



The Role of Self-Control on Retirement Preparedness of US Households

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Abstract

We examine the self-control problems of U.S households and their effects on households' retirement preparedness based on the Behavioral Life-Cycle Hypothesis. Using the 2010 Survey of Consumer Finances dataset, the level of retirement adequacy was estimated with income replacement ratio (IRR), and only 42% of households were adequately prepared for retirement. Results from logistic regression analysis indicated that households with loan payment and saving self-control problems were less likely to be prepared adequately for retirement compared to those without such problems. Age, education, race/ethnicity, marital status, employment status, retirement plans, expected retirement age and risk tolerance were significantly related to retirement preparedness. This study provides financial educator and researchers with suggestions on how to help household make a better retirement plan.

Keywords

self-control, retirement preparedness, retirement savings, retirement planning, survey of consumer finances

Introduction

When preferences are inconsistent across time or within context unlike assumptions of rational decision-making model with consistent preference, a consumer will make different choices from what they had planned originally to achieve their goals (Ainslie, 1975; Loewenstein, 1996). Demonstration of inconsistent preferences is often related to self-control problem which leads to a less optimal utility. If the consumer makes a systematic effort to control the inconsistency in decision makings between short-term and long-term preferences or between intentions and actions, the consumer utility can increase (Ersner-Hershfield, Garton, Ballard, Samanez-Larkin, & Knutson, 2009).

Although saving for retirement is one of the most important financial goals a household undertakes, there is the disparity between low actual saving rates and high normative response rates for retirement savings. Previous studies found an evidence of the conflict in self-control between intentions and actions (Farkas & Johnson, 1997; Laibson, Repetto, Tobacman, Hall, Gale & Akerlof, 1998).

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Households cannot depend solely on Social Security to support retirement spending, although Social Security accounts for approximately 40% of retirement income (Brown, Liebman, & Wise, 2009). They are to be more responsible for their retirement plan and to improve control over the retirement fund as the recent transition of defined benefit (DB) pension plans to defined contribution (DC) plans has been accelerating. DC plans require households to choose how much to assign in pretax contributions to their retirement saving accounts (Choi, Laibson, & Madrian, 2004). With the Pension Protection Act of 2006, policymakers have tried to promote retirement savings for workers through projects such as Save More Tomorrow (SMarT) and Quick Enrollment. Although these policies have encouraged many US workers to enroll in 401(k) plans, studies have emphasized the importance of active saving decisions (i.e., no default or compulsory choice) to increase retirement savings in a diversified portfolio with greater discretion (Benartzi & Thaler, 2013; Carroll, Choi, Laibson, Madrian, & Metrick, 2009).

This study is aimed to examine the effects of self-control problems related to financial decisions on retirement preparedness. By applying the concept of self-control to the retirement saving issue, this study expected to discover the difficulties that households suffer when making their day-to-day saving decisions, to assess the problems, and to provide insights designed to improve retirement saving practices. Analyzing the saving decisions of households with self-control problems can reveal the various circumstances and patterns of household saving decisions, which have not been addressed by previous retirement adequacy studies that rely on standard economic theories. This study expands the previous work by Kim, Lee and Hong (2013), which analyzes the relationship between self-control issues and retirement adequacy using the Survey of Consumer Finances (SCF) dataset. Findings in this research will contribute to the literature on financial decisions related to self-control problems as well as retirement adequacy by investigating the effect of self-control problems on the retirement preparedness of US households. This study assessed the retirement preparedness using the retirement income stage method, which accounts for possible complicated dynamics of households, and analyzed other factors related to retirement adequacy with a logistic regression model.

Review of Literature

Life Cycle Hypothesis and Behavioral Life-Cycle Model

According to the Life Cycle Hypothesis (LCH), rational individuals make financial decisions to maximize lifetime utility by sustaining smooth consumption over the course of their lives (Ando & Modigliani, 1963). This consumption smoothing with the neutral time preference of the LCH has been used to analyze retirement adequacy with the replacement ratio approach. The replacement ratio has been used as a proxy for retirement needs, with an underlying assumption that pre-retirement spending is a proxy for adequate post-retirement spending (Palmer, 1992; 1994). Retirement adequacy is considered as post-retirement income that is at least as high as needed for post-retirement spending. This is consistent with the consumption smoothing implied by the normative life cycle model (Ando & Modigliani, 1963).

On the other hand, the Behavioral Life Cycle Hypothesis (BLCH) (Shefrin & Thaler, 1988) describes time inconsistent financial decisions using the following three behavioral concepts under bounded rationality: self-control, mental accounting, and framing (Beverly, McBride, & Schreiner, 2003; Karlsson, Gärling, & Selart, 1997; Levin, 1998; Thaler & Benartzi, 2004). The BLCH interprets the self-control problem under the assumption that individuals are tempted always based on the dual preference framework, in which each can both plan for future preferences and succumb myopically to present preferences. Individuals are tempted to consume now rather than save for tomorrow because of a weakness of will power referred to as “akrasia” (Graham & Isaac, 2002; Shefrin & Thaler, 1988). They assume that such weak self-control can be improved by using various commitment devices or constraint techniques, such as pension plans dealing with people’s reluctance to postpone a significant portion of consumption until retirement.

The BLCH offers hypothetical examples, in which individuals suffer difficulties in achieving the best consumption plan (Graham & Isaac, 2002; Thaler, 1990); this supports the importance of using self-control in the decision-making process with respect to household saving (Heath & Soll, 1996; Karlsson *et al.*, 1997; Rha, Montalto, & Hanna, 2006). Although advocates of the BLCH argue that behavioral variables, such as self-control and mental

considerations, should be included in models of saving behavior, few empirical studies have been undertaken to test this hypothesis.

Self-Control and Financial Behaviors

Self-control theory was developed first in the field of psychology, but in applying the concept to household finances, researchers have adopted the term, “financial self-control” as a determinant of asset accumulations. Many researchers have since adopted the notion of self-control in studying consumption-saving decisions (Benhabib & Bisin, 2005; Gul & Pesendorfer, 2001; 2004). For example, Gul and Pesendorfer (2001, 2004) stated that the lack of self-control is due to temptation, not dynamic inconsistency, in which economic agents use self-control to resist temptation. Not surprisingly, the majority of previous researchers who have studied the relationship between self-control and saving behaviors found evidence that self-control problems are related negatively to the accumulation of wealth (Ameriks, Caplin, Leahy, & Tyler, 2007; Gathergood, 2012). Baumeister (2002) referred to this reduced capacity for self-control as “ego-depletion” and ego-depleted consumers have a problem with long-term saving goals due to heightened temptation and impulsivity. Laibson (1997) indicated that lack of self-control caused a decline in US saving rates, and emphasized commitment mechanisms, such as holding illiquid assets (e.g., IRAs and 401(K) plans), to overcome self-control problems. The importance of such commitment mechanism is consistent with Strotz (1956) who proposed that people use external mechanisms, such as pre-commitment, to impose self-control. Decisions made under internal conflict regarding the long and short-term importance of saving require the ability to monitor one’s spending and financial decisions (Haws, Bearden, & Nenkov, 2012). Rha, *et al.* (2006) found that self-control practices, including having saving goals, foreseeing future expenses, and saving rules were related positively to saving behaviors.

Researchers have also examined how self-control affects household credit card use. Baumeister (2002) found a correlation between lack of self-control and fiscal excess, showing that those with low self-control are likely to have more debt. Gathergood (2012) reported that self-control problems were associated with greater use of credit cards and a higher likelihood of becoming over-indebted. He also showed that income shocks, credit

withdrawals, and unforeseen expenditures on durables were related closely to the lack of self-control. Meier and Sprenger (2010) similarly found a positive relationship between credit card use and levels of impatience when studying disposable income and other individual characteristics. They argued that less patient people have higher credit card debt and higher active borrowing levels. Although previous studies of financial self-control in diverse areas have used different proxies for self-control, all of these studies found that self-control had a positive effect on financial well-being, such as greater savings and lower household debt.

Self-Control and Retirement Adequacy

Household finance issues stem from procrastination in selecting good investments (Laibson *et al.*, 1998; Loewenstein, Prelec, & Weber, 1999). Substantial mistakes in preparing for retirement are based on an individual’s immediate preferences because the individual will not carry out the original plan (O’Donoghue & Rabin, 1999). Thaler and Bernartzi (2004) suggested that saving for retirement requires having self-control, and emphasized its importance as they observed a rapid shift from DB to DC plans. Laibson *et al.* (1998) introduced the concept of retirement plans as a commitment device to reduce the self-control problem. Abel and Hayslip (1987) found that individuals who participated in a retirement preparation program maintained a high external locus of control, suggesting a positive relationship between locus of control and effective retirement preparation. Studies mentioned above have argued that low self-control is responsible for low retirement savings, however, only a few studies have addressed empirically the relationship between self-control and retirement savings.

Methods

Data and Sample Selection

The dataset analyzed in this study came from the 2010 Survey of Consumer Finances (SCF), released triennially since 1983 by the Board of Governors of the Federal Reserve System. The SCF is designed to provide very detailed information on various aspects of household finances, including assets, liabilities, and incomes of US households, as well as their investments in financial services. Most questionnaires are based on the micro level of the individual

household. Sufficient demographic background information for each household, such as age, race, education level, etc.

This study included a sample composed of households in which the head or a spouse/partner is employed full time, between the ages of 35 and 70, and indicates their expected retirement age from full-time work, following previous retirement adequacy studies, for example, Yuh, Montalto, and Hanna, (1998), Yao, Hanna & Montalto, (2003), Chen (2007), and Kim, Hanna, and Chen, (2014). Previous studies focused on the financial decisions made by the household head, defined as the male for mixed-sex couple households, and the older member of same-sex couple households in the SCF. However, this study focused on the financial decisions made by survey respondents, because a respondent in the SCF is more knowledgeable financially, which is a crucial issue in couple households. The total sample size of the 2010 SCF dataset was 6,482, with a final sample size of 2,636 households.

Dependent Variable: Retirement Adequacy

This study used a method similar to that reported by Chen (2007), Kim *et al.* (2014), and Kim and Hanna (2015) to assess retirement wealth. Retirement wealth is comprised of Social Security benefits, DB pensions, part-time wages, and projected income from annuity distributions. The projection of asset values at the expected retirement age was computed based on stock, bond, cash equivalent categories, and investment. This study used a lognormal projection to estimate the future value of the balances and contributions based on the long-term inflation-adjusted mean and variance estimates at the time of the survey. This study also assumed that contributions to retirement account financial assets remain constant over the investment horizon until retirement when households use all of their accumulated assets to buy a fixed real return annuity.

The calculation of retirement spending followed the method used by Chen (2007) and Kim *et al.* (2014). The retirement spending benchmarks were estimated from the Bureau of Labor Statistics 2010 Consumer Expenditure Survey (CE), which published results and projected amounts above the published income categories using a power function estimation from the lower income categories. This study calculated the mean income replacement ratio (IRR) with benchmark income replacement

ratios for different income levels estimated from the 2010 CE. This study compared each household's IRR to the benchmark ratio for that household's income category: if the household's IRR was at least as high as the benchmark, it is counted as having adequate retirement preparedness. Therefore, the dependent variable was dichotomous and had a value equal to 1 if the IRR was equal to or greater than the benchmark replacement ratio, 0 otherwise.

Independent Variables: The Self-Control Problem

While discussions about the self-control problem have expanded in recent years, few advances have been made in measuring self-control variables and related models (Ameriks *et al.*, 2007). Household finance studies using various proxies of self-control have all suggested that high self-control has a positive influence on financial well-being, and have described how important self-control is in making sound financial decisions. Self-control problems usually result in sub-optimal financial decisions, such as overconsumption, low retirement saving, and low asset accumulation (Ameriks *et al.*, 2007; Laibson *et al.*, 1998); therefore, this study identified these problems as a lack of self-control that could affect households' retirement preparedness. This study used the following to construct the self-control problem variable, which included the following: (1) loan payment, (2) credit card, and (3) saving self-control problem.

Loan Payment and Credit Card Self-Control Problems

Issues of self-control with respect to credit is often correlated to financial excesses, such as having more debt, outstanding balances, or revolving credit card debt (Baumeister, 2002; Bertaut, Haliassos, & Reiter, 2008; Mansfield, Pinto, & Parente, 2003). This study included late loan payments and credit card revolving charges in the credit self-control problem measured as two dichotomous variables. This study measured loan payment self-control with the following questions: (1) whether or not households had ever had late loan payments during the last year; (2) whether or not households had ever had late loan payments for 2 months or more; (3) whether or not households had ever been bankrupt, or (4) whether or not households usually paid off the monthly total balance on their credit card accounts. The credit card problem, on the other hand, considered whether or not households had a

revolving charge or any charge on their credit cards after their last payment.

Saving Self-Control Problem

From the perspective of the BLCH, the planner may seek techniques to achieve self-control, such as imposing constraints (rules and mental accounting) by restricting his/her inconsistent time preference over consumption-saving decisions. Saving self-control problem consisted of two parts: (1) the saving goal for retirement, and (2) the saving rule. The saving goal for retirement measured whether households had the main reason to save for retirement or not as a binary variable. The saving rule as a binary variable was constructed to the following three questions related to the saving and spending habits of households: whether households (1) save the income of one family member and spend the income of another; (2) spend regular income and save other income, or (3) save regularly by putting money aside each month.

Other Independent Variables

Control variables are categorized as demographics, economic status, and financial attitudes. The demographic variables included an age of respondent, education level of the household, race, marital status, and employment status. Age is classified into five categories: 25-34, 35-44, 45-54, 55-64, and 65-70. The educational level of the household consisted of five dummy variables: less than high school, high school graduate, some college, bachelor degree, and post-bachelor degree. For couple households, the highest educational level of the head or the spouse/partner was considered the educational attainment of the household. Marital status was measured by four categories: married couple, single male, single female, and living with a partner. Racial/ethnic groups included four dummy variables: Whites, Black, Hispanic, and Asian/other. This study categorized the respondent's employment status as employed (salaried workers), self-employed, retired, or not working. Economic status variables included normal income and having either a DB or a DC pension. To address the possibility of a nonlinear relationship, this study used the natural log of normal income. The financial attitude variables included expected retirement age and risk tolerance. The expected retirement age

of the respondent included three categories based on the age of eligibility for social security: before 62, between 62 and 65, over 65, and "never retire." The level of risk tolerance of the respondent on saving or investment decisions was measured by four dummy variables: no risk, average, above average, and substantial risk.

Empirical Specification

Previous researchers have identified various demographic and financial predictors of retirement adequacy. For this study, retirement adequacy was assumed to be a function of self-control factors and other household characteristics, such as demographics, economic status, and financial attitudes.

Retirement adequacy = f (self-control, demographic, economic status, financial attitudes)

The empirical model for retirement adequacy was specified using a logistic regression model, expressed as the log odds function.

$$\text{logit}(p) = \log\left(\frac{p}{1-p}\right) = \beta_0 + x_1\beta_1 + x_2\beta_2 + \dots + x_k\beta_k = X\beta$$

Where

X = a vector of independent variables, such as self-control, demographics, economic status, and financial attitudes.

β = a vector of coefficients to be estimated.

In addition to the logistic regression model, this study used means tests to examine differences in retirement preparedness between households with or without self-control problems. For the hypothesis testing, this study used an unweighted dataset with the Repeated-Imputation Inference (RII) technique, which provides a more accurate estimate of true variances than do estimates obtained by only one impute (Lindamood, Hanna & Bi, 2007).

Research Hypotheses

This study examined the effect of various aspects of self-control variables on the retirement preparedness of U.S. households by addressing the following research hypotheses.

H₁: The loan payment self-control problem is related negatively to the likelihood of having adequate retirement preparedness.

H₂: The credit card self-control problem is related negatively to the likelihood of having adequate retirement preparedness.

H₃: The saving self-control problem is related negatively to the likelihood of having adequate retirement preparedness.

Results

Descriptive Results

The characteristics of sample households are displayed in Table 1. The majority of sample households was between ages 35 and 54 (72%), married couples (63%), and whites (70%). Over 70% of households had more than a high school education, and 11% of households were self-employed. Almost half of households owned defined contribution pensions, while 16% had DB pension plans. 42% of households responded that they expected to retire after age 65, including those who reported that they would never retire, and 37% replied that they would retire between ages 62 and 65. The remaining 21% of households responded that they would retire before the age of 62. Lastly, over 60% of households had more than average risk tolerance.

Table 2 shows the descriptive results of the self-control variables. Respondents with loan payment self-control problems comprised more than 52% of the total, while respondents with credit card self-control problems comprised only 6%. 25% of households had saving self-control problems. Overall, the descriptive results showed that a considerable portion of households have self-control problems in loan payment and saving decisions. The results of the means test of projected retirement adequacy by self-control problems are also presented in Table 2. This study calculated the mean IRR with the retirement income stage method, then calculated the mean retirement adequacy by comparing the mean IRR with the benchmark ratio. The proportion of households with retirement adequacy was 39% among those with a loan payment problem, compared to 44% of households without self-control problems. Households with credit card problems were less likely to be prepared adequately for retirement (38%), by comparison to 42% of households without self-control problems. Slightly less than half (46%) of households without saving self-

Table 1. Characteristics of sample households, 2010 SCF

| Variable | Percentage |
|--------------------------------|------------|
| Age of respondent | |
| 25 - 34 | 4.2 |
| 35 - 44 | 35.0 |
| 45 - 54 | 37.0 |
| 55 - 64 | 20.4 |
| 65 - 70 | 3.4 |
| Education of household | |
| Less than high school | 5.4 |
| High school | 22.7 |
| Some college | 19.6 |
| Bachelor degree | 31.8 |
| Post-bachelor degree | 20.5 |
| Marital Status | |
| Married | 63.0 |
| Partner | 6.2 |
| Single male | 11.8 |
| Single female | 19.0 |
| Race | |
| White | 69.6 |
| Black | 12.7 |
| Hispanic | 12.8 |
| Asian or others | 4.9 |
| Employment status | |
| Salary worker | 78.1 |
| Self-employment | 11.1 |
| Retired | 1.7 |
| Not working | 9.1 |
| Retirement plan | |
| Have Defined Contribution plan | 50.4 |
| Have Defined Benefit pension | 16.4 |
| Planned retirement age | |
| Retirement < 62 | 21.4 |
| 62 ≤ Retirement age ≤ 65 | 37.0 |
| Retirement age > 65 | 22.7 |
| Never Retire | 18.9 |
| Risk tolerance | |
| No risk | 37.9 |
| Average risk | 42.0 |
| Above average risk | 17.4 |
| Substantial risk | 2.7 |

Note: Restrictions are described in the Methods Section, and include head or spouse/partner being 35 or older, but no more than 70, and head and/or the spouse being in the labor force.

Table 2. Projected Retirement Adequacy by Self-control variables, Bivariate Analysis, 2010 SCF

| Variable | Category ^a | Percentage in Category | Retirement Adequacy ^b | Mean difference | Significance ^c |
|-----------------------------------|-----------------------|------------------------|----------------------------------|-----------------|---------------------------|
| All households | - | - | 41.5% | N/A | N/A |
| Loan payment self-control problem | Yes | 52.4% | 39.0% | -5.3% | <.0001 |
| | No | 47.6% | 44.3% | N/A | N/A |
| Credit card self-control problem | Yes | 6.0% | 38.3% | -3.4% | 0.0716 |
| | No | 94.0% | 41.7% | N/A | N/A |
| Saving self-control problem | Yes | 24.5% | 28.4% | -17.4% | <.0001 |
| | No | 75.5% | 45.8% | N/A | N/A |

^aThe reference category used in the mean test is indicated in bold face.

^bWeighted data: RII technique is used.

^cSignificance test is for mean difference from reference category for each variable.

control problems were prepared adequately for retirement, while only 28% of households with a saving problem were. On loan payment and saving self-control problems, the projected retirement adequacy of households with and without self-control problems was statistically different. Overall, households with self-control problems had lower rates of retirement preparedness than those that did not.

Multivariate Results

Table 3 shows the results of the multivariate logistic regression. This study tested the effect of self-control variables on the likelihood of retirement adequacy, controlling for various household characteristics, such as demographics, economic status, and financial attitude variables. The magnitude of the results was reported by odds ratio.

The loan payment problem was negatively related to the adequacy of retirement preparedness, while the credit card problem was not found to be significant. Specifically, households with loan payment problems decreased the odds of having adequate retirement preparedness by 22.1% by comparison to households without the problem. Furthermore, the saving self-control problem had a negative association with the likelihood of retirement preparedness. The odds of households with saving problems having adequate retirement preparedness were 25.7% lower than those without the problem.

With respect to the control variables, age, education, marital status, retirement plans, expected retirement age, and risk tolerance were all found to be significant. The odds of households aged 65 to 70 having adequate retirement preparedness were 212% higher compared to households between 55 and 64. The likelihood of having adequate retirement preparedness increased as the level of education increased. Some college increased the odds of having adequate retirement preparedness by 108%, a bachelor's degree by 130%, and a post-bachelor degree by 127%. The odds of married couple households having adequate retirement preparedness were higher than single females by 40.7%. Self-employed and not working status increased the odds of having adequate retirement preparedness by comparison to salaried workers, by 134% and 65%, respectively. Log-normal income was associated positively with the likelihood of having adequate retirement preparedness. Having retirement plans, such as a DB or a DC pension, also increased the odds of having adequate retirement preparedness by 83.5% (DB) and 70.4% (DC), by comparison to those without such plans. As expected, the odds of having adequate retirement preparedness increased with the age of expected retirement, by up to 167%. Lastly, the odds that households that were willing to take average or above-average risk were prepared adequately for retirement were 49.3% and 70.5%, respectively, higher than were those unwilling to take any risk.

Table 3. Result of logit regression on retirement preparedness, 2010 SCF

| Variable | Estimate | Standard Error | 2-sided p-value ^a | Odds ratio |
|--|----------|----------------|------------------------------|------------|
| Self-Control variables (reference category: No) | | | | |
| Loan payment self-control problem | -0.2498 | 0.1158 | 0.0311 | 0.779 |
| Credit card self-control problem | -0.2743 | 0.2263 | 0.2254 | 0.761 |
| Saving self-control problem | -0.2974 | 0.1329 | 0.0252 | 0.743 |
| Age of respondent: reference category: Age 55 to 64 | | | | |
| 25 - 34 | -0.1044 | 0.3041 | 0.7315 | 0.900 |
| 35 - 44 | 0.1307 | 0.1517 | 0.3889 | 1.139 |
| 45 - 54 | -0.0496 | 0.1465 | 0.7350 | 0.951 |
| 65 - 70 | 1.1419 | 0.3293 | 0.0005 | 3.121 |
| Education of household: reference category: Less than high school | | | | |
| High school | 0.4360 | 0.3030 | 0.1502 | 1.547 |
| Some college | 0.7338 | 0.3104 | 0.0181 | 2.083 |
| Bachelor degree | 0.8328 | 0.3026 | 0.0059 | 2.299 |
| Post-bachelor degree | 0.8209 | 0.3277 | 0.0122 | 2.273 |
| Racial-ethnic category: reference category: White | | | | |
| Black | -0.1235 | 0.1786 | 0.4893 | 0.885 |
| Hispanic | -0.1774 | 0.1937 | 0.3596 | 0.838 |
| Asian or others | -0.2929 | 0.2488 | 0.2389 | 0.746 |
| Marital status: reference category: Married | | | | |
| Single male | -0.2218 | 0.1706 | 0.1935 | 0.801 |
| Single female | -0.5236 | 0.1553 | 0.0007 | 0.593 |
| Partner | 0.0237 | 0.2365 | 0.9202 | 1.025 |
| Employment status: reference category: Salary worker | | | | |
| Self-employed | 0.5014 | 0.1870 | 0.0073 | 2.344 |
| Retired | 0.7146 | 0.4047 | 0.0775 | 2.044 |
| Not working | 0.8525 | 0.1643 | <.0001 | 1.65 |
| Log of Income | 0.5028 | 0.0631 | <.0001 | 1.652 |
| Retirement plan: reference category: No | | | | |
| Have Defined Contribution (DC) plan | 0.5336 | 0.1110 | <.0001 | 1.704 |
| Have Defined Benefit (BD) pension | 0.6076 | 0.1443 | <.0001 | 1.835 |
| Expected retirement age: reference category : Before 62 | | | | |
| 62 ≤ Retirement age ≤ 65 | 0.7932 | 0.1463 | <.0001 | 2.209 |
| Retirement age > 65 | 0.9824 | 0.1725 | <.0001 | 2.669 |
| Never Retire | 0.4641 | 0.1721 | 0.0070 | 1.59 |
| Risk tolerance: reference category: Take no risk | | | | |
| Average risk | 0.4012 | 0.1334 | 0.0026 | 1.493 |
| Above average risk | 0.5335 | 0.1581 | 0.0007 | 1.705 |
| Substantial risk | 0.2802 | 0.2759 | 0.3098 | 1.323 |
| Concordance (mean) | 84.4% | - | - | - |

^a Unweighted RII analysis of 2010 SCF dataset

Discussion

This research identified the relationship between the self-control problem and the likelihood of being prepared adequately for retirement. As reported previously in related research (Gathergood, 2012; Haws *et al.*, 2012; Laibson, 1997; Rha *et al.*, 2006), this study confirmed the importance of the self-control practice in making financial decisions that lead to positive retirement outcomes.

First, empirical results showed that a considerable portion of US households has self-control problems on financial management, such as loan payment and saving decisions. Self-control problems in loan payment and savings were associated negatively with the adequate retirement preparedness, which support the hypotheses 1 and 3. The method of ascertaining retirement adequacy assumed that the goal was having retirement consumption equal to preretirement consumption. However, households that discount the future heavily may not behave this way in retirement planning, and might also be more likely to engage in behaviors that result in financial management problems.

In addition, this study also deduced the importance of household retirement preparedness of having regular and conventional saving decision principles, and suggested ways to improve the retirement preparedness by using self-control practice. Because self-control problems result from inconsistent preferences, building consistent self-regulation practices appears to be important in improving related decisions. Voluntarily imposing constraints on one's future choices such as goal clarification, self-evaluation, and deadline setting, is a strategic attempt to reduce this conflict (Ariely & Wertenbroch, 2002; Lee & Hanna, 2015; Peetz & Buehler, 2009) and known to enhance consistency and regularity in dealing with tasks by managing one's plans or goals, such as setting regular principles for spending and saving (O'Donoghue & Rabin, 1999) and giving detailed information about the current choice and its consequence (Park, Cho, & Yoon, 2012).

The self-control problem was not significant for revolving credit cards, on the other hand, and this study assumed that this was due to the different purposes for, and characteristics of loan and credit card use. While a credit card is usually associated with the purchase of consumable goods, loans are related to asset reallocation over a

certain period for housing, vehicles, and education. Thus, applying for a loan is more stringent than applying for a credit card. Further, a household should apply for a new loan when in need of additional loan amounts, whereas credit card users can use credit more flexibly by making payments above the minimum as often or as much as possible. These distinctions affect households' mental accounting separately and construct different attitudes towards loans and credit (Shefrin & Thaler, 1988; Thaler, 1980). It is also possible that revolving credit card behavior reflects particular preferences since people can choose to make late payments, even though they are penalized. This intended deferment may not be considered a controversial self-control issue.

The results also showed that control variables, such as age, education, race/ethnicity, marital status, employment status, retirement plans, expected retirement age and risk tolerance, were related significantly to retirement preparedness. In particular, the role of education could have important implications, as it is related closely to financial literacy, which affects retirement saving decisions (Lusardi & Mitchell, 2007; van Rooij, Lusardi, & Alessie, 2011); more financially knowledgeable households are more likely to plan for retirement adequately. Lusardi and Mitchell (2007) argued that many households have difficulty understanding the most basic economic concepts useful for saving and investment decisions. Thus, acquiring related knowledge and skills can improve retirement saving (Banks, O'Dea, & Oldfield, 2010).

It is important for households to stay focused on their goals in their long-term financial decision making with the help of financial educators and industry experts. Learning how to set goals and check their progress in practicing regular rules from an early age could increase the chances of achieving financial goals (Kim, 2005). Understanding financial decisions and practicing one's rules is likely to lead students or households to achieve better retirement preparedness outcomes. Concurrently, teaching how to avoid high discounting of future rewards or control present-oriented tendencies in financial management should also be emphasized. Hanna and Kim (2014) argued that a low discount rate should be used as advice "to avoid recommendations that are likely to lead to future regrets." Besides young students, older adults can even improve saving and investment decisions when they consult financial experts on their investment experiences and knowledge

(Baek, 2010). Professionals can provide appropriate information about possible consequences of current or future decisions and suggestions for a better decision under specific circumstances and goals.

Limitations

There are at least two limitations to note in this study. Because the SCF dataset does not provide a direct measurement of self-control problems, this study used three variables which included certain aspects of efforts to impose constraints on inconsistent time preferences for future financial decision makings. Although this study created self-control variables based on the theoretical framework (i.e., BLCH), the self-control variables may not have contained all aspects of the effort regarding self-constraints on future financial decisions.

In addition, this study assessed an adequate level of retirement preparedness of households using the retirement income stage method (Kim *et al.*, 2014; Kim & Hanna, 2015). This measurement may reflect incomplete prediction on retirement spending and personal discount rates, which can cause a wide range of adequacy rates (Munnell, Rutledge, & Webb, 2014). For example, 42% of households in the sample were assessed to have enough saving to maintain their current spending level after retirement. However, this result is somewhat parsimonious when compared to another previous retirement preparedness study that reported that 80% of working households are saving enough for retirement (Scholz, Seshadri, & Khitatrakun, 2006).

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Appendix: Description of Self-control variable, Survey of Consumer Finances

| Variable | Description |
|--------------------------------------|---|
| Loan payment self-control problem | <ul style="list-style-type: none"> • Whether households have ever experienced late loan (various loan or mortgage) payments during the last year or not, or for two months or more • Whether they have ever been bankrupt or not • Whether they usually pay off their monthly total balance owed on credit card account or not |
| Credit card self-control problem | <ul style="list-style-type: none"> • Whether households have revolving charge or any charge on credit cards after last payment |
| Saving decision self-control problem | Saving Goal self-control problem <ul style="list-style-type: none"> • Whether households have saving reason for retirement |
| | Saving Rule self-control problem <ul style="list-style-type: none"> • Whether households have saving rules such as, <ul style="list-style-type: none"> - Save income of one family members and spend the other - Spend regular income and save other income - Save regularly by putting money aside each month |