Financial Knowledge Overconfidence and Early Withdrawals from Retirement Accounts

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Abstract

Early distributions from retirement accounts could endanger future retirement income security, and the U.S. has restrictions to discourage them, including possible tax penalties. On the other hand, tapping one's retirement assets may be rational when an individual encounters financial hardship. With the 2020 Coronavirus Aid, Relief, and Economic Security Act (CARES Act), early distribution from retirement accounts became an even more attractive option to individuals. In this study, we examined factors related to individuals' decision of taking hardship withdrawals and plan loans, focusing on financial knowledge and overconfidence in financial knowledge, using the 2018 National Financial Capability Study dataset. We found evidence that people may be making early withdrawals without understanding possible consequences. Objective financial knowledge was negatively related to hardship withdrawals and plan loans, but the subjective assessment of financial knowledge was positively related to hardship withdrawals. Respondents with financial knowledge overconfidence (high subjective and low objective knowledge) were more likely to take early withdrawals than those with other combinations of objective and subjective knowledge. We discuss implications for public policy and financial education and advice.

Keywords: early withdrawals, financial knowledge, hardship withdrawals, overconfidence, retirement plan loans

JEL classification: D12; D14; G41; G51; G53

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Introduction

Being financially independent throughout a longer duration of retirement life has become increasingly important. Many studies of retirement adequacy in the United States project that only half of the employed households are on track to be able to maintain the same standard of living after retirement than they had before retirement (Hanna, Kim, & Chen, 2016). A study by VanDerhei (2019) corroborates this finding, showing that about 40% of U.S. households with a household head between 35 and 64 years old are at risk of running out of money during retirement. Numerous studies have been conducted to examine the process of retirement asset accumulation. However, not only the accumulation of assets but also the decumulation of assets before retirement, or dissaving, is of great importance (Mitchell, 2001). This study examines two actions related to the decumulation of retirement assets before retirement.

The study explores pre-retirement withdrawal decisions, focusing on hardship withdrawals and plan loans taken from retirement accounts, including both employer-sponsored retirement plans and IRAs. Pre-retirement dissaving could be in various forms such as hardship withdrawal, taking a loan against assets in the plan, or not making a roll-over to IRA or other types of retirement savings accounts when changing jobs. These pre-retirement withdrawals are referred to as leakage of retirement assets (Engelhardt, 2002; Munnell & Webb, 2015; U.S. Government Accountability Office, 2010). Beshears et al. (2012) referred to the restrictions and penalties for preretirement withdrawals as commitment devices since many consumers realize that they may be tempted to spend retirement savings, and many realize that they may succumb to temptation or short-term needs. Often these withdrawals will result in permanent reductions in assets available by retirement (U.S. Government Accountability Office, 2010).

In 2019, the IRS issued rules easing limitations on withdrawals from retirement accounts (Ebeling, 2019). Then, with the unprecedented financial and health crisis of COVID-19, the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) was passed. The Act waives a 10% early penalty for withdrawals up to $100,000 by qualified individuals, which normally applies to withdrawals taken before attaining age 59 ½, and raises the maximum limit for retirement plan loans from $50,000 to $100,000 (Internal Revenue Service, 2020). The provisions were intended to help U.S.

households in dealing with financial difficulty, but they might lead some households to believe they are accessing retirement assets at no cost. Many people may be tempted to take a hardship withdrawal and/or a plan loan because of the financial crisis, but workers are risking their financial security in retirement to cover current financial needs. Therefore, research is needed on whether people making decisions to take early withdrawals have a full understanding of the implications.

This study analyzed factors related to individuals' decision of taking early withdrawals from retirement accounts via hardship withdrawal or plan loans. We focused on financial knowledge and overconfidence as salient factors associated with the early withdrawal decision. For empirical analyses, we used the 2018 National Financial Capability Study dataset and results provide evidence that people may be making early withdrawals without understanding possible consequences. While our research is on a survey taken in 2018, before changes in withdrawal rules, our results have implications for future advice and policy.

Literature Review

Early Distributions from Retirement Accounts in the United States

Pre-retirement distributions include in-service withdrawals and plan loans.[3] In-service withdrawals are subject to income tax when the distribution is made. However, the distribution amount taken before the participant reaches age 59 ½ is subject to an additional 10% early withdrawal penalty according to IRC section 72(t). The Pension Protection Act of 2006 (PPA 2006) allowed hardship withdrawals without penalty if the valid exceptions apply. These exceptions include death, disability, higher education, medical expenses, and Substantially Equal Periodic Payments (SEPP).

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[3] One additional type of pre-retirement withdrawal is when the accrued benefit is cashed out at termination of employment from a former employer. Employees have a number of options for the assets in a retirement plan under a former employer, including leaving the balance in the former employer's plan, rolling the balance over to a retirement plan under a new employer, transferring the balance to an IRA, or cashing out the account balance. The cash out is also subject to income tax withholding and a 10% penalty. However, this form of pre-retirement withdrawal is not examined in our study.

The change in regulations announced by the IRS in 2019 regarding hardship withdrawals from 401(k) accounts makes hardship withdrawals more appealing to plan participants. The rule eliminated the six-month contribution suspension, which originally prohibited employees from contributing to a 401(k) plan for six-month following the hardship distribution. It eased the process of hardship verification as well, which is a necessary procedure to ensure that hardship withdrawal applicants are actually experiencing the need and do not have other sources of assets to support such needs. As a result of these changes, many professionals predict an increase in the number of applications for hardship distributions (Ebeling, 2019; Tacchino, 2019).

Plan loans are another form of pre-retirement withdrawal. To avoid an early withdrawal penalty and being taxed as ordinary income, the amount of plan loan should be less than the maximum set by IRC section 72(p), which is $50,000[4] (Qualified individuals may now borrow up to $100,000 under the CARES Act). Plan loans are generally repaid through payroll deductions. If an individual fails to repay the loan, the outstanding loan balance is considered as a withdrawal and subject to ordinary income tax and possibly a 10% withdrawal penalty.

Pre-retirement Asset Dissaving and Consumption Smoothing

Individuals can tap their employer-sponsored retirement plan assets if it is permitted under the plan document. Even though early withdrawal usually entails tax penalties and further restrictions on future contributions, many people access those savings when the need arises (Butrica, Zedlewski, & Issa, 2010a). As previously mentioned, pre-retirement withdrawals (leakage of retirement assets) include in-service withdrawals and plan loans (U.S. Government Accountability Office, 2010).

Bryant, Holden, and Sabelhaus (2011) estimated that the ratio of leakage to assets in the plan was 2.2% for taxable withdrawals and 0.6% for penalized withdrawals in 2007 for employees younger

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[4] IRC Section 72(p)(2) states that: "A loan that does not exceed the lesser of:

a. $ 50,000, reduced to the extent that the participant's or beneficiary's highest balance for plan loans outstanding during the preceding 12 months exceeds the current balance for plan loans, or

b. 50 percent of the participant's or beneficiary's nonforfeitable benefit (or $10,000 if greater)."

than 55 years old. Argento, Bryant, and Sabelhaus (2015) estimated that the ratio of aggregate leakage to new contributions was 40% in 2010, which means that 40 cents were leaked for every dollar of contribution. Munnell and Webb (2015) examined Vanguard 401(k) participants and found that in 2013, 3.7% of participants had taken in-service withdrawals and 16.6% had taken plan loans. They estimated that leakage amounts to about 1.5% of assets each year, and major sources of leakage in assets were in-service withdrawals and cash out at job change.

Argento et al. (2015) referred to early withdrawals as a double-edged sword, because while individuals' retirement assets are reduced as a result of withdrawal, they could use the resource to smooth consumption in the circumstances of sudden shock. Many researchers have expressed concern about early in-service withdrawals given its potential to harm the retirement adequacy of individuals (Engelhardt, 2002; Munnell, 2012; Munnell & Webb, 2015; Purcell, 2009; U.S. Government Accountability Office, 2010). Munnell and Webb (2015) concluded that employees' retirement assets in 401(k) and IRA accounts would have been 20% higher if it were not for the allowance of leakage under current rules.

The general consensus among the previously mentioned studies is that early withdrawal is problematic, even though there is a benefit of consumption smoothing. However, Butrica et al. (2010a) raised a question as to whether early withdrawals from retirement accounts are really problematic. They emphasized the potential benefit of withdrawing early, suggesting early withdrawals might not always entail detrimental consequences in certain circumstances. Early withdrawals are especially common among low-income households who do not have any other options when they face events such as job loss, divorce, or the birth of a child. The authors pointed out that these could be "legitimate and compelling" reasons for individuals to access retirement savings. Thus, instead of putting more restrictions on early withdrawals, Butrica et al. (2010a) suggested that savings for retirement and other needs should be encouraged in general.

Overview of previous studies on early withdrawals from retirement accounts

As discussed above, one of the key factors found to be related to early withdrawals is a financial or non-

financial shock. Financial shocks such as income decreases, job losses, medical expenses or decreases in the number of earners in the family were positively related to pre-retirement withdrawals (Amromin & Smith, 2003; Argento et al., 2015; Butrica, Zedlewski, & Issa, 2010b; Tharayil & Walstad, 2016). According to Argento et al. (2015), the dollar amount of pre-retirement withdrawals increased after the Great Recession as well. Non-financial shocks include family shocks such as divorce or birth of a child, and having such a shock was also found to be related to early withdrawal decisions (Amromin & Smith, 2003; Argento et al., 2015; Butrica et al., 2010b). These findings showed that individuals' pre-retirement withdrawals could be explained partly by life-affecting financial and non-financial shocks, and most of the studies attributed this to household attempts to smooth consumption after the shock.

Financial knowledge has been linked to asset accumulation (Henager & Mauldin, 2015; Letkiewicz & Fox, 2014) and retirement savings in previous studies (Jacobs-Lawson & Hershey, 2005; van Rooij, Lusardi, & Alessie, 2012). Lack of financial knowledge is often linked to poor borrowing behaviors as well (Kim et al., 2019; Robb, Babiarz, Woodyard, & Seay, 2015; Tokar Asaad, 2015). Tharayil and Walstad (2016) showed that more financially knowledgeable individuals were less likely to make in-service withdrawals before retirement. Utkus and Young (2011) found that people with low objective financial knowledge were more likely to take loans against their 401(k). However, they did not examine how one's perceived knowledge or other attitudinal variables affected in-service withdrawal and loan decisions.

In addition, another limitation of previous studies is that many of them were not able to examine personal behaviors or attitudes. This was mainly because the majority of studies were conducted using tax data that lack such information (Amromin & Smith, 2003; Argento et al., 2015; Bryant et al., 2011; Goda, Jones, & Ramnath, 2017). To provide more insights into why retirement leakage occurs, the purpose of our study is to analyze the effects of objective and subjective financial knowledge, and of financial knowledge overconfidence, on the likelihood of taking a hardship withdrawal and of taking a plan loan.

Methodology

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Conceptual Framework

If households behaved in ways consistent with the extended life cycle model (Yuh & Hanna, 2010), they would attempt to smooth consumption to maximize expected lifetime utility. Preretirement withdrawals can be considered dissaving, and therefore normative considerations for dissaving should apply to the withdrawals. Households would rationally dissave when current income was lower than normal, and also when unexpected needs appeared (e.g., medical expenses). In terms of planning for retirement, factors related to a longer life expectancy might imply higher saving, so, for instance, all other things equal, females should be less likely to have preretirement withdrawals than males. Lower-income households might rationally save a lower proportion of income than higher-income households because of the higher replacement rates of Social Security pensions. Younger workers would have time to make up for withdrawals from retirement accounts before retirement, unlike older workers, so age might be negatively related to the likelihood of withdrawals. Those with higher risk tolerance might expect a higher rate of return on investments, and therefore, all other things equal might be more likely to have a withdrawal than those with lower risk tolerance.

If all relevant objective factors related to rational saving and dissaving decisions are controlled, and all households behaved consistently with the extended life cycle model, we expect that financial literacy would not be related to the likelihood of preretirement withdrawals. However, as Robb et al. (2015) suggested, consumers might have bounded rationality partly due to limited knowledge and overconfidence, which might result in suboptimal decisions. Therefore, we test for whether objective financial knowledge is negatively related to preretirement withdrawals, whether subjective financial knowledge is positively related to preretirement withdrawals, and also whether financial knowledge overconfidence is positively related to preretirement withdrawals.

One challenge for this study is the endogeneity of financial knowledge. It is possible for financial knowledge or overconfidence to be related to other variables. For instance, Fenton-O'Creevy and Furnham (2020) found that individual demographic factors, money attitudes, personality traits, and ideology were related to financial knowledge. We should be cautious in making causal inferences from our analyses, as we did not attempt estimations that might reduce bias due to potential

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endogeneity.

Dataset

The dataset used for the analyses is the 2018 State-by-State National Financial Capability Study (NFCS) which surveyed 27,091 respondents nationwide. Our analytic sample was restricted to non-retired households with a retirement account, including both employer-sponsored retirement plans such as a 401(k) and other forms of retirement accounts such as IRAs and SEPs. Given that defined benefit pension plans do not allow early withdrawals from the plan, respondents who did not have a choice in the asset allocation of any retirement account are also excluded from our sample. The analyses were weighted with the national-level weight provided by NFCS and the weighted population size of the sample is 7,931.

Measurement of Variables

Dependent variable: Early withdrawals from retirement accounts

The dependent variables were (1) whether a hardship withdrawal was taken, and (2) whether a retirement plan loan was taken. Respondents were asked "In the last 12 months, have you [or your spouse/partner] taken a hardship withdrawal from your retirement account(s)?" and "In the last 12 months, have you [or your spouse/partner] taken a loan from your retirement account(s)?". Participants answered yes or no to these questions and we excluded observations with missing values. Two binary indicators were created based on the response to each question.

Key independent variables: Financial knowledge variables

The first measure is a self-reported perceived level, which we refer to as subjective knowledge. The second is an index we created based on the number of correct answers to six financial knowledge problems, which we refer to as objective knowledge (details of specific questions available in Appendix Table A1). We then constructed a categorical variable based on the combination of two measures following the procedure suggested by previous studies (Kim, Lee, & Hanna, 2019; Porto & Xiao, 2016;

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Robb, Babiarz, Woodyard, & Seay, 2015; Xia, Wang, & Li, 2014). We categorized each respondent as having high objective financial knowledge if the objective score was higher than the median, and low objective financial knowledge otherwise. We categorized each respondent as having high subjective financial knowledge if the subjective knowledge level was higher than the median, and low subjective knowledge level otherwise. Then we classified each respondent into four categories; (1) Appropriate high (high subjective and high objective), (2) Overconfident (high subjective and low objective), (3) Underconfident (low subjective and high objective) and (4) Appropriate low (low subjective and low objective) following the category terms used in Kim et al. (2019).

As a robustness check and to test the relationship between the degree of overconfidence and early withdrawals, we also conducted analyses using a continuous measure of overconfidence in financial knowledge, which we created based on the numerical difference between two financial knowledge indices. The logistic regression results are robust to different specifications of overconfidence, including continuous measures, but we present complete results only for the estimations using categorical variables for overconfidence, etc., as those results are more intuitive and easier to understand. Appendix Table A2 shows summaries of logistic regression results with other confidence specifications.

Control variables

Control variables were selected following the normative framework suggested by Yuh and Hanna (2010) and previous empirical studies related to early withdrawals (Amromin & Smith, 2003; Argento et al., 2015; Butrica et al., 2010b). Control variables included age, gender, respondent's education, marital status, race/ethnicity, employment status, household income, homeownership, financial education, financial hardship, risk tolerance, retirement planning experience, and income drop. For our descriptive results (Table 1), we created categories for financial knowledge, age, and risk tolerance, though, in our multivariate analyses we used the original continuous values available in the NFCS dataset. Household income was available only in the categories shown in Table 1.

Analyses

We conducted sets of logistic regression analyses. For each dependent variable, Model 1 included the subjective knowledge variable and the objective knowledge score as independent variables. Model 2 included four financial knowledge categories as defined previously. Logistic regression analyses were conducted with (1) hardship withdrawal and (2) plan loan experiences as dependent variables. The empirical models for our analyses using sets of logit functions are shown below, where X_i is a vector of control variables for individual i.

$$Logit(Hardship\ Withdrawals_i) = \beta_0 + \beta_1 SubjectiveFK + \beta_2 ObjectiveFK + \gamma X_i \qquad (1\text{-}1)$$

$$Logit(Hardship\ Withdrawals_i) = \beta_0 + \beta_1 AppHigh_i + \beta_2 Over_i + \beta_3 Under_i + \gamma X_i \qquad (1\text{-}2)$$

$$Logit(Plan\ Loans_i) = \beta_0 + \beta_1 SubjectiveFK + \beta_2 ObjectiveFK + \gamma X_i \qquad (2\text{-}1)$$

$$Logit(Plan\ Loans_i) = \beta_0 + \beta_1 AppHigh_i + \beta_2 Over_i + \beta_3 Under_i + \gamma X_i \qquad (2\text{-}2)$$

While we considered the potential problem of endogeneity in financial knowledge, we did not explicitly account for the issue in this study. Lusardi and Mitchell's (2014) review of empirical studies concluded that instruments for financial literacy show stronger effects than the effects estimated without accounting for endogeneity. Therefore, our estimates of the effects of financial knowledge and of financial knowledge overconfidence might possibly underestimate the true effects. Further research in the future could attempt to formally account for possible endogeneity by using instrumental variables for financial knowledge and for financial knowledge overconfidence.

Results

Descriptive results

Table 1 includes descriptive patterns on hardship withdrawals and plan loans. Of all non-retired households with retirement accounts, 14% had taken a hardship withdrawal and almost 18% had taken a retirement plan loan in the past 12 months. Table 1 also shows how the percentage of people taking hardship withdrawals and plan loans differ by various characteristics. For the group with high subjective

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financial knowledge levels, 20% took hardship withdrawals and 22% took plan loans, compared to 8% taking hardship withdrawals and 13% taking plan loans in the group with low subjective financial knowledge. For the group with high objective financial knowledge, 5% took hardship withdrawals and 8% took plan loans, compared to 24% taking hardship withdrawals and 28% taking plan loans in the group with low objective financial knowledge.

Table 1 presents the percentage of respondents who made early withdrawals by each financial knowledge confidence category as well. Among overconfident respondents, 37% took hardship withdrawals and 40% took plan loans. In contrast, those who had appropriate high confidence or who were underconfident had low rates of hardship withdrawals (about 5% for each group) and low rates of plan loans (7% and 9%). Those with appropriate low confidence had rates in the middle of the other groups, with 11% taking hardship withdrawals, and 16% taking plan loans.

The percentages of respondents taking early withdrawals from retirement accounts are significantly different by age, gender, racial/ethnicity, marital status, occupation, income, homeownership, financial education, financial hardship, risk tolerance, planning for retirement, and the experience of income drop. Salient results include the high rates for those age 30 to 39, for Black respondents, for those with some college, for those with household incomes from $75,000 to $100,000, for those who had received financial education, those who had experienced financial hardship, and those who had a substantial income drop.

[Insert Table 1]

Logistic Regression Results

Table 2 shows the results of logistic regressions on the likelihood of taking a hardship withdrawal. Model 1 of Table 2 shows that subjective knowledge is positively, and objective knowledge is negatively related to the likelihood of taking a hardship withdrawal, controlling for various household characteristics. While it seems reasonable that more knowledgeable individuals might make better financial decisions, it is not as clear why those with higher assessments of their financial knowledge would be more likely to take an action that might have serious long-term consequences. Model 2

combines the subjective and objective measures into four confidence categories, and overconfident respondents had odds of taking a hardship withdrawal 2.1 times as high as those with appropriate low confidence, 3.7 times as high as those with appropriate high confidence, and 3.6 times as high as those who were underconfident (Appendix Table A3).

Figure 1 presents the calculated likelihood of a hardship withdrawal by financial knowledge confidence categories, holding all other variables at mean values. Those who were overconfident had a calculated likelihood of taking a hardship withdrawal of 35%, much higher than the other groups, with appropriate low having a 16% likelihood, underconfident having a 9% likelihood, and appropriate high having a 9% likelihood. It is notable that overconfident respondents were more likely to take hardship withdrawals than those who were low in both objective and subjective financial knowledge.

[Insert Figure 1]

In terms of other control variables, financial hardship and experiencing an income drop are factors that could be of great importance given the economic circumstances in 2020. Those who reported experiencing a very difficult financial hardship had odds of taking a hardship withdrawal 5.9 times (Model 2) the odds of those who did not report any financial difficulties. This supports the findings from previous studies that individuals utilize early withdrawals when they experience shocks (Amromin & Smith, 2003; Argento et al., 2015; Butrica et al., 2010b; Tharayil & Walstad, 2016). Those who had experienced a substantial income drop had odds of taking a hardship withdrawal 5.7 times (Model 2) the odds of those who had not had a substantial income drop.

[Insert Table 2]

Table 3 shows the results of logistic regressions on the likelihood of taking a plan loan. Model 1 of Table 3 shows that objective knowledge is negatively related to the likelihood of taking a hardship withdrawal, controlling for income, education, age, gender, and other characteristics. However, the respondent's subjective assessment of financial knowledge did not have a significant relationship with the likelihood of taking a plan loan. As discussed above, it seems reasonable that more knowledgeable individuals might make better financial decisions. Model 2 combines the subjective and objective measures into four confidence categories, and overconfident respondents had odds of taking a hardship

withdrawal 1.6 times as high as those with appropriate low confidence, 2.9 times as high as those with appropriate high confidence, and 2.1 times as high as those who were underconfident (Appendix Table A3).

Figure 2 presents the calculated likelihood of a hardship withdrawal by financial knowledge confidence categories, holding all other variables at mean values. Those who were overconfident had a calculated likelihood of taking a plan loan of 33%, much higher than the other groups, with appropriate low having a 20% likelihood, underconfident having a 15% likelihood, and appropriate high having an 11% likelihood. It is notable that overconfident respondents were more likely to take hardship withdrawals than those who were low in both objective and subjective financial knowledge.

[Insert Figure 2]

As with the results for hardship withdrawals (Table 2), those who reported experiencing a very difficult financial hardship or had a substantial income drop had higher odds of taking a plan loan. Most of the significant control variables were consistent with that of the hardship withdrawals analyses.

[Insert Table 3]

Discussion and Implications

The objective of this study was to examine the decision to take hardship withdrawal or plan loans, focusing on their relationship to financial knowledge and overconfidence in financial knowledge. A number of household characteristics that are plausibly related to rational decisions about preretirement withdrawals, including income drops, financial hardship, gender, and age were related to the likelihood of taking a hardship withdrawal (Table 2) and of taking a plan loan (Table 3) in ways consistent with rational decision-making. Controlling for these characteristics, subjective financial knowledge was positively related to the odds of taking a hardship withdrawal, and objective financial knowledge was negatively related to the odds of taking hardship withdrawals and plan loans. Those who were overconfident were more likely to take hardship withdrawals and plan loans than otherwise similar non-overconfident individuals.

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While Tharayil and Walstad (2016) explored the relationship between financial knowledge and hardship withdrawals, they only tested the effect of objective financial knowledge. Our study extends the literature by examining both objective and subjective financial knowledge, and we also separately analyzed the effect of overconfidence in financial knowledge. With the change in hardship withdrawals regulations and CARES Act in place, people are more likely to tap their retirement savings. Thus, it is important to examine who is making early withdrawals from both employer-sponsored retirement accounts and IRAs, especially whether they are making such decisions while fully understanding the consequences.

Even though we did not evaluate whether early withdrawal decisions were appropriate or optimal, the evidence from the multivariate analyses suggests that individuals might be making decisions with bounded rationality. Our multivariate results support our concern that people might be making important financial decisions without actually understanding the consequences of early withdrawals. With the 2020 pandemic and the CARES Act, people might be more likely to use hardship withdrawals and plan loans to deal with financial and non-financial shocks. Tacchino (2020) suggested that individuals might overspend because of the allowance of early withdrawals under the CARES Act.

Based on our multivariate analyses, overconfident individuals were even more likely to take withdrawals and plan loans than the appropriate low group (low subjective and objective knowledge.) These results suggest that to increase the chance of workers making appropriate decisions about their retirement accounts, increasing objective financial knowledge and also decreasing the discrepancy between actual ability and perceptions of ability are necessary. Thus, financial educators should design financial knowledge education programs taking both subjective and objective knowledge into account. Some authors have suggested that financial education programs could be giving individuals false assurance of being financially literate and capable while they lack actual understanding of financial matters (Kilborn, 2010; Willis, 2008). Financial education programs should be carefully evaluated in terms of how they relate to both objective and subjective financial knowledge, to avoid simply boosting confidence while not improving actual knowledge, as overconfidence might lead to more detrimental outcomes. Financial educators could address this potential issue by creating more tailored education

program based on needs. For instance, those who are overconfident will require reassessment of their financial knowledge, education and information to improve objective knowledge and might need tools to assist them in financial decision making.

For financial planners, an important takeaway from our research is realizing that people may not be making early withdrawal decisions with full capability to understand the consequences. Early withdrawal is a complicated process that includes filing documents, evaluation, and consideration of income taxes and possible penalties for the withdrawal. We found that financial knowledge overconfidence was strongly related to early withdrawals, even after controlling for income and other characteristics, which is a worrisome finding. As Kim, Pak, Shin, and Hanna (2018) concluded, advice from financial planners can assist individuals in achieving long-term financial goals of retirement planning. Therefore, it is possible that consulting with financial planners could help individuals with low financial knowledge make more appropriate early withdrawal decisions.

The implications for policy are complex because some early withdrawals are for medical emergencies or to avoid home foreclosure (Munnell & Webb, 2015). Beyond restoring the previous restrictions and penalties for early withdrawals, additional tightening could be reasonable, if retirement security were the main focus, especially given our findings that those who are overconfident in their financial knowledge are much more likely to take early withdrawals than otherwise similar respondents who were not overconfident. However, having resources to cushion financial shocks is important to many households, and overly limiting the ability to tap retirement resources might decrease participation in retirement saving programs.

Because of the lack of detailed data about retirement plans, we were not able to control for the balance of retirement accounts. Also, we were not able to directly examine the impact of the CARES Act and COVID 19 on early withdrawal decisions, though our results have implications for the economic situation in 2020 and beyond. Recent news articles suggest that about 30% of Americans have already tapped their retirement accounts or planning to do so due to the pandemic (De Lea, 2020). While early withdrawals definitely can have benefits, the costs and benefits need to be carefully weighed with

a full understanding of financial consequences, especially with CARES act allowing easier access to retirement accounts.

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Table 1. Proportion of taking hardship withdrawals and plan loans by various characteristics, bivariate analyses (means test)

Variable	Category	Percentage in category	Panel A: Hardship withdrawals		Panel B: Plan loans	
			Proportion taking	*p*-value	Proportion taking	*p*-value
Whole sample	**-**	100.00	14.01	-	17.70	-
Subjective knowledge	**<=5**	47.16	7.72		12.61	
	>5	52.84	19.62	<0.001	22.25	<0.001
Objective knowledge	**<=3**	47.18	24.44		28.31	
	>3	52.82	4.69	<0.001	8.23	<0.001
Financial knowledge confidence category	**Appropriate low**	23.03	11.02		15.97	
	Appropriate high	28.68	4.78	<0.001	7.24	<0.001
	Overconfident	24.16	37.24	<0.001	40.07	<0.001
	Underconfident	24.14	4.58	<0.001	9.40	<0.001
Age	**Younger than 30**	16.27	22.80		25.48	
	30-39	25.63	26.38	0.069	30.86	0.008
	40-49	20.92	8.13	<0.001	13.49	<0.001
	50-59	21.98	6.32	<0.001	9.38	<0.001

Variable	Category	Percentage in category	Panel A: Hardship withdrawals		Panel B: Plan loans	
			Proportion taking	*p*-value	Proportion taking	*p*-value
	60 and over	15.21	2.94	<0.001	5.01	<0.001
Gender	Male	57.23	18.69		22.09	
	Female	42.77	7.74	<0.001	11.83	<0.001
Race/Ethnicity	**White**	62.69	10.73		14.93	
	Black	11.89	36.46	<0.001	38.08	<0.001
	Hispanic	15.14	12.95	0.183	18.43	0.060
	Asian/others	10.29	9.59	0.420	9.95	<0.001
Education	Less than high school	0.68	27.24	0.432	19.97	0.526
	High school diploma	18.54	17.67	0.151	23.67	0.545
	Some college	26.03	20.18		24.81	
	Associate degree	11.77	9.44	<0.001	13.13	<0.001
	Bachelor's degree	25.15	9.56	<0.001	12.42	<0.001
	Post-bachelor's degree	17.83	9.96	<0.001	11.49	<0.001

Variable	Category	Percentage in category	Panel A: Hardship withdrawals		Panel B: Plan loans	
			Proportion taking	*p*-value	Proportion taking	*p*-value
Marital status	**Married**	61.44	12.00		16.07	
	Single	8.51	17.09	0.011	20.67	0.028
	Separated/divorce/widow	30.06	17.24	<0.001	20.20	0.001
Occupation	**Self-employed**	9.46	20.65		21.59	
	Salaried worker	70.39	13.80	<0.001	18.67	0.131
	Part-time worker	8.75	10.78	<0.001	11.51	<0.001
	Homemaker	5.67	7.32	<0.001	10.42	<0.001
	Student	2.11	24.88	0.396	23.75	0.667
	Disabled	1.69	13.41	0.069	13.99	0.045
	Unemployed	1.93	12.07	0.016	9.34	<0.001
Income	Less than $15,000	2.70	27.55	<0.001	28.16	<0.001
	$15,000 to $25,000	4.14	20.35	<0.001	19.59	<0.001
	$25,000 to $35,000	6.26	15.67	<0.001	21.32	<0.001
	$35,000 to $50,000	11.99	12.20	<0.001	14.98	<0.001

Variable	Category	Percentage in category	Panel A: Hardship withdrawals		Panel B: Plan loans	
			Proportion taking	*p*-value	Proportion taking	*p*-value
	$50,000 to $75,000	20.51	10.13	<0.001	13.15	0.001
	$75,000 to $100,000	20.91	25.11	<0.001	29.95	<0.001
	$100,000 to $150,000	21.05	9.84	<0.001	14.19	0.001
	$150,000 or more	12.43	4.64		8.46	
Homeownership	**No**	25.77	8.66		12.72	
	Yes	74.23	15.86	<0.001	19.43	<0.001
Financial education	**No**	69.60	11.37		15.55	
	Yes	30.40	20.04	<0.001	22.62	<0.001
Financial hardship	**Not at all difficult**	59.90	5.38		8.30	
	Somewhat difficult	30.04	14.41	<0.001	20.37	<0.001
	Very difficult	10.06	64.18	<0.001	65.72	<0.001
Risk tolerance	**<=6**	52.60	6.79		10.86	
	>6	47.40	22.02	<0.001	25.29	<0.001
Retirement planning	**No**	32.50	9.00		13.38	

Variable	Category	Percentage in category	Panel A: Hardship withdrawals		Panel B: Plan loans	
			Proportion taking	*p*-value	Proportion taking	*p*-value
	Yes	67.50	16.42	<0.001	19.78	<0.001
Income drop	**No**	77.28	4.59		8.83	
	Yes	22.72	46.03	<0.001	47.88	<0.001

Notes. Analyses by authors of 2018 NFCS, weighted with the national-level weight provided by the NFCS. Reference categories used for bivariate analyses are in bold face. P-value retrieved from bivariate analyses significance test, indicating mean difference of (1) taking hardship withdrawals and (2) taking plan loans from reference category by each variable.

Table 2. Logistic regressions of financial knowledge on taking a hardship withdrawal, 2018 NFCS

	Model 1				Model 2			
	Coef.	Std. Err.	Odds Ratio	P>t	Coef.	Std. Err.	Odds Ratio	P>t
Financial knowledge								
Continuous								
Subjective knowledge	0.164	0.056	1.178	0.003	-	-	-	-
Objective knowledge	-0.317	0.040	0.728	<0.001	-	-	-	-
Confidence category (Ref: Appropriate low)								
Appropriate high	-	-	-	-	-0.572	0.195	0.564	0.003
Overconfident	-	-	-	-	0.724	0.151	2.063	<0.001
Underconfident	-	-	-	-	-0.566	0.182	0.568	0.002
Age	-0.029	0.005	0.972	<0.001	-0.029	0.005	0.972	<0.001
Gender (Ref: Male)	-0.740	0.131	0.477	<0.001	-0.725	0.129	0.484	<0.001
Race/Ethnicity (Ref: White)								
Black	0.446	0.157	1.561	0.004	0.402	0.159	1.494	0.012
Hispanic	-0.006	0.187	0.994	0.976	-0.012	0.183	0.988	0.947

	Model 1				Model 2			
	Coef.	Std. Err.	Odds Ratio	P>t	Coef.	Std. Err.	Odds Ratio	P>t
Asian/others	0.132	0.184	1.141	0.472	0.095	0.185	1.100	0.607
Education (Ref: Some college)								
Less than high school	-0.094	0.588	0.910	0.873	-0.059	0.568	0.943	0.918
High school diploma	0.102	0.174	1.107	0.559	0.122	0.172	1.129	0.479
Associate degree	-0.319	0.212	0.727	0.132	-0.309	0.210	0.734	0.142
Bachelor's degree	0.129	0.160	1.138	0.417	0.131	0.159	1.140	0.409
Post-bachelor's degree	0.214	0.171	1.239	0.210	0.222	0.174	1.249	0.201
Marital status (Ref: Married)								
Single	-0.254	0.208	0.776	0.224	-0.250	0.209	0.779	0.231
Separated/divorce/widow	0.045	0.137	1.046	0.742	0.037	0.137	1.037	0.790
Occupation (Ref: Self-employed)								
Salaried worker	-0.067	0.182	0.935	0.713	-0.040	0.183	0.961	0.828
Part-time worker	-0.183	0.261	0.833	0.483	-0.129	0.263	0.879	0.625

	Model 1				Model 2			
	Coef.	Std. Err.	Odds Ratio	P>t	Coef.	Std. Err.	Odds Ratio	P>t
Homemaker	-0.035	0.313	0.965	0.910	0.020	0.309	1.020	0.948
Student	-0.022	0.390	0.978	0.955	-0.006	0.401	0.994	0.988
Disabled	0.556	0.475	1.743	0.242	0.572	0.492	1.771	0.245
Unemployed	-0.401	0.399	0.670	0.315	-0.482	0.403	0.617	0.231
Income (Ref: $150,000 or more)								
Less than $15,000	0.793	0.363	2.210	0.029	0.882	0.368	2.416	0.016
$15,000 to $25,000	0.498	0.333	1.645	0.135	0.542	0.343	1.720	0.114
$25,000 to $35,000	0.487	0.308	1.628	0.113	0.509	0.309	1.664	0.099
$35,000 to $50,000	0.476	0.257	1.609	0.065	0.504	0.260	1.655	0.053
$50,000 to $75,000	0.436	0.231	1.546	0.059	0.461	0.232	1.586	0.047
$75,000 to $100,000	0.742	0.217	2.100	0.001	0.752	0.220	2.122	0.001
$100,000 to $150,000	0.383	0.224	1.466	0.087	0.394	0.227	1.483	0.083
Homeownership (Ref: No)	0.775	0.161	2.170	<0.001	0.733	0.160	2.080	<0.001
Financial education (Ref: No)	0.215	0.114	1.240	0.060	0.216	0.115	1.241	0.059

	Model 1				Model 2			
	Coef.	Std. Err.	Odds Ratio	P>t	Coef.	Std. Err.	Odds Ratio	P>t
Financial hardship (Ref=Not at all difficult)								
Somewhat difficult	0.635	0.132	1.888	<0.001	0.650	0.131	1.916	<0.001
Very difficult	1.815	0.164	6.138	<0.001	1.780	0.165	5.931	<0.001
Risk tolerance	0.110	0.027	1.116	<0.001	0.106	0.027	1.111	<0.001
Retirement planning (Ref: No)	0.198	0.133	1.219	0.135	0.159	0.131	1.172	0.227
Income drop	1.766	0.120	5.848	<0.001	1.743	0.121	5.716	<0.001
Constant	-2.970	0.807	0.051	<0.001	-2.906	0.744	0.055	<0.001
Wald Chi-square	1154.33***				1199.36***			
Pseudo R^2	0.4331				0.436			

Notes: Analyses by authors of 2018 NFCS, weighted with the national-level weight provided by the NFCS. Significance level: *$p < .05$, **$p < .01$, ***$p < .001$.

Table 3. Logistic regressions of financial knowledge on taking a plan loan, 2018 NFCS

	Model 1				Model 2			
	Coef.	Std. Err.	Odds Ratio	P>t	Coef.	Std. Err.	Odds Ratio	P>t
Financial knowledge								
Continuous								
Subjective knowledge	0.046	0.045	1.047	0.298	-	-	-	-
Objective knowledge	-0.228	0.033	0.796	<0.001	-	-	-	-
Confidence category (Ref: Appropriate low)								
Appropriate high	-	-	-	-	-0.567	0.153	0.567	<0.001
Overconfident	-	-	-	-	0.487	0.126	1.628	<0.001
Underconfident	-	-	-	-	-0.268	0.142	0.765	0.058
Age	-0.028	0.004	0.972	<0.001	-0.028	0.004	0.972	<0.001
Gender (Ref: Male)	-0.430	0.099	0.650	<0.001	-0.420	0.099	0.657	<0.001
Race/Ethnicity (Ref: White)								
Black	0.194	0.132	1.214	0.142	0.166	0.134	1.181	0.214
Hispanic	0.043	0.152	1.044	0.779	0.034	0.149	1.034	0.820

	Model 1				Model 2			
	Coef.	Std. Err.	Odds Ratio	P>t	Coef.	Std. Err.	Odds Ratio	P>t
Asian/others	-0.379	0.166	0.685	0.023	-0.402	0.166	0.669	0.015
Education (Ref: Some college)								
Less than high school	-0.848	0.539	0.428	0.116	-0.780	0.553	0.458	0.158
High school diploma	0.240	0.139	1.271	0.083	0.253	0.136	1.288	0.064
Associate degree	-0.402	0.165	0.669	0.015	-0.385	0.164	0.680	0.019
Bachelor's degree	-0.231	0.129	0.794	0.074	-0.228	0.130	0.796	0.080
Post-bachelor's degree	-0.362	0.148	0.696	0.014	-0.350	0.150	0.705	0.020
Marital status (Ref: Married)								
Single	-0.235	0.171	0.790	0.169	-0.228	0.170	0.796	0.179
Separated/divorce/widow	0.057	0.112	1.059	0.610	0.046	0.112	1.048	0.677
Occupation (Ref: Self-employed)								
Salaried worker	0.247	0.144	1.280	0.087	0.259	0.147	1.296	0.077
Part-time worker	-0.240	0.230	0.786	0.295	-0.196	0.229	0.822	0.392

	Model 1				Model 2			
	Coef.	Std. Err.	Odds Ratio	P>t	Coef.	Std. Err.	Odds Ratio	P>t
Homemaker	-0.079	0.251	0.924	0.754	-0.035	0.250	0.965	0.888
Student	-0.279	0.321	0.756	0.384	-0.248	0.329	0.780	0.450
Disabled	0.159	0.391	1.172	0.684	0.170	0.397	1.185	0.669
Unemployed	-0.935	0.372	0.393	0.012	-0.982	0.385	0.375	0.011
Income (Ref: $150,000 or more)								
Less than $15,000	0.064	0.314	1.066	0.838	0.136	0.314	1.146	0.664
$15,000 to $25,000	-0.408	0.283	0.665	0.150	-0.371	0.284	0.690	0.192
$25,000 to $35,000	0.064	0.261	1.066	0.807	0.079	0.261	1.082	0.763
$35,000 to $50,000	-0.166	0.221	0.847	0.453	-0.148	0.222	0.863	0.507
$50,000 to $75,000	-0.118	0.198	0.889	0.552	-0.108	0.199	0.897	0.586
$75,000 to $100,000	0.452	0.180	1.572	0.012	0.441	0.182	1.554	0.016
$100,000 to $150,000	0.173	0.183	1.189	0.346	0.174	0.185	1.190	0.347
Homeownership (Ref: No)	0.583	0.128	1.792	<0.001	0.544	0.127	1.723	<0.001
Financial education (Ref: No)	0.106	0.099	1.112	0.282	0.099	0.098	1.104	0.311

|	Model 1				Model 2			
	Coef.	Std. Err.	Odds Ratio	P>t	Coef.	Std. Err.	Odds Ratio	P>t
Financial hardship (Ref=Not at all difficult)								
Somewhat difficult	0.779	0.108	2.180	<0.001	0.783	0.107	2.188	<0.001
Very difficult	1.724	0.147	5.610	<0.001	1.701	0.148	5.481	<0.001
Risk tolerance	0.107	0.022	1.112	<0.001	0.097	0.021	1.102	<0.001
Retirement planning (Ref: No)	0.149	0.105	1.161	0.156	0.123	0.103	1.131	0.230
Income drop	1.258	0.100	3.517	<0.001	1.237	0.100	3.446	<0.001
Constant	-2.852	0.636	0.058	<0.001	-3.071	0.627	0.046	<0.001
Wald Chi-square	1213.04***				1291.65***			
Pseudo R^2	0.3171				0.3204			

Notes: Analyses by authors of 2018 NFCS, weighted with the national-level weight provided by the NFCS. Significance level: [*]$p < .05$, [**]$p < .01$, [***]$p < .001$.

Figure 1. Calculated probability of hardship withdrawal from retirement account by Financial Knowledge Groups, 2018 NFCS
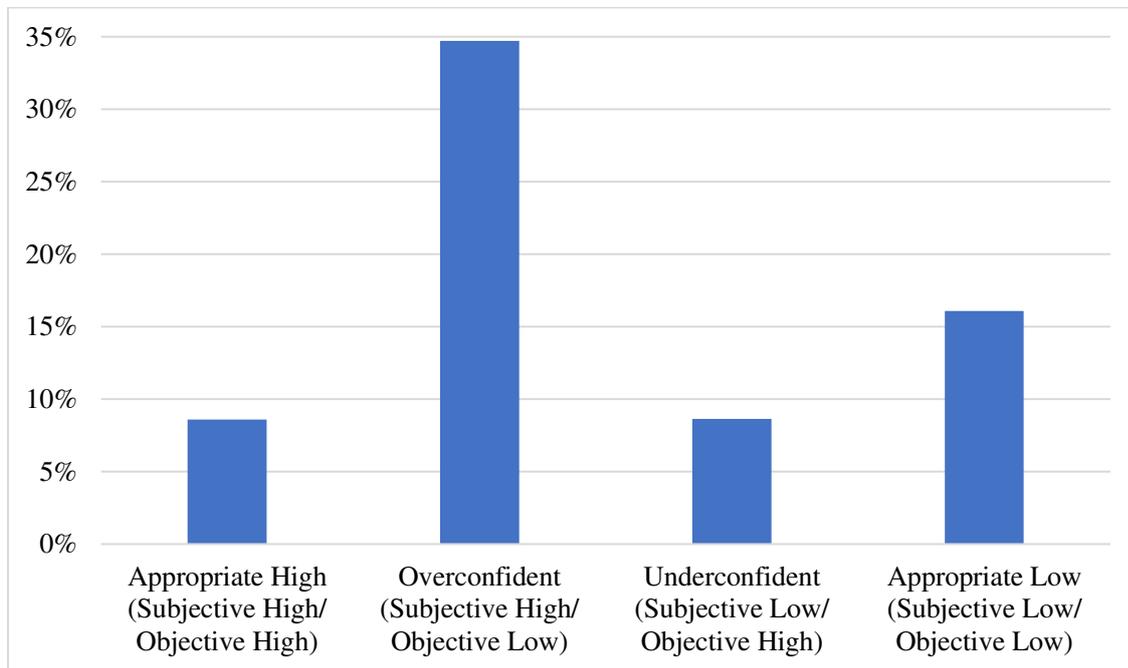
Notes. Based on logistic regression results from Model 2 of Table 2. To calculate each probability, we calculated $Exp(L)/(1 + Exp(L))$, with $L = \sum BX$, with L calculated at the mean value of each independent variable, except for the confidence categories, plus an adjustment factor such that the probability = mean rate of hardship withdrawals for sample for mean values of all X variables.

Figure 2. Calculated probability of plan loans by Financial Knowledge Groups, 2018 NFCS
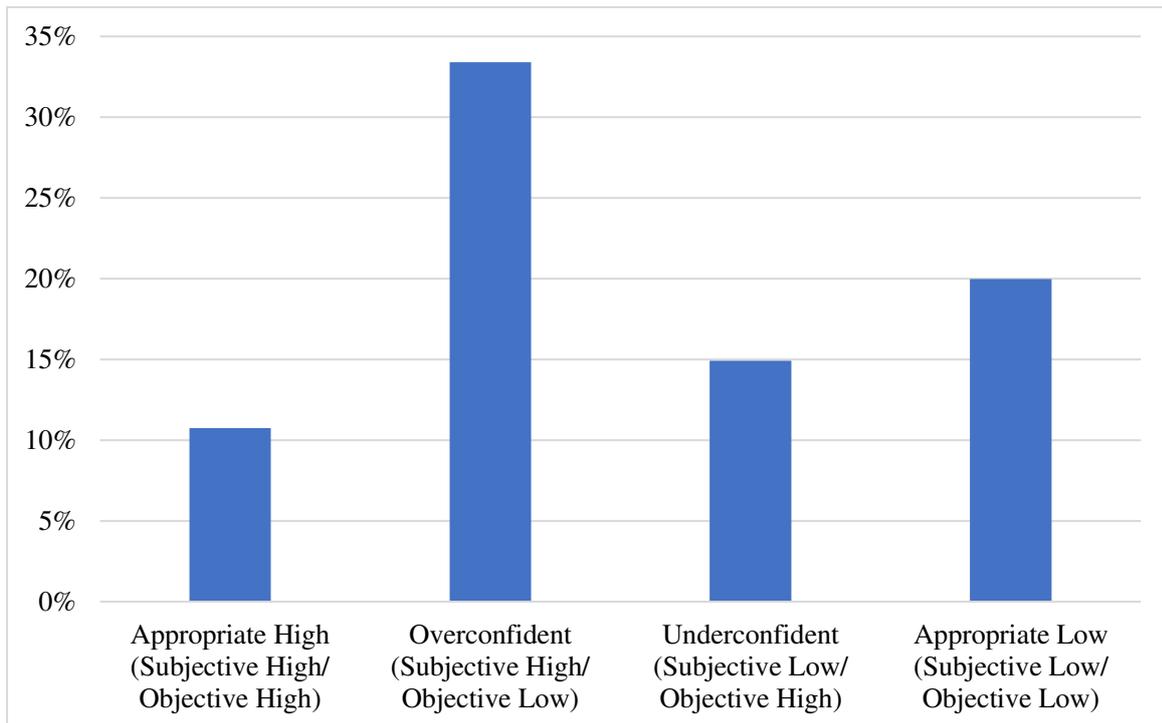
Notes. Based on logistic regression results from Model 2 of Table 3. To calculate each probability, we calculated $Exp(L)/(1 + Exp(L))$, with $L = \sum BX$, with L calculated at the mean value of each independent variable, except for the confidence categories, plus an adjustment factor such that the probability = mean rate of plan loans for sample for mean values of all X variables.

Table A1. Measurement of dependent and key independent variables

Variables	Measurement
Dependent variables	
Hardship withdrawal	In the last 12 months, have you [or your spouse/partner] taken a hardship withdrawal from your retirement account(s)? (1) Yes (2) No (98) Don't know (99) Prefer not to say
Plan loans	In the last 12 months, have you [or your spouse/partner] taken a loan from your retirement account(s)? (1) Yes (2) No (98) Don't know (99) Prefer not to say
Key independent variables	
Objective financial knowledge (Compounding)	Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? (1) More than $102 (2) Exactly $102 (3) Less than $102 (98) Don't know (99) Prefer not to say Observations with the response (1) coded as having the value of

Variables	Measurement
	1, and observations with responses (2), (3), and (98) coded as having the value of 0. Observations with the response (99) are dropped.
Objective financial knowledge (Inflation)	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? (1) More than today (2) Exactly the same (3) Less than today (98) Don't know (99) Prefer not to say Observations with the response (3) coded as having the value of 1, and observations with responses (1), (2), and (98) coded as having the value of 0. Observations with the response (99) are dropped.
Objective financial knowledge (Bond)	If interest rates rise, what will typically happen to bond prices? (1) They will rise (2) They will fall (3) They will stay the same (4) There is no relationship between bond prices and the interest (98) Don't know (99) Prefer not to say Observations with the response (2) coded as having the value of 1, and observations with responses (1), (3), (4), and (98) coded as having the value of 0. Observations with the response (99) are

Variables	Measurement
	dropped.
Objective financial knowledge (Mortgage)	A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less. (1) True (2) False (98) Don't know (99) Prefer not to say Observations with the response (1) coded as having the value of 1, and observations with responses (2) and (98) coded as having the value of 0. Observations with the response (99) are dropped.
Objective financial knowledge (Stock)	Buying a single company's stock usually provides a safer return than a stock mutual fund. (1) True (2) False (98) Don't know (99) Prefer not to say Observations with the response (2) coded as having the value of 1, and observations with responses (1) and (98) coded as having the value of 0. Observations with the response (99) are dropped.
Objective financial knowledge (Time value of money)	Suppose you owe $1,000 on a loan and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double? (1) Less than 2 years

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Variables	Measurement
	(2) At least 2 years but less than 5 years
	(3) At least 5 years but less than 10 years
	(4) At least 10 years
	(98) Don't know
	(99) Prefer not to say
	Observations with the response (2) coded as having the value of 1, and observations with responses (1), (3), (4), and (98) coded as having the value of 0. Observations with the response (99) are dropped.
Subjective financial knowledge	On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?
	[Scale of 7] (1) Very Low --- (7) Very High
	(98) Don't know
	(99) Prefer not to say

Notes. For variables except for the six objective financial knowledge questions, observations with responses (98) Don't know and (99) Prefer not to say are excluded from the analytic sample.

Table A2. Robustness check: Logistic regressions with continuous overconfidence indices, 2018 NFCS

	(1) Hardship withdrawals			(2) Plan loans		
	Coef.	Std. Err.	P>t	Coef.	Std. Err.	P>t
Panel A:						
Overconfidence index 1	0.253	0.033	<0.001	0.154	0.027	<0.001
Control variables		Yes			Yes	
Pseudo R^2		0.432			0.315	
Panel B:						
Overconfidence index 1	0.072	0.070	0.300	0.009	0.057	0.879
(Overconfidence index 1)^2	0.036	0.012	0.003	0.030	0.011	0.004
Control variables		Yes			Yes	
Pseudo R^2		0.434			0.316	
Panel C:						
Overconfidence index 2	0.369	0.051	<0.001	0.218	0.042	<0.001
Control variables		Yes			Yes	
Pseudo R^2		0.431			0.314	
Panel D:						
Overconfidence index 2	0.296	0.049	<0.001	0.171	0.040	<0.001
(Overconfidence index 2)^2	0.112	0.026	<0.001	0.093	0.023	<0.001
Control variables		Yes			Yes	
Pseudo R^2		0.435			0.317	

Notes. Overconfidence index 1 is created by subtracting objective financial knowledge from subjective financial knowledge. Overconfidence index 2 is created by subtracting standardized objective financial knowledge from standardized subjective financial knowledge. Control variables are same as our main model. Full logistic regression results available upon request.

Table A3. Logistic regressions on hardship withdrawals and plan loans with different confident group as reference category

	(1) Hardship withdrawals				(2) Plan loans			
	Coef.	Std. Err.	Odds Ratio	P>t	Coef.	Std. Err.	Odds Ratio	P>t
Overconfident vs. App low	0.724	0.151	2.062	<0.001	0.487	0.126	1.628	<0.001
Overconfident vs. App high	1.296	0.163	3.654	<0.001	1.054	0.133	2.869	<0.001
Overconfident vs. Underconfident	1.290	0.167	3.633	<0.001	0.755	0.131	2.128	<0.001
Underconfident vs. App low	-0.566	0.182	0.568	0.002	-0.268	0.142	0.765	0.058
Underconfident vs. App high	0.006	0.194	1.006	0.976	0.299	0.147	1.348	0.043
App high vs. App low	-0.572	0.195	0.564	0.003	-0.567	0.153	0.567	<0.001

Notes. Analyses by authors of 2018 NFCS, weighted with the national-level weight provided by the NFCS. Replicated Model 2 from Table 2 and Table 3.

Latter category as a reference group.