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Influence of the Consideration of Future Consequences on Financial Behavior: The Case of Japanese Individual Investors

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Abstract: We analyze the impact of the "consideration of future consequences" (CFC) on the amount of financial assets and the liabilities of individual investors by applying a Tobit model to data from a web-based survey. We find that impatient individuals with high CFC have fewer deposits and financial asset balances. We also examine the influence of the CFC-immediate (CFC-I) and CFC-future (CFC-F) sub-indicators often used in psychology as well as CFC on financial asset balances and liabilities. CFC-I show concern with immediate consequences and also an index related to ego depletion. We find that the higher the CFC-I, the lower the amount of deposits and financial asset balances. However, CFC-F is a sub-indicator designating lack of concern with future consequences; thus, the higher the CFC-F, the larger the debt.

Keywords: *Ratio of risky asset holding, individual investors, Web-based survey, Behavioral finance, Japan, Consideration of future consequences.*

1. Introduction

To investigate the relationship between the various attributes (including psychological tendencies) of Japanese individual investors and their investment behavior, we use the "Survey on Japanese Individual Investors' Financial Behavior" and analyze the data from this survey (Kozu et al., 2012, Takeda et al., 2013). Following recent studies on behavioral economics and behavioral finance, in conducting behavioral analysis of individual investors, we use data that can be clearly classified by characteristics such as age, gender, holding status of assets, individual feelings, and also psychological tendencies. In this study, we thus analyze the influence of the consideration of future consequences (CFC) on the financial assets owned by individual investors based on demographic parameters from the web-based survey. Furthermore, we divide CFCs into CFC-immediate (CFC-I), which means "concerned with immediate consequences," and CFC-future (CFC-F), which refers to "concerned with future consequences," and comparatively analyze them. A Tobit model is then applied to the results, whose parameters are related to time and money preferences.

2. Literature Review

An early empirical study by Nakagawa and Katagiri (1999) uses micro data (individual data) on Japanese household asset allocation to analyze the reason the holding ratio of risky assets is lower in Japanese households than in other countries. The study shows that Japanese investors do not consider the profitability of assets significantly important, indicating a stronger tendency to value safety and liquidity than US investors. More recently, research on behavioral economics has also been conducted using behavioral characteristics data. Kinari and Tsutsui (2009) measure the psychological tendencies of an individual being an optimist, including not only demographic parameters, such as age and sex, but also personal psychological ones such as the time discount rate of individuals. They show that psychological tendencies have influences on the holding of financial assets. Prior studies on the influence of time discount rate of individuals are roughly divided into two categories: (1) the impact on the balance of financial assets and (2) the influence on the holding ratio of risky assets. Regarding the impact of the time discount rate on the balance of financial assets, many studies show that the amount of financial assets reduces as the time discount rate increases, and "impatient" individuals tend to value "current consumption" over "future consumption." For instance, Takeuchi and Hoshino (2014) find that the time discount rate has a significantly negative influence on the holding of financial assets. They show that the higher the time discount rate is, the lower the financial assets

are. The authors conclude that the holding amount of financial assets, including risky assets, is small because individuals who are present-oriented and rational consume more.

This is based on the fact that the ratio of the time discount rate changes the evaluation of current and future consumption under the setup of the utility function in traditional economics theory. In other words, individuals with high time discount rates emphasize current consumption, meaning that savings for future consumption tend to be small. Feng et al. (2017) assert that the discount rate significantly reduces the probability of having bank deposits, postal savings, stocks, investment trusts, government bonds, and corporate pensions. However, most studies conducted in Japan on the influence of the time discount rate on personal financial asset formation compare the receipt of money between two points of time. As one of few exceptions, identify current bias by asking the qualitative question of how often the respondents did their homework as children. They find that those who are strongly focused on the present are less likely to hold financial assets. Ammerman and MacDonald (2017) summarize past research on the holding ratio of risky to financial assets. They show that whether the period is short- or long-term and the scale of profit and loss affect the impact of time discount rate on individual asset allocation. For example, if long-term investors are optimistic about future profits and the lower the time discount rate, the more likely they are to hold many risky assets aiming for future profits.

However, if investors think that the risk of a financial crisis will increase in the near future, they would be pessimistic about future profit. In this case, investors believe that loss would occur and the lower the investors' time discount rate, the more likely to reduce their risk assets. The authors also summarize that the time discount rate factor affects an individual investor's asset allocation by combining the risky asset holding ratio with expected returns, among others. Webley and Nyhus (2013) analyze the characteristics of bias related to self-control (Self-Control) using 18- to 32-year-old Dutch voter data. They show an easy feature is to increase the proportion of cash out of the assets held (for quick consumption) to value short-term consumption, as bias is stronger. Ammerman and MacDonald (2017) also use Dutch population data to show that the cash holding ratio is high for individuals with a strong current bias that values, based on current bias parameters often used in psychology, among other fields. This current bias parameter is the CFC proposed by Strathman et al. (1994) and is often used for analyzing the behavioral characteristics of individuals. However, the only example is the study conducted by Ammerman and MacDonald (2017) using Dutch data, which uses a determinant of the asset holding amount of individual investors.

3. Web-Based Survey and Framework

Web-Based Survey: In this study, we used individual data collected using the Internet survey titled "Survey on Japanese Individual Investors' Financial Behavior 2017" (hereinafter, the "2017 Survey") conducted in March 2017[1]. The subjects were male and female (Japanese) aged 20 years and over having invested in stock or other types of mutual funds (e.g., stock mutual funds, balanced mutual funds). We conducted a preliminary survey of about 20,000 people by extracting 1,233 people to investigate whether the subjects of the survey satisfy the conditions. In addition, we used an oversampling technique and calculated the time spent by each respondent to answer about 50 questions. Before beginning the statistical analysis, we excluded those observations for which the respondents took a short time to answer. After screening, the number of observations was reduced to 1,218. Of the surveyed subjects, 75.3% were men, of which 60% had less than 5 million yen as income and 60% had less than 5 million yen as deposits and other financial assets. However, around 25% of respondents owned 10 million yen or more. Regarding the amount of liabilities, about 70% of respondents replied that they had zero liabilities. Regarding residential areas, the Kanto region is the largest in our sample (at around 40%).

[1] Web-based (Internet) methods inevitably have data collection weaknesses, but it is not always desirable to use Internet surveys if the purpose of the survey is to provide useful information useful to individuals and organizations It has been suggested that decision making (The Japan Institute for Labor Policy and Training, 2005). These collected data are assumed to be useful for rational analysis. Specifically, observations with a response time of 6 minutes or less were excluded. This is less than half the average response time (about 12 minutes).

Consideration of Future Consequences (CFC): Strathman et al. (1994) focus on future thought in relation to future prospects, conducting a study on CFC and creating a questionnaire including the 12 questions in Table 1. From the responses to the questionnaire, we can measure whether individuals tend to be affected by considering how their current behavior affects future results. Specifically, in many cases, factor analysis is applied to the answers to the 12 questions, and the score of the first factor is taken as a future result deliberation indicator showing the degree of consideration for each future result. Inoue and Arimitsu (2008) evaluate its usefulness by surveying Japanese CFCs by using the translated version of Strathman et al.'s (1994) questions into Japanese. In addition, Joireman et al. (2008) analyze the characteristics of CFC as CFC-I and CFC-F. While both indicators refer to CFC, we can divide the CFC results in relation to the present or future. Specifically, among the 12 questions in Table 1, the factor score as a result of factor analysis using only questions 1, 2, 6, 7, and 8 corresponds to CFC-F, and questions 3, 4, 5, 9, 10, 11, and 12 refer to CFC-I. Regarding these qualitative interpretations, according to Joireman et al. (2008), although both CFC-I and CFC-F are related to the time discount rate, CFC-I also strongly related to ego depletion. In this study, we investigate CFC, CFC-I, and CFC-F using the Japanese translated version of the questions in Table 1. The answers are based on a five-point Likert scale: applicable, slightly applicable, indifferent, slightly inapplicable, and inapplicable.

Table 1: Questions used to Investigate CFC Indicators

1	I consider how things might be in the future and try to influence those things with my day–to–day behavior
2	I often engage in a particular behaviors in order to achieve outcomes that may not have resulted for many years.
3	I only act to satisfy immediate concerns, figuring the future will take care of itself.
4	My behavior is only influenced by the immediate (i.e., a matter of days or weeks) outcomes of my actions.
5	My convenience is a big factor in the decisions I make or the actions I take.
6	I am willing to sacrifice my immediate happiness or wellbeing in order to achieve future outcomes.
7	I think it is important to take warnings about negative outcomes seriously even if the negative outcome will not occur for many years.
8	I think it is more important to perform a behavior with important distant consequences than a behavior with less important immediate consequences.
9	I generally ignore warnings about possible future problems because I think the problems will be resolved before they reach crisis level.
10	I think that sacrificing now is usually unnecessary since future outcomes can be dealt with at a later time.
11	I only act to satisfy immediate concerns, figuring that I will take care of future problems that may occur at a later date.
12	Since my day–to–day work has specific outcomes, it is more important to me than behavior that has distant outcomes.

Model: Because the purpose of this research is to show the influence of the bias of CFC on individual investors' asset holding, the dependent variables are "deposit amount," "stock or other types of mutual funds" (e.g., stock mutual funds, balanced mutual funds), and "liability amount" the results on "deposit ratio" and "share or other types of mutual funds ratio" for total financial assets are summarized in the Appendix. The 2017 survey includes many questions that measure not only demographic attributes and the asset holding status of individual investors, but also individual behavioral characteristics commonly used in behavioral economics. We choose independent variables likely to affect the holding status of individual financial assets,

as shown in Table 2. A linear regression that ignores this data function is highly biased towards underestimating the response to the amount of individual investor assets held in relation to covariates such as age. In other words, it is important to consider whether ego depletion influences deposit amounts with respect to current time valuation.

This result shows that the concept of the time discount rate in the traditional economic utility function depend on people's view of whether they should emphasize the present. High education dummy, investment experience dummy, risk aversion, or behavioral finance factors. Since the dependent variables are based on pre-specified answers, we use a Tobit model. The Tobit analysis is designed to estimate the linear relationships between the explanatory variables and the explained variable based on censoring from below and above, respectively. Censoring from above takes place when values at or above a threshold are converted to the threshold, so that the true value might be equal to the threshold, but it might also be higher. In the case of censoring from below, values at or below the threshold are censored (Green, 2012). Specifically, we used demographic parameters and CFC as independent variables (Model 1) for each dependent variable (three types), demographic parameters, CFC-F, and CFC-I (Model 2), respectively. The Kinki and Chubu regions account for the next largest groups. These three regions collectively account for nearly 80% of respondents.

Table 2: Dependent Variables

Variables	Definition of variables	#	Mean	S.D.
Amount of deposit	0 JPY, 0.01–0.5 million JPY, 0.5–1 million JPY, 1–2 million JPY, 2–3 million JPY, 3–5 million JPY, 5–7 million JPY, 7–10 million JPY, 10–15 million JPY, 15–30 million JPY, 3000 million JPY or over ⇒ 0 JPY, 0.25 million JPY, 0.75 million JPY, 1.5 million JPY, 2.5 million JPY, 4 million JPY, 6 million JPY, 8.5 million JPY, 12.5 million JPY, 22.5 million JPY, 30 million JPY	1218	811.9	908.8
Amount of stock or other types of mutual funds (e.g., stock mutual funds, balanced mutual funds)	0 JPY, 0.01–0.5 million JPY, 0.5–1 million JPY, 1–2 million JPY, 2–3 million JPY, 3–5 million JPY, 5–7 million JPY, 7–10 million JPY, 10–15 million JPY, 15–30 million JPY, 3000 million JPY or over ⇒ 0 JPY, 0.25 million JPY, 0.75 million JPY, 1.5 million JPY, 2.5 million JPY, 4 million JPY, 6 million JPY, 8.5 million JPY, 12.5 million JPY, 22.5 million JPY, 30 million JPY	1218	647.3	829.6
Stock of other financial assets	0 JPY, 0.01–0.5 million JPY, 0.5–1 million JPY, 1–2 million JPY, 2–3 million JPY, 3–5 million JPY, 5–7 million JPY, 7–10 million JPY, 10–15 million JPY, 15–30 million JPY, 3000 million JPY or over ⇒ 0 JPY, 0.25 million JPY, 0.75 million JPY, 1.5 million JPY, 2.5 million JPY, 4 million JPY, 6 million JPY, 8.5 million JPY, 12.5 million JPY, 22.5 million JPY, 30 million JPY	1218	371.4	706.6
Amount of debt	0 JPY, 0.01–0.5 million JPY, 0.5–1 million JPY, 1–2 million JPY, 2–3 million JPY, 3–5 million JPY, 5–7 million JPY, 7–10 million JPY, 10–15 million JPY, 15–30 million JPY, 3000 million JPY or over ⇒ 0 JPY, 0.25 million JPY, 0.75 million JPY, 1.5 million JPY, 2.5 million JPY, 4 million JPY, 6 million JPY, 8.5 million JPY, 12.5 million JPY, 22.5 million JPY, 30 million JPY	1218	265.8	696.9

Table 3: Independent Variables

Variables	Definition of variables	#	Mean	S.D.
Age	1. 20s, 2. 30s, 3. 40s, 4. 50s, 5. 60s or over	1218	3.37	1.16
High education dummy	1. College graduates or over, 0. Other	1213	0.67	0.47
Investment experience dummy	1. Having investment experiences over 10 years, 0. Other	1218	0.52	0.50
Risk aversion	When do you usually go out? At what probability of rain will you take an umbrella when going out?" (0-100%)	1218	56.64	19.41
CFC	Factor score of CFC questions	1218	0.00	0.91
CFC-F	Factor score of CFC-F questions	1218	0.00	0.82
CFC-I	Factor score of CFC-I questions	1218	0.00	0.90

4. Results

Here, we discuss the results of the Tobit model described above. First, there is no difference in the amount of deposits, stocks, etc. based on gender. However, men have more liabilities than women. Regarding age, the results show that the higher the age, the more deposits and stocks an individual is likely to have and the lower the liability amount. In addition, people with education higher than the university level tend to have more deposits and stock holdings, while their amount of debt tends to be lower. People with long investment experience have large amounts of deposits and stock holdings. However, CFC, CFC-F, and CFC-I differ depending on the explained variables. With the deposit amount as a dependent variable, we find that the higher the CFC is (impatience), the lower the deposit amount. Although CFC-F is not statistically significant, CFC-I is significant. In other words, present-oriented individuals have fewer deposits. CFC, CFC-F, and CFC-I do not have a statistically significant impact on stocks as dependent variables. CFC does not have a statistically significant impact on debt amount as dependent variable. However, the effect of CFC-F is significant, and the individuals who do not value the future have higher amounts of debt.

Table 4: Estimation Results

	Amount of deposit				Amount of stocks				Amount of debt			
	model 1		model 2		model 1		model 2		model 1		model 2	
	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value
Male dummy	-85.81	0.19	-87.54	0.18	14.49	0.80	15.09	0.79	1079.13	0.00	1058.42	0.00
Age	214.05	0.00	217.14	0.00	158.18	0.00	157.85	0.00	-347.57	0.00	-319.21	0.00
High education	247.16	0.00	243.94	0.00	229.87	0.00	229.54	0.00	150.79	0.43	136.01	0.48
Experience	199.93	0.00	200.42	0.00	444.79	0.00	444.92	0.00	326.88	0.08	330.80	0.08
Risk aversion	-2.21	0.12	-2.17	0.12	-0.33	0.79	-0.34	0.78	-1.56	0.72	-0.76	0.86
CFC	-69.73	0.03			-22.36	0.41			82.61	0.40		
CFC-F			31.17	0.37			-5.48	0.86			309.37	0.01
CFC-I			-71.48	0.03			-26.98	0.33			124.84	0.20
Constant	-2.16	0.99	-11.05	0.93	-265.05	0.01	-263.74	0.01	-1581.49	0.00	-1690.63	0.00
LR chi2 (6,7)	134.7		135.9		204.8		205.0		42.2		50.5	
Log Likelihood	-9213.8		-9213.2		-9231.1		-9231.0		-2671.7		-2667.6	
Pseudo R2	0.0073		0.0073		0.011		0.011		0.0078		0.0094	
#	1213		1213		1213		1213		1213		1213	

5. Conclusion

This is the first study to analyze the influence of CFC, CFC-I, and CFC-F on the balance of financial assets and liabilities by using data on Japanese individual investors. Regarding demographic parameters, our findings show that the higher the age is, the higher is the amounts of deposits, stocks, and mutual funds are. We can interpret the relationship as a higher age being associated with more financial assets due to the increased number of chances to increase savings. However, regarding the debt amount, the higher the age, the smaller the debt amount this is consistent with the life cycle viewpoint of taking mortgages and other loans at a young age. In addition, we find that individuals with long investment experiences tend to have more deposits and stocks, among others. However, CFC, CFC-F, and CFC-I have various influences on the individual holding of financial assets. Regarding CFC, the deposit amounts decrease as the indicator is high (short-term preference is strong and impatient). As discussed by Ammerman and MacDonald (2017), when CFC is low, impatient individuals value current consumption and the savings rate tends to be low.

Thus, their deposits tend to decrease. This result is consistent with result using Japanese data, although their CFC measurement method is different. Moreover, we find that CFC-I has a negative impact on the amount of deposits (i.e., the stronger the tendency to value the present, the fewer the deposits and overall financial assets are). In other words, the influence of ego depletion on the deposit amount is important with respect to current time valuation. As for the debt amount, we find that the higher the CFC-F is, the higher debt is. People with a high CFC-F do not place importance on the future, meaning that a low concern for future repayment leads to an increase in current debt. In this study, we analyzed the influence of CFC on the possession of financial assets, which has not been previously studied. As a result, we found that CFC-I has a negative impact on the amount of deposits (i.e., the stronger the tendency to value the present, the fewer the deposits and overall financial assets are). This study contributes to deepening our understanding of the determinants of the time discount rate.

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Appendix: Influence of CFC on "Deposit Ratio" and "Stock Ratio": This study analyzes the impact of CFC on the financial assets and liability holdings of individual investors. However, there are various prior studies on the influence of deposit and stock ratios on total financial assets, as shown below. Previous studies have derived several conclusions in this field. For instance, Kinari and Tsutsui (2009) indicate that the time discount rate has no significant influence on the holding ratio of risky assets. They argue that the time discount rate is important in the estimation of the CCAPM Euler equation, but there is no reason for the significant influence on the holding status of financial assets indicated by cross-sectional data at one time point. Kitamura and Nakashima (2010) also show that the time preference rate for stock allocation is not significant. Meanwhile, Nogata and Takemura (2017) demonstrate that the higher the time discount rate, the higher the risky asset holding ratio is they contend.

That individual may desire to earn high earnings in the near future, meaning they are investing in risky and high return risky assets. Feng et al. (2017) show that the time discount rate significantly reduces the risky asset ratio in our study, “deposit ratio” and “equity ratio” (total of stocks and stock investment trusts), which individuals indicate directly from 0 to 100% in the 2017 survey, are dependent variables, while gender, age, college graduate dummy, investment experience dummy, risk aversion parameter, CFC, CFC-F, and CFC-I are independent variables (Table A1). According to the estimation results, age is not related to the deposit ratio, while individuals with higher age have higher share ratios. In addition, regarding investment experience, the deposit is low and stock ratios are high, among others. However, CFC, CFC-F, and CFC-I do not show statistically significant impacts. Although they all affect the outstanding balance of financial assets, there is no effect on holdings.

Table A1: Estimation Results of the Models for Deposit Ratio and Stock Ratio

	Ratio of deposit				Ratio of stocks			
	model 1		model 2		model 1		model 2	
	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value
Male dummy	−6.93	0.00	−6.85	0.00	6.29	0.00	6.37	0.00
Age	1.06	0.15	0.96	0.19	0.04	0.96	−0.07	0.91
High education	−2.62	0.13	−2.53	0.14	0.71	0.65	0.79	0.62
Experience	−12.54	0.00	−12.52	0.00	7.77	0.00	7.79	0.00
Risk aversion	0.00	0.99	0.00	0.94	0.04	0.25	0.04	0.27
CFC	−1.45	0.11			0.51	0.54		
CFC-F			−1.28	0.20			−1.24	0.18
CFC-I			−1.68	0.07			0.33	0.70
Constant	60.27	0.00	60.60	0.00	25.22	0.00	25.55	0.00
LR chi2 (6,7)	81.0		83.1		48.7		50.3	
Log Likelihood	−5651.8		−5650.8		−5501.7		−5500.9	
Pseudo R2	0.0071		0.0073		0.0044		0.0046	
#	1213		1213		1194		1194	