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

Toru SUEHIRO¹ Koichi TAKEDA² Takashi KOZU³ Toshihiko TAKEMURA⁴

Abstract

We analyze the impact of “Consideration of Future Consequences” (CFC) on the amount of financial assets and liabilities owned by individual investors by applying the tobit model to the results of the WEB based survey. We show that impatient individuals who have high CFC are less deposits and financial assets balances. We also examine the influence of CFC-Immediate (CFC-I) and CFC-Future (CFC-F), sub-indicators often used in psychology as well as CFC, on financial assets balances and liabilities. CFC-I shows a concern with immediate consequences and is also an index related to the Ego Depletion. We show that the higher the CFC-I, the lower the amount of deposits and the holding of the financial assets balances. On the other hand, CFC-Future (CFC-F) is an indicator showing not to concern with future consequences, we show that the higher the individual is, the more debt is.

Keywords: Ratio of risky asset holding, individual investors, Web-based survey, Behavioral finance, Japan, Consideration of Future Consequences

JEL Code Classification: G41, D91

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1 Introduction

To investigate the relationship between various attributes (including psychological tendencies) owned by individual investors and investment behavior about investment behavior of Japanese individual investors, we have continued to "Survey on Japanese Individual Investors' Financial Behavior", and analyze the results of the survey (Kozu, et al., 2012, Takeda, et al., 2013).

As it has been investigated in recent studies of behavioral economics and behavioral finance, in conducting behavioral analysis of individual investors, we use not only data that can be clearly classified like age, sex, holding status of assets, etc., based on individual feelings including psychological tendencies.

In this study, we analyze the influence of the Consideration of Future Consequences (CFC) on the financial assets owned by individual investors in addition to demographic parameters on the WEB based survey. Tobit model is applied to the results of the analysis and analyzed in the study. This parameter is related with time and money preferences. Although there are some studies analyzing the impact of time discount rate on investor's financial assets, an analysis using CFC widely used in psychology does not exist in Japan. Furthermore, in this study we divided CFCs into CFC-Immediate (CFC-I) which is "concerning with immediate consequences" and CFC-Future (CFC-F) which is a "concerning with future consequences" and analyze whether contemplation comes from the thinking for the present or future.

2 Literature Review

Nakagawa and Katagiri (1999) is an early study in empirical research using micro data (individual data) on Japanese household's asset allocation. They analyze that the reason of holding ratio of risky assets in Japanese households is lower than that of other countries by using the individual data. Japanese investors don't place much importance on the profitability of assets, indicating that there is a strong tendency to value safety and liquidity compared to US investors.

In recent years, research related to behavioral economics has also been conducted using behavioral characteristics data such as overconfidence and optimism. Kinari and Tsutsui (2009) adds questions to measure the psychological tendency about whether an individual is an optimist or not, not only demographical parameters such as age and sex, but also personal psychological ones. They show that the psychological tendencies have influences on the holding of the financial assets.

Prior works on the influence of time discount rate of individuals are roughly divided

into two types of studies, the impact on the balance of financial assets and the influence on the holding ratio of risky assets in financial assets. Regarding the impact of the time discount rate on the balance of financial assets, a lot of studies show that the amount of financial assets are reduced as the time discount rate is high and people with "impatience" tend to value "current consumption" rather than "future consumption". Takeuchi and Hoshino (2014) shows that the time discount rate has a significantly negative influence on the holdings of financial assets. They show that the higher the time discount rate, the lower the financial assets. They conclude that the holding amount of financial assets including risky assets is small because people who are currently oriented and rational are more consuming. Feng et al. (2017) says that the discount rate significantly reduces the possession probability of bank deposits, postal savings, stocks, investment trusts, government bonds and corporate pensions. Most of studies on the influence of time discount rate conducted in Japan on personal financial asset formation compare receipt of money between two points of time. Among them, Otake and Akasaka (2017) uses the result of measuring the current bias by using the question of when you often do your homework when you are a child. As a result, they show 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 assets to financial assets. Ammerman and MacDonald (2017) shows that the impact of time discount rate on individual asset allocation is affected by whether the period is short-term or long-term and the scale of profit and loss. For example, if long-term investors are optimistic about future profits, the lower the time discount rate, the more likely it is to hold many risky assets aiming for future profits. However, if the investors think that the risky of the financial crisis is rising in the near future, they would be pessimistic about future profits. In this case, investors believe that loss would occur, and the lower the investor's time discount rate, the more likely to reduce risky assets. They summarize that the time discount rate factor affects individual investor's asset allocation by combining the risky asset holding ratio with expected return etc. Webley and Nyhus (2013) analyzes the characteristics of bias related to self-control (Self-Control) using Dutch 18-32 year old vote data. As a result, they show that there is a feature that it is easy to increase the proportion of cash out of the assets held (to quickly consume) in order to value short-term consumption as the bias is stronger now. Ammerman and MacDonald (2017) also analyzes using Dutch population data. As a result, they show that cash holding ratio is high with individuals with strong bias that values current, using current bias parameters often used in Psychology fields etc. This current bias parameter is the Consideration of Future Consequences (CFC) indicated by

Strathman et al. (1994) and is often used for analyzing behavioral characteristics of individuals. However, there is no example other than the study using Dutch data conducted by Ammerman and MacDonald (2017), which is used as a determinant of the asset holding amount of individual investors.

3 Web-based Survey and Frame Work

3.1 Web-based Survey

In this study, we use the individual data collected by the Internet survey entitled "Survey on Japanese Individual Investors' Financial Behavior 2017" (hereinafter referred to as "2017 Survey") conducted in March 2017⁵. The subjects of the survey are male and female (Japanese) aged 20 years and over who were investing in stock or other types of mutual funds (e.g. stock mutual funds, balanced mutual funds). This survey is conducted by a preliminary survey for about 20,000 people to investigate whether it is the subject of survey, extracting 1,233 people who satisfy the conditions from among them. In addition we conduct oversampling and calculating the time spent by each respondent to answer about 50 questions from the response start time and end time before starting the statistical analysis, after looking at the distribution of time too much. Also we exclude the samples those who responded in a short time.

As a result of this screening, the number of samples is reduced to 1,218 with elimination of defective respondents according to the above criteria. The composition of the surveyed subjects is 75.3% for men, 60% for less than 5 million yen for their own income and 60% for less than 5 million yen for deposits and other financial assets. On the other hand, there are about 25% of respondents who own those amounts of 10 million yen or more. Regarding the amount of liabilities, about 70% of respondents reply that they are zero. Looking at the residential area, the Kanto region is the largest at about 40%, accounting for less than 80% of respondents together with Kinki and Chubu.

3.2 Consideration of Future Consequences (CFC)

Strathman et al. (1994) focuses on the future thought in relation to the future prospects, conducts a study on the Consideration of Future Consequences (CFC), and creates a questionnaire according to the 12 questions shown in Table 1.

From the response to this questionnaire, we can measure whether individuals tend

⁵ Although the Web-based (Internet) method inescapably contains weakness of data collection, it has been suggested that it is not necessarily undesirable to use an Internet survey if the aim of the survey is to offer beneficial information that is useful for individual and organizational decision-making (The Japan Institute for Labor Policy and Training, 2005). We assume that these collected data are useful for a reasonable analysis.

to be affected by the result of considering how the current behavior affects the future results. Specifically, in many cases, factor analysis is applied to the answer result of 12 questions, and the factor score of the first factor is taken as a future result deliberation indicator showing the degree of consideration of each future result. Inoue and Arimitsu (2008) evaluates its usefulness by surveying Japanese CFCs by using the translated version of Strathman et al. (1994) 's questions into Japanese.

In addition, Joireman et al. (2008) analyzes the characteristics of CFC as CFC-Immediate (CFC-I) which is "concern with immediate consequences" and CFC-Future (CFC-F) which is "concern with future consequences". Both show the Consideration of Future Consequences, but we can divide the CFC results whether being related to the present or the future. Specifically, among the 12 questions shown in Table 1, the factor score as a result of factor analysis using only 1, 2, 6, 7, 8 is CFC-F, and 3, 4, 5, 9, 10, 11, 12, and the factor score obtained by factor analysis is 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 is also strongly related to the Ego Depletion.

In this research, we investigate CFC, CFC-I and CFC-F using Japanese translated version shown in Table 1. The answer is based on five grades of: Applicable, Slightly Applicable, Neither, Slightly Inapplicable, Inapplicable.

1	I consider how things might be in the future, and try to influence those things with my day to day behavior
2	Often I engage in a particular behavior in order to achieve outcomes that may not result 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 lessimportant 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.

Table1: Questions to investigate CFC indicators

3.3 Model

Since the purpose of this research is to show the influence of the bias of the CFC on

the individual investor's asset holding situation, the dependent variable is "deposit amount", "stock or other types of mutual funds (e.g. stock mutual funds, balanced mutual funds) and "liability amount" are used. The results on "deposit ratio" and "share or other types of mutual funds ratio" for total financial assets are summarized in the Appendix.

In the 2017 survey, we investigate many questions that measure not only demographic attributes and asset holding status of individual investors but also individual behavior characteristics commonly used in behavioral economics. We chose independent variables, mainly variables that are likely to affect the holding status of individual financial assets, and show the outline in Table 2. Since the dependent variable is censored data which is not a free description but a choice from options, we use the tobit model in this study. Specifically, we use demographic parameters and CFC as independent variables (model 1) for each dependent variable (3 types), demographic parameters and CFC-F, CFC-I (Model 2), respectively.

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

Table 2: the Dependent variable list

		#	Mean	S.D.
Male dummy	1. male, 0. female	1218	0.75	0.43
Age	1. 20s, 2. 30s, 3. 40s, 4. 50s, 5. 60s or over	1218	3.37	1.16
Hihg educastion dummy	1. College graduates or over, 0. Other	1213	0.67	0.47
Investent experience dummy	1. Having investment experiences over 10yr, 0. Other	1218	0.52	0.50
Risk aversion	“When you go out usually, how many percent of the probability of precipitation is going out with an umbrella?” (0–100%)	1218	43.36	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

Table 3: Independent variable list

4 Results

In this section, we discuss the analysis results of the tobit model described above. First of all, it turns out that there is no influence on the amount of deposits, stocks etc concerning gender. However, it turns out that men have more liabilities than females. Regarding the age, we show that the higher the age, the more deposits and stocks are. We also show that the higher the age, the less the liability amount. In addition, we show that people with educational backgrounds above university graduates tend to have more deposits and holdings of stocks, and the amount of debt tends to be less. We show that people with long investment experience have large amounts of deposits and holdings of stocks etc. On the other hand, CFC, CFC-F and CFC-I differ depending on explained variables.

When deposit amount is taken as a dependent variable, we find that the higher the CFC (impatience), the lower the deposit amount. Although CFC-F is not statistically significant, CFC-I has significant results. In other words, we show that the people who are more intrinsic with time have less amount of deposits and the impatient people who value the current have less deposit. CFC, CFC-F and CFC-I don't result in statistically significant results when stocks were taken as dependent variables. CFC don't result in statistically significant results when the debt amount is taken as the dependent variable. However, the CFC-F has a significant result, and the people who don't value the future are found to have more debt.

	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	

Table 4: Estimate results of the models

5 Conclusion

This study 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 of Japanese individual investors. For demographic parameters, we show that the higher the age, the higher the amount of deposits, stocks and mutual funds. We can interpret that the relationship that the higher the age is, the more financial assets are, the higher the age have had chances to increase the savings before. On the other hand, as for the debt amount, the higher the age, the smaller the result is. This is consistent with the life cycle viewpoint of holding the debt of mortgage loans etc. at a young age. In addition, we show that people with long investment experiences tend to have more deposits and stocks etc.

On the other hand, CFC, CFC-F and CFC-I have various influences on the individual holdings of financial assets. Regarding CFC, it is found that the deposit amount becomes smaller as the indicator is high (short-term preference is strong and impatient). As discussed in a previous study such as Ammerman and MacDonald (2017), as the CFC is low and impatient, individuals value current consumption and the savings rate tends to be low. As a result, their deposits tend to decrease. This result is consistent with the result of Akeaka and Otake (2017) using Japanese data, although the measurement method of CFC is different. Also, we show that CFC - I 's negative impact on the amount of deposits (the stronger the tendency to value the current, the less deposits and the overall financial assets). In other words, it is important whether influence on deposit amount is ego-depletion with respect to time and whether to value current. As for the debt amount, we show that the higher the CFC - F, the more debt is. People with a high CFC-F don't place importance on the future and it can be interpreted that low consciousness for future repayment leads to an increase in current debt.

In this research, we analyze the influence of CFC which had not been done so far on the possession of financial assets. It will be the foundation of future research in this field.

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Appendix ~ Influence of CFC on "Deposit ratio" and "Stock ratio"

This study analyze the impact of CFC on the financial assets and liability holdings of individual investors. On the other hand, there are various prior research on the influence of deposit ratios and stock ratios on total financial assets and we also analyze and show it in this Appendix section.

The conclusion of the previous researches are various. Tsutsui and Kinari (2009) shows that the time discount rate has no significant influence on the holding ratio of risky assets. They say that the time discount rate is important in the estimation of the CCAPM Euler equation but there is no positive reason for having a significant influence on the holding status of financial assets indicate by the cross section data at one time point. Kitamura (2010) also says that the time preference rate for stock allocation is not significant. Meanwhile, Nogata and Takemura (2016) shows that the higher the time discount rate, the higher the risky asset holding ratio is. They say that means individuals may desire to earn high earnings in the near future and may mean that they are investing in risky and high return risky assets. Feng et al. (2017) shows that the time discount rate significantly reduces the risky asset ratio. In this research, the "deposit ratio" and "equity ratio ratio" (total of stocks and stock investment trusts), which individuals respond directly from 0 to 100% in the 2017 survey, are dependent variables, and gender, age , College graduate dummy, investment experience dummy, risk aversion parameter and CFC, CFC-F, CFC-I as independent variables (Table 5).

According to estimation results, the age is not related to the deposit ratio, while the higher the age, the higher the share ratio is. Also, with investment experience, the deposit ratio is low and the ratio of stocks etc. is high. On the other hand, neither CFC, CFC-F, CFC-I nor any statistically significant results are obtained. CFC, CFC - F, and CFC - I affect the outstanding balance of financial assets, but it has been found that there is no effect on the holdings.

	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	

Table 5: Estimate results of the models for the deposit ratio and stock ratio