.

5.4.2. Random parameter logit (RPL) model

For the random parameter logit model, we suppose the utility is represented by

$$U_{ntj} = \beta_n \cdot x_{ntj} + \varepsilon_{ntj}$$

In this model, we assume β_n is different for each decision maker n, and has the density function $f(\beta \mid \theta)$, where θ is the parameter of the density such as, for example, mean and standard deviation. Following Train (2003), the conditional probability for decision maker n to chose product i given β_n is:

$$L_{nti}(\beta_n) = \frac{\exp(\beta_n \cdot x_{nti})}{\exp\left(\sum_{j=1}^{J} \beta_n \cdot x_{ntj}\right)}.$$

In order to consider the multiple choice opportunities, we let:

$$S_n(\beta_n) = \prod_t \prod_j L_{ntj}(\beta_n)$$

The unconditional probability can be found by integration over all of β_n:

$$P_n(\theta) = \int S_n(\beta_n) f(\beta_n \mid \theta) d\beta_n ,$$

There is no analytic solution for this integral. We find the parameter θ by simulations. The Log likelihood function for this integral is:

$$LL(\theta) = \sum_n \ln(P_n(\theta))$$

The Log likelihood function for the simulation can be expressed by:

$$SLL(\theta) = \sum_n \ln\left\{\frac{1}{R}\sum_{r=1}^{R} S_n(\beta^r)\right\}.$$

where R is the number of simulations. The β^r represents the r th random draw from the density $f(\beta \mid \theta)$. The parameter θ maximizes above function.

5.5 Appendix E: Results of random parameter logit (RPL) model

	Working households		Retired households	
	Coeff./(Std.Err.)	Std./(Std.Err.)	Coeff./(Std.Err.)	Std./(Std.Err.)
RISK	−3.062 ***	9.959 ***	−2.321 **	9.011 ***
	(1.087)	(1.003)	(1.077)	(1.039)
RETURN	21.285 ***		17.975 ***	
	(3.450)		(3.521)	
TIME	−0.040 ***	0.085 ***	−0.155 ***	0.164 ***
	(0.008)	(0.009)	(0.017)	(0.018)
ACCUMULATIONS	−0.015 ***	0.025 ***		
	(0.003)	(0.003)		
DISTRIBUTIONS			−0.021 ***	0.049 ***
			(0.006)	(0.006)
GUARANTEE	0.788 ***	0.873 ***	1.139 ***	1.168 ***
	(0.115)	(0.142)	(0.131)	(0.137)
INTERNATIONAL	−0.938 ***	1.376 ***	−1.046 ***	1.348 ***
	(0.128)	(0.125)	(0.131)	(0.132)
FEE	−0.029 ***	0.033 ***	−0.028 ***	0.031 ***
	(0.004)	(0.004)	(0.004)	(0.004)
STOCK*RISK	−0.014		1.945	
	(1.544)		(1.509)	
STOCK*RETURN	12.834 ***		8.735 *	
	(4.930)		(4.907)	
STOCK*TIME	−0.001		0.002	
	(0.011)		(0.023)	
STOCK*ACCUMULATION	0.002			
	(0.004)			
STOCK*DISTRIBUTIONS			−0.004	
			(0.008)	
STOCK*GUARANTEE	−0.046		−0.019	
	(0.155)		(0.172)	
STOCK*INTERNATIONAL	0.162		0.120	
	(0.175)		(0.175)	
STOCK*FEE	0.002		0.008 *	
	(0.005)		(0.005)	
Num of observations	10,032		9,920	
Num of choice sets	5016		4960	
LR chi^2	332.70 ***		289.40 ***	

Note: *** indicates significance at 1%, ** indicates significance at 5%. * indicates significance at 10%.

5.6 Appendix F: Marginal rate of substitution by RPL

	Working households		Retired households	
	Coef.	Std. Err.	Coef.	Std. Err.
RISK	0.1439	(0.0448) ***	0.1291	(0.0520) ***
RETURN	−1.0000	.	−1.0000	.
TIME	0.0019	(0.0005) ***	0.0086	(0.0018) ***
ACCUMULATIONS	0.0007	(0.0002) ***		
DISTRIBUTIONS			0.0012	(0.0004) ***
GUARANTEE	−0.0370	(0.0075) ***	−0.0634	(0.0136) ***
INTERNATIONAL	0.0441	(0.0092) ***	0.0582	(0.0134) ***
FEE	0.0014	(0.0003) ***	0.0015	(0.0003) ***

Note: Marginal rate of substitutions are calculated from the coefficients in Appendix E. The standard error is computed by the delta method. *** indicates significance at 1%.

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