

## ABSTRACT

The annuity take-up rate is lower than economic theory predicts.<sup>1</sup> Using data from the 2018 National Financial Capability Study, we conduct an empirical analysis of individuals in the retirement-planning phase of the life cycle (ages 40–61) and individuals of retirement age (age 62 and over). We examine individuals' balance sheets, financial situations, and retirement planning steps to understand the barriers to annuity ownership, and we identify the financial and sociodemographic factors that contribute to annuity ownership. We find that debt obligations, lack of access to liquidity, and low financial literacy are all likely barriers to annuity ownership; the annuity owners in our sample are more likely than the non-owners to have access to liquidity and to report higher levels of financial satisfaction. Results indicate that access to liquidity and to professional investment management are positively associated with annuity ownership. Furthermore, financial literacy could lead to improved take-up rates through improved access to liquidity. These findings lead us to conclude that efforts to improve individuals' financial literacy levels may lead to enhanced retirement outcomes.

# EXAMINING THE BARRIERS TO ANNUITY OWNERSHIP FOR OLDER AMERICANS

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## INTRODUCTION

The economic downturn caused by the COVID-19 pandemic has destabilized the financial situations of many households, and decisions about how to cope with unexpected expenses, such as whether to take out a loan or make a hardship withdrawal from a retirement account, are likely to have long-term consequences, particularly on retirement planning and preparedness.

Planning for and living in retirement entail many complex decisions. Long before the pandemic, the responsibility for retirement saving and planning had shifted from the employer to the individual. Many employers have switched from defined-benefit to defined-contribution retirement plans, which do not guarantee an income in retirement. Investment and retirement products have become more accessible and more complex, requiring that individuals possess financial knowledge to make informed decisions. Moreover, life expectancy has risen, so individuals must save more to prepare for longer retirements. In addition to having increased responsibility for planning, individuals face numerous risks in their retirement decisions, from ensuring that they will not outlive their savings to protecting their investments and anticipating unexpected expenses.

Annuities, which can provide a guaranteed income stream for life, can shield retirees from some of these risks. Economic theory argues that annuitizing a considerable portion of retirement funds is optimal for retirees (Davidoff, Brown, and Diamond 2005; Yaari 1965). However, the take-up rate of annuities has remained much lower than theory suggests, resulting in what has been termed “the annuity puzzle.” While this puzzle remains, research has advanced the understanding of some of the barriers to annuity ownership, including liquidity constraints and lack of financial knowledge. Annuities

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can hedge against longevity risk, but they come at the cost of reducing retirees' flexibility both in how they use their funds and in whether they have access to liquidity. Additionally, annuities are complex investment products that individuals might not thoroughly understand. Brown, Casey, and Mitchell (2008) show that, when given a choice to exchange part of their annuity benefit for a lump-sum payment, financially literate individuals were more likely to prefer the annuity over the lump sum.

In this paper we build on existing research through an empirical analysis of individuals in the retirement planning phase of the life cycle (ages 40–61) and individuals of retirement age (age 62 and over), using data from the 2018 National Financial Capability Study (NFCS; Lin et al. 2019). We find that lack of access to liquidity, debt obligations, and low financial literacy are all likely barriers to annuity ownership. Additionally, we find that annuity owners are more likely than non-owners to have higher incomes and larger investment values, to have greater access to liquidity, and to report higher levels of satisfaction with their financial situation. Our results indicate that having access to liquidity and working with a professional to make investment decisions are both positively associated with having an annuity. While we do not find any significant relationship between financial literacy and annuity ownership for our sample, results indicate that financial literacy can lead to increased annuity take-up rates through improved access to liquidity as well as through engagement with retirement planning activities in general.

In what follows we examine individuals' assets and debt, financial situation, financial fragility, and retirement planning using data from the NFCS State-by-State Survey (Lin et al. 2019). This analysis provides insights into how well prepared individuals are for retirement and the barriers they face to annuity ownership. We then combine the State-by-State Survey with the NFCS Investor Survey to examine the financial and socioeconomic characteristics of annuity owners, as well as the factors that contribute to annuity ownership, including access to liquidity and financial literacy. Finally, we discuss the potential consequences of our findings on annuity ownership and make recommendations for improved annuity access and take-up.

## I. LITERATURE REVIEW

Since individuals face increasing complexity and respon-

sibility in their investment decisions, it is important to understand whether those nearing and in retirement are well prepared and, if they are not, what policies and services will help them achieve security in retirement. Retirement and retirement planning have remained a predominant focus of economic research. However, many questions remain about individual retirement preparedness and why annuities, which can have beneficial outcomes, have been largely underused. The answer may, in part, have to do with the complexity of retirement decisions.

Individuals face numerous risks and complex trade-offs in their retirement decisions. Some common risks are longevity risk, investment risk, and health-care-cost risk (Mackenzie 2020). Longevity risk is the risk that a retiree will outlive his or her savings. It can be difficult to predict lifespans and consumption in retirement, so determining an adequate amount of savings can include a high degree of uncertainty. Investment risk is an important consideration for individuals nearing or in retirement. A market downturn can significantly impact retirees' savings, since they lack the working years necessary to recoup the loss (Mackenzie 2020). Health-care-cost risk is the risk of affording and having access to funds to pay for medical care. This risk is applicable both to individuals who do and those who do not qualify for Medicare: Individuals not covered by Medicare might not be covered by another insurance, either, perhaps due to job loss, and so would need funds to cover medical costs. Additionally, even individuals who qualify for Medicare could still have uncovered medical costs and so need access to additional funds (Peijnenburg, Nijman, and Werker 2015). It can be difficult to navigate around these risks, and individuals often face trade-offs when deciding how to avoid them.

A common trade-off is to hold on to liquidity and flexibility instead of exchanging it for security against both investment risk and longevity risk. Retirees may choose to spend down their assets over time, such as through systematic withdrawals from their retirement and investment accounts. This option provides flexibility in use of funds while maintaining liquidity in case of an unexpected expense. They face investment and longevity risk, however, since they are susceptible to market downturns and the risk of outliving their savings in retirement. Alternatively, individuals could choose to purchase a life annuity. The annuity provides a guaranteed stream of income for the remainder of their life, ensuring their income will not decrease or run out in retirement. In

exchange, however, retirees do not have flexibility in their funds and lack access to liquidity, which may lead to lower take-up rates.

Peijnenburg, Nijman, and Werker (2015) argue that medical costs can be substantial in retirement, meaning that retirees need the liquidity to cover these expenses. These costs can occur early in retirement; if retirees have not accumulated other liquid assets, annuitization may be less optimal since it could hinder individuals from covering these medical costs. Health shocks and health status could also lead to individual preference for liquidity and lessen the benefit of annuitization (Sinclair and Smetters 2004; Turra and Mitchell 2008). More general concerns about liquidity may also be present since annuities do not generally provide flexibility for owners to borrow against their future value, to change the frequency of payouts, or to reverse the annuity (Davidoff, Brown, and Diamond 2005).

To help mitigate this trade-off of hedging against longevity risk versus maintaining liquidity, there are annuity options that offer some form of a combination. For example, Guaranteed Minimum Withdrawal Benefit variable annuities offer protection against longevity risk while also providing some liquidity options in the form of money-back guarantees and partially refundable premiums. Horneff et al. (2015) argue that the model of those variable annuities can be an appropriate fit for individuals' needs and could contribute to increased lifetime utility. While these products may provide some benefits over traditional annuities, they can still be complex.

In addition to lower liquidity, the complexity of annuities can be difficult for individuals to fully understand, resulting in lower demand. Evidence suggests that individuals are likely to misunderstand and struggle with correctly valuing annuities (Brown et al. 2008). In a hypothetical choice experiment, Brown et al. (2019) show that, as the complexity of an annuity increases, individuals' ability to correctly value the annuity decreases. Individuals may also have misperceptions about annuities, and might perceive annuitization as a gamble of living long enough to recoup funds spent on the annuity, instead of a hedge against longevity risk (Brown 2007). Therefore, financial literacy can play an important role in improving the take-up rate of annuities (Lambregts and Schut 2020). Individuals with higher levels of financial literacy are more likely to correctly value annuities (Brown et al. 2017), to shop around among annuity options (Banks, Crawford, and Tetlow 2015), and to pay attention to retirement-re-

lated information (Ramsay and Oguledo 2019).

Despite its importance, research shows that levels of financial literacy have remained low among US adults. According to the most recent "TIAA Institute–GFLEC Personal Finance Index (P-Fin Index)" (Global Financial Literacy Excellence Center [GFLEC] 2021), US adults correctly answered on average only half of the 28 financial literacy questions that make up the P-Fin Index (Yakoboski, Lusardi, and Hasler 2021). The 28 financial literacy questions were divided into eight functional areas: borrowing, saving, earning, consuming, identifying go-to information sources, investing, insuring, and comprehending risk. Functional knowledge was lowest in comprehending risk, where on average only 37 percent of the risk questions were answered correctly. Moreover, similar findings from earlier waves of the P-Fin Index show that Americans consistently demonstrate low levels of knowledge in this functional area (Lusardi, Oggero, and Yakoboski 2017; Yakoboski, Lusardi, and Hasler 2018, 2019, 2020, 2021). The ability to comprehend risk relates to the ability to manage and hedge risk and uncertainty, which is of particular relevance for annuity-related decisions. Findings from the P-Fin Index indicate that individuals are unlikely to have the financial knowledge necessary to make well-informed decisions regarding annuities.

This paper contributes to the current literature through an empirical analysis of individuals planning for and in retirement. We study individuals' balance sheets, financial situation, and retirement planning to identify potential barriers to annuity ownership. We also compare individuals with an annuity with those without one to observe the characteristics and factors likely contributing to annuity ownership, with a particular focus on the roles of liquidity constraints and financial literacy. Specifically, we use four measures of access to liquidity to provide a more comprehensive understanding of those measures' influence on annuity ownership: lacks emergency savings, no money left over at the end of the month, financially fragile, and too much debt.

## II. MEASURES OF ACCESS TO LIQUIDITY

We use four variables to measure individuals' access to liquidity. Each measure captures a slightly different aspect of liquidity and provides a more comprehensive under-

standing of individuals' liquidity constraints, including both sides of the balance sheet: assets and liabilities.

- **Lacks emergency savings** is measured using responses to the following question: "Have you set aside emergency or rainy-day funds that would cover your expenses for three months in case of sickness, job loss, economic downturn, or other emergencies?" This measure examines the amount of savings individuals currently have and whether those savings are easily accessible. Yes/no response options are provided; respondents who select "no" are defined as lacking emergency savings.
- **No money left over at the end of the month** is measured using responses to the following statement: "I have money left over at the end of the month." This measure provides insights into an individual's discretionary income and saving ability. If individuals do not have money left over, debt obligations and spending may prevent them from saving, and therefore from having access to liquid funds. Responses are on a 5-point Likert scale that goes from "never" to "always." Respondents who select "never" or "rarely" (1 or 2 on the 5-point Likert scale) are defined as having no money left over at the end of the month.
- **Financially fragile** is measured using responses to the following question: "How confident are you that you could come up with \$2,000 if an unexpected need arose within the next month?" This measure examines an individual's ability to access liquid funds to cover a mid-size shock. Instead of examining current savings, this measure examines whether individuals could access liquid funds within a short time frame (30 days); this access could include selling assets or borrowing funds. Responses include the following options: "I am certain I could come up with the full \$2,000," "I could probably come up with \$2,000," "I could probably not come up with \$2,000," or "I am certain I could not come up with \$2,000." Individuals who respond that they certainly or probably could not come up with \$2,000 are defined as financially fragile.
- **Too much debt** is measured using responses to the following statement: "I have too much debt right

now." Instead of calculating savings, this measure examines the debt side of an individual's balance sheet. This measure examines whether individuals feel constrained by their debt obligations, which would limit their ability to accumulate liquid funds. Responses are provided on a 7-point Likert scale from "strongly disagree" to "strongly agree." Individuals who selected 5, 6, or 7 are defined as having too much debt.

While these measures are all positively correlated, they examine different aspects of access to liquidity (see appendix table A1, "Correlation Matrix of the Access to Liquidity Measures").<sup>2</sup>

### III. DATA SAMPLES

This paper uses two surveys from the 2018 NFCS (Lin et al. 2019): the State-by-State Survey and the Investor Survey. The State-by-State Survey is a nationwide survey that includes a rich set of variables to measure individuals' financial situations, behaviors, and literacy levels. The Investor Survey provides a large set of variables regarding investor decision-making as well as behavior and investment assets. Both the State-by-State Survey and the Investor Survey are supported by the Financial Industry Regulatory Authority (FINRA) Investor Education Foundation, and are triennial. The State-by-State Survey began in 2009 and the Investor Survey began in 2015.

The State-by-State Survey includes a large number of observations, with approximately 27,000 adult respondents, aged 18 and over. Included in the State-by-State Survey is the following question: "Not including retirement accounts, does your household/do you have any investments in stocks, bonds, mutual funds, or other securities?" In 2018 a sample of 2,003 respondents who completed the State-by-State Survey and answered "yes" to the above question were selected to complete the Investor Survey. Additionally, respondents in this sample were screened to confirm that they held investments outside of their retirement accounts and were either the primary or shared decision-maker regarding these investments. Since respondents of the Investor Survey are a subset of the State-by-State Survey, individual responses to both surveys can be matched to examine investors

<sup>2</sup> All four measures also include respondent options of "do not know" and "prefer not to say."

across a broad range of variables, including whether investors own an annuity.

We examine two primary age groups: individuals ages 40–61 and those age 62 and over. In the first part of our analysis, we examine the general population across these two age groups. In the second part of our analysis, we examine two groups of investors within these same two age groups: investors who own an annuity and investors who do not own an annuity. Only the Investor Survey includes a question regarding annuity ownership, so our analysis on the characteristics of annuity owners is limited to the investor subpopulation.

We exclude individuals ages 39 and younger to construct a more homogenous sample in terms of retirement planning. According to the 2018 NFCS State-by-State Survey, only 36 percent of individuals age 39 and younger have tried to figure out how much they will need for retirement. This indicates that the majority of these individuals are not planning for retirement and thus including them would not likely provide insights into individuals nearing retirement. This age restriction results in a sample of 10,027 observations in the 40–61 age group and 7,085 observations in the 62-and-over age group.

In the second part of our analysis, we examine investors with and without an annuity across the two age groups. Investors are defined as having an annuity if they answered “yes” to whether they own a fixed, indexed, or variable annuity in their non-retirement account. Due to the wording of the question, we are not able to determine the type of annuity an investor owns. The total number of observations of investors in the 40–61 age group with an annuity is 192 and those without an annuity is 508. The total number of observations of investors in the 62-and-over age group with an annuity is 393 and without an annuity is 562.

## IV. EMPIRICAL FINDINGS

In the first part of our analysis we examine the general population of individuals who are in the retirement planning phase of their life cycle, are nearing retirement, and are in retirement. This analysis provides insights into the financial situation of individuals and any potential barriers to annuity ownership.

### 4.1. BARRIERS TO ANNUITY OWNERSHIP

Table 1 (next page) reports the demographic characteristics of individuals ages 40–61 and individuals age 62 and over. The two age groups have significantly different demographic characteristics: The older group is more likely to be female, less likely to have higher education, and less likely to be ethnically/racially diverse. Additionally, the older group is more likely to have annual income between \$50,000 and \$99,000, which could be because these individuals rely on retirement savings for income. Seventy-two percent of the 62-and-over group are retired, compared to only 10 percent of individuals in the 40–61 age group. Furthermore, those in the older group that are still working might be advanced in their career path and, as a result, could be earning higher salaries.

An important consideration is the level of financial literacy in the two age groups. Individuals who can correctly answer three basic financial literacy questions that assess their understanding of interest rates, inflation, and risk diversification are defined as financially literate (Lusardi and Mitchell 2014); the exact wording of the three questions is found in appendix B. Table 1 indicates that financial literacy increases with age: only 34 percent of younger individuals correctly answered all of the financial literacy questions compared to 45 percent of the older group. This is consistent with the theory of learning by doing: as individuals make financial decisions and interact with varied financial services and products, they increase their financial knowledge. Even among the older group, however, financial literacy is shockingly low. The fact that fewer than half could correctly answer all three basic financial literacy questions signals a likelihood that older Americans struggle to understand even fundamental financial topics, to say nothing of complex financial topics such as annuities.

The financial concept that appears to be most easily understood is interest rates, with 75 percent of younger respondents correctly answering that question compared to 82 percent of the older group. However, respondents struggled with the questions measuring comprehension of risk, with only 47 percent of the younger group answering correctly, compared to 55 percent of the older group. This indicates individuals are likely to struggle with concepts related to investment and risk management, which are essential to understanding annuities.

To further understand potential barriers to annuity ownership, we examine the financial situation of respondents, with information provided in tables 2 and 3. Overall, we

**TABLE 1: Demographics**

Age Groups		40–61 years	62+ years
Gender	Female	0.51	0.54 <sup>a</sup>
	Male	0.49	0.46 <sup>a</sup>
Education	Some college or less	0.71	0.68 <sup>a</sup>
	College or more	0.29	0.32 <sup>a</sup>
Income	< \$25,000	0.20	0.17 <sup>a</sup>
	\$25,000–\$49,999	0.23	0.28 <sup>a</sup>
	\$50,000–\$99,999	0.33	0.36 <sup>a</sup>
	>= \$100,000	0.24	0.19 <sup>a</sup>
Race/Ethnicity	White non-Hispanic	0.66	0.81 <sup>a</sup>
	Black non-Hispanic	0.11	0.07 <sup>a</sup>
	Hispanic (any race)	0.15	0.06 <sup>a</sup>
	Asian non-Hispanic	0.05	0.04 <sup>a</sup>
	Other non-Hispanic	0.03	0.02 <sup>a</sup>
Marital Status	Married	0.57	0.61 <sup>a</sup>
	Not married	0.43	0.39 <sup>a</sup>
Employment Status	Employed	0.66	0.22 <sup>a</sup>
	Unemployed	0.24	0.06 <sup>a</sup>
	Retired	0.10	0.72 <sup>a</sup>
Financial Literacy	Interest question correct	0.75	0.82 <sup>a</sup>
	Inflation question correct	0.61	0.76 <sup>a</sup>
	Risk question correct	0.47	0.55 <sup>a</sup>
	Big Three questions correct (interest, inflation, risk)	0.34	0.45 <sup>a</sup>
Observations		10,027	7,085

Note: All data are from the 2018 NFCS State-by-State dataset (Lin et al. 2019). Sample is restricted to individuals age 40 and over; data are weighted. *College or more* includes respondents who have achieved at least a bachelor's degree. *Income* represents household annual income from all sources, such as wages, tips, investment income, public assistance, and retirement plans. *Married* is a dummy variable taking value 1 if the respondent is married but not divorced, separated, or widowed, and 0 otherwise. *Employed* includes respondents who are employed full time or part time, or who are self-employed. *Unemployed* includes respondents who are unemployed, temporarily laid off, a homemaker, full-time student, or sick/disabled. *Big Three questions correct* is a dummy variable with value 1 if the respondent correctly answered the three basic financial literacy questions (Big Three); these questions assess understanding of interest rate, inflation, and risk diversification. <sup>a</sup>indicates that the difference from the 40–61 age group is statistically significant at the 0.05 level.

find that individuals in both age groups have accumulated assets, including retirement plans and homes (table 2). More than half (65 percent) of the younger group have a retirement plan through a current/previous employer and/or a private retirement plan they set up themselves, such as an IRA. Additionally, the majority of individuals in both groups own a home, at 63 percent and 80 percent, respectively. Even with these assets, however, individuals could face liquidity constraints, since a home is an illiquid asset and retirement assets cannot be accessed easily or without a high penalty. Additionally, table 2 shows that mortgages are prevalent even among older adults, indicating their assets might be leveraged, meaning they could have debt that

needs to be paid off. Of those with a home, 62 percent of individuals in the younger group and 37 percent in the older group have a mortgage. A meaningful share of individuals in both age groups report having home equity, automobile, and/or student loans.

The percentage of respondents with debt is higher among the younger group, which is not surprising given their life stage. They might be facing many different financial obligations at the same time, such as paying off their own student debt, buying a home, and providing for any children and their education. These obligations likely limit their ability to save, accumulate liquid assets, and prepare for retirement. Furthermore, to be able to service debt obligations

**TABLE 2: Assets and Debt**

Age Groups		40–61 years	62+ years
Assets	Has a checking account	0.90	0.97 <sup>a</sup>
	Has a savings account, money market account, or CDs	0.70	0.82 <sup>a</sup>
	Has a retirement plan either through a current/previous employer and/or a private retirement plan they set up themselves (i.e., IRA, Keogh, SEP)	0.65	0.73 <sup>a</sup>
	Owns a home	0.63	0.80 <sup>a</sup>
	Has financial investments aside from retirement accounts (i.e., stocks, bonds, mutual funds, or other securities)*	0.31	0.44 <sup>a</sup>
Short-Term Debt	Has unpaid medical bills that are past due	0.24	0.10 <sup>a</sup>
	Has credit card debt <sup>**</sup>	0.53	0.35 <sup>a</sup>
Long-Term Debt	Has a mortgage <sup>**</sup>	0.66	0.37 <sup>a</sup>
	Has a home equity loan <sup>**</sup>	0.11	0.13 <sup>a</sup>
	Has an automobile loan	0.15	0.27 <sup>a</sup>
	Has a student loan	0.05	0.05 <sup>a</sup>
Observations		10,027	7,085

Note: All data are from the 2018 NFCS State-by-State dataset (Lin et al. 2019). Sample is restricted to individuals age 40 and over; data are weighted. This table shows the composition of the asset and liability sides of the balance sheet for 2018 NFCS respondents ages 40–61 and 62 and over. *Has financial investments aside from retirement accounts* includes investments in stocks, bonds, mutual funds, or other securities. *Has unpaid medical bills that are past due* includes respondents who have any unpaid bills from a health-care or medical service provider that are past due. *Has credit card debt* is a dummy variable taking value 1 if the respondent has carried over a credit card balance and paid interest in the past 12 months, and 0 otherwise. \*Proportion conditional on having a checking or savings account. \*\*Proportion conditional on having the related asset or debt. <sup>a</sup>indicates that the difference from the 40–61 age group is statistically significant at the 0.05 level.

**TABLE 3: Financial Situation**

Age Groups		40–61 years	62+ years
Access to Liquidity	Lacks emergency savings	0.55	0.34 <sup>a</sup>
	No money left over at the end of the month	0.34	0.22 <sup>a</sup>
	Financially fragile	0.33	0.18 <sup>a</sup>
	Too much debt	0.39	0.20 <sup>a</sup>
Financial Anxiety and Satisfaction	Not satisfied with personal financial condition	0.28	0.14 <sup>a</sup>
	Thinking about personal finances can create anxiety	0.54	0.34 <sup>a</sup>
	Concerned the money he/she has or will save won't last	0.44	0.22 <sup>a</sup>
Retirement Planning	Tried to figure out how much money is needed for retirement	0.44	0.54 <sup>a</sup>
	Worry about running out of money in retirement	0.57	0.36 <sup>a</sup>
Observations		10,027	7,085

Note: All data are from the 2018 NFCS State-by-State dataset (Lin et al. 2019). Sample is restricted to individuals age 40 and over; data are weighted. *Lacks emergency savings* is a dummy variable taking the value 1 if respondent does not have funds that would cover expenses for three months in case of sickness, job loss, economic downturn, or other emergencies, and 0 otherwise. *No money left over at the end of the month* is a dummy variable taking value 1 if respondent never or rarely has money left over, and 0 otherwise. Respondents are classified as *financially fragile* if they reported that they certainly or probably could not come up with \$2,000 in response to the following question: “How confident are you that you could come up with \$2,000 if an unexpected need arose within the next month?” Respondents are classified as having *too much debt* if they responded 5, 6, or 7 on a 7-point Likert scale in agreement with the following statement: “I have too much debt right now.” *Not satisfied with personal financial condition* is based on the following question: “Overall, thinking of your assets, debts, and savings, how satisfied are you with your current personal financial condition?,” on a scale from 1 (not at all satisfied) to 10 (extremely satisfied). The percentage of respondents answering 1, 2, or 3 are reported in this table. *Thinking about personal finances can create anxiety* reports the percentage of people that selected 5, 6, or 7 on a scale from 1 (strongly disagree) to 7 (strongly agree) in response to the following statement: “Thinking about my personal finances can make me feel anxious.” *Concerned the money he/she has or will save won't last* is based on answer options 4 (describes me very well) and 5 (describes me completely) to the following statement: “I am concerned that the money I have or will save won't last.” *Worry about running out of money in retirement* is a dummy variable taking value 1 if respondent answered with 5, 6, or 7 on a 7-point Likert scale in agreement with the following statement: “I worry about running out of money in retirement.” <sup>a</sup> indicates that the difference from the age group 40–61 is statistically significant at the 0.05 level.

and ultimately pay off debt, individuals need liquidity. Compounding these factors, high debt levels make it challenging to access liquidity through borrowing. While individuals in the older group might be less likely than younger individuals to have debt, a substantial proportion of older adults are still paying off debt. Doing so with limited retirement income is challenging and can further constrain access to liquidity for emergencies. In fact, the liquidity required for servicing debt during retirement could be a barrier to annuity ownership.

Limited access to liquidity and lack of retirement preparedness are apparent among many individuals in both age groups, as can be seen in table 3. Over half (55 percent) of the younger group and over one-third (34 percent) of the older group lack emergency savings. This is worrisome, since older adults around retirement age are at the peak of their wealth accumulation. Similar results are shown across all of our measures of liquidity. About one-third of the younger group do not have money left over at the end of the month (34 percent) and about the same number

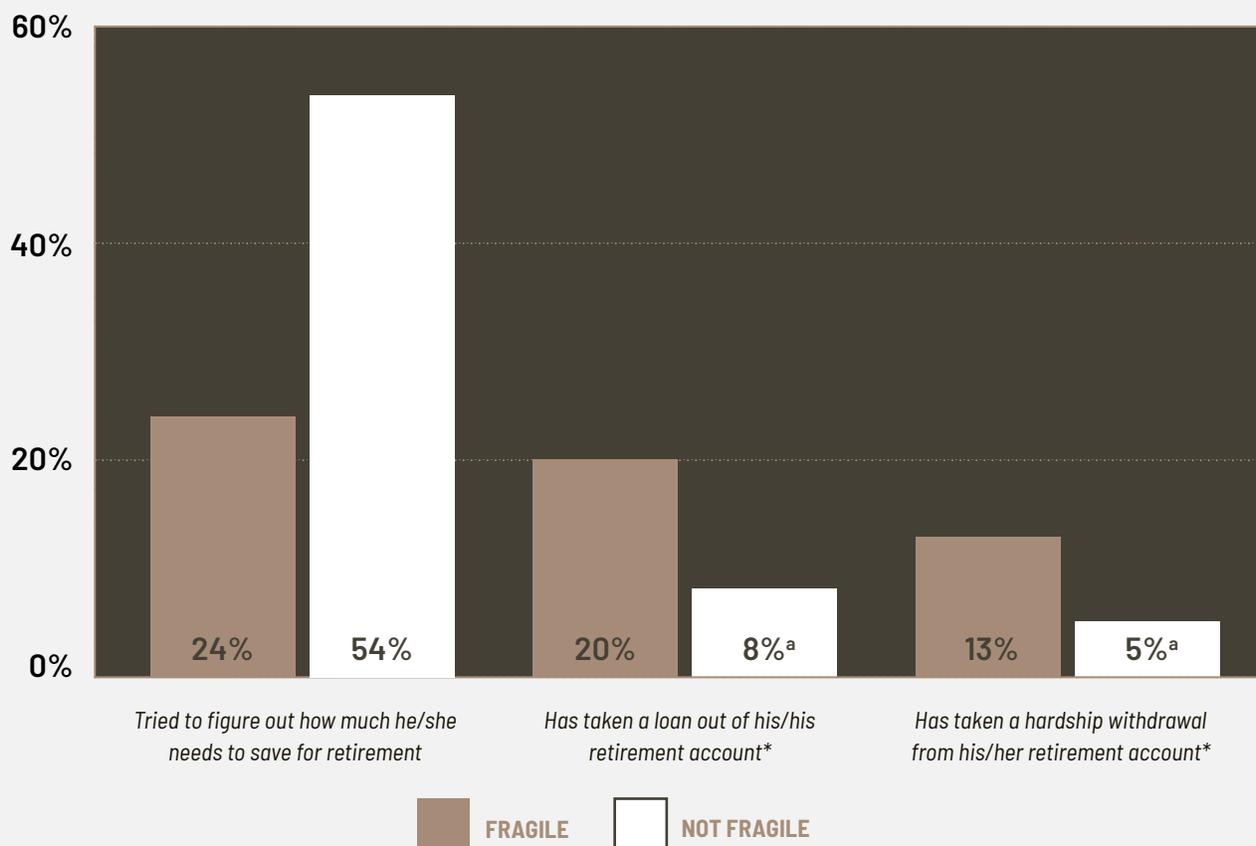
are classified as financially fragile (33 percent)—in other words, they would not be able to cover a \$2,000 shock in a one-month time frame. About one-fifth (22 percent) of the older group do not have money left over at the end of the month and 18 percent of the older group are classified as financially fragile. Thus, access to liquidity seems to be a challenge for many households, both younger and older.

Additionally, 39 percent of the younger group and 20 percent of the older group report having too much debt, which likely strains their personal finances and diminishes their access to liquidity through borrowing. This finding is in line with the relatively high debt holdings discussed in the previous section. Additional measures of financial anxiety, financial satisfaction, savings concern, and retirement planning indicate that a sizeable percentage of individuals

are not well prepared for retirement and struggle with their finances. Just under half (44 percent) of respondents in the younger group and 22 percent in the older group are concerned that the money they have or will save will not last. More than half (57 percent) of the younger group and more than one-third (36 percent) of the older group worry about running out of money in retirement. And, overall, only 44 percent of the younger and 54 percent of the older group have tried to determine how much money they need to save for retirement. This suggests that individuals likely struggle with unexpected expenses and with managing longevity risk in retirement.

We further examine the role of liquidity access on retirement planning. Figure 1 compares the retirement planning behavior of individuals in the 40–61 age group who are

**FIGURE 1:** Retirement Planning and Financial Fragility, 40–61 Age Group



Note: All data are from the 2018 NFCS State-by-State dataset (Lin et al. 2019). The sample is restricted to individuals ages 40–61; data are weighted. Observations of respondents defined as fragile is 3,157; number of respondents defined as not fragile is 6,870. \* Indicates that the sample is restricted to those who have a retirement account. <sup>a</sup> Indicates that the difference from fragile is statistically significant at the 0.05 level.

considered to be financially fragile—in other words, who are facing liquidity constraints—to those classified as not fragile. Among financially fragile individuals, only 24 percent have tried to determine how much money they need to save for retirement; this figure is significantly higher (54 percent) among those who are not financially fragile. Moreover, one-fifth of financially fragile individuals have taken a loan from their retirement account and 13 percent have taken a hardship withdrawal, meaning they are tapping into their retirement funds and potentially jeopardizing their retirement security. These figures are significantly higher than those for non-fragile individuals, among whom only 8 percent have taken a loan and 5 percent have taken a hardship withdrawal. As reported in table 1, the majority of individuals in this age group are nearing retirement age, with limited years remaining to accumulate retirement savings. Therefore, the use of retirement funds to cover immediate expenses is likely to have detrimental and long-term effects on retirement security. Results from figure 1 indicate that liquidity constraints are likely to have a significant influence on individuals' ability to save and prepare for retirement.

Overall, findings from the first section of our analysis on individuals' balance sheets, financial situation, and retirement planning suggest that many are struggling to achieve security in retirement. We find that financial literacy remains strikingly low among both age groups. Moreover, individuals are least knowledgeable about risk diversification, a necessary component to making well-informed decisions about retirement planning and annuities. Therefore, financial literacy is likely a barrier to annuity ownership. We also find a meaningful percentage of adults nearing and in retirement have leveraged assets and lack emergency savings, resulting in limited access to liquidity. This lack of access likely has a detrimental influence on retirement planning and savings, as well as on annuity ownership.

#### 4.2. UNDERSTANDING WHO OWNS ANNUITIES

We next examine individuals among the investor subpopulation with and without an annuity to explore the characteristics that are likely to contribute to annuity ownership, with a particular focus on the role of liquidity constraints and financial literacy. It is important to note that our examination of annuity ownership is among the investor subpopulation only, due to limitations in the data. Therefore, the analysis in this section may be more indicative of the characteristics of investors than of the general population. Table 4 (next page) reports the demographics of investors who do and do not own an annuity. This distribution is reported for each demographic characteristic separately (i.e., each row in table 4). The

overall distribution shows that 27 percent of the younger group own an annuity and 73 percent do not. In the older group, 41 percent own an annuity and 59 percent do not. In line with our expectations, we find that annuity ownership is more common among older individuals. Across both age groups, annuity owners share some characteristics: they tend to have higher incomes and higher total value of investments in their non-retirement accounts. In the younger group, 33 percent of individuals with an income of \$100,000 or more have an annuity. In the older group, 42 percent of individuals who have an income of \$100,000 or more have an annuity. Additionally, 38 percent of the younger group and 45 percent of the older group who have total investment values of at least \$100,000 have an annuity. These results indicate that annuity owners in our sample are more likely to be wealthy than are non-owners.

We further explore the characteristics of investors who do and do not own an annuity by examining and comparing their financial situation as measured by their access to liquidity, financial anxiety and satisfaction, and retirement planning (table 5, page 13).

In both age groups access to liquidity is greater among annuity owners. Among the younger group, only 17 percent of annuity owners report not having emergency savings, compared to 25 percent of those without an annuity. Among the older group, only 9 percent of annuity owners lack emergency savings, compared to 12 percent of those without an annuity. Additionally, only 12 percent of annuity owners in the younger group and 7 percent of annuity owners in the older group report not having money left over at the end of the month. This is compared to 16 percent of those without an annuity in the younger group and 10 percent of those without an annuity in the older group. We find little difference in financial fragility between annuity owners and those who do not own an annuity. The most statistically significant difference we find is among the younger group regarding emergency savings. Emergency savings is likely a more direct measure of liquidity and therefore could have a more significant relationship with annuity ownership.

We also find that financial satisfaction is higher among annuity owners and financial anxiety is lower. Among the younger group, 25 percent of annuity owners report being concerned that the money they have or will save will not last, compared to 33 percent of non-owners. Similar results are shown for the older group, but the differences are not significant. Additionally, annuity holders

in both age groups are less likely to worry about running out of money in retirement. Our findings are consistent with previous literature that found that retirees who relied on their annuity for lifetime income were more likely to be satisfied in retirement than those who did not have an annuity (Panis 2003).

Finally, we examine financial literacy levels of annuity owners and information sources used to make invest-

ment decisions (table 6). Overall, financial literacy levels among all investors (those who do and those who do not own an annuity) are low despite being considerably higher than financial literacy levels among the general population. Among the younger group, 66 percent of annuity owners and 75 percent of non-owners correctly answered the risk diversification question. Among individuals in the older group, 77 percent of annuity owners and 75 percent of non-owners correctly answered the risk di-

**TABLE 4: Investor Demographics**

Age Groups		40–61 years		62+ years	
		Annuity	No annuity	Annuity	No annuity
Total		0.27	0.73	0.41	0.59
Gender	Female	0.28	0.72	0.45	0.55
	Male	0.26	0.74	0.38	0.62
Education	Some college or less	0.26	0.74	0.42	0.58
	College or more	0.28	0.72	0.41	0.59
Income	< \$25,000	0.12	0.88	0.25	0.75
	\$25,000–\$49,999	0.21	0.79	0.44	0.56
	\$50,000–\$99,999	0.26	0.74	0.42	0.58
	≥ \$100,000	0.33	0.67	0.42	0.58
Total Value of Investments (non-retirement accounts)	< \$10,000	0.08	0.92	0.17	0.83
	\$10,000–\$100,000	0.19	0.81	0.38	0.62
	≥ \$100,000	0.38	0.62	0.45	0.55
Marital Status	Married	0.28	0.72	0.42	0.58
	Not married	0.25	0.75	0.41	0.59
Employment Status	Employed	0.26	0.74	0.38	0.62
	Unemployed	0.28	0.72	0.48	0.52
	Retired	0.32	0.68	0.42	0.58
Observations		192	508	393	562

*Note: All data are from the 2018 NFCS State-by-State and the 2018 NFCS Investor datasets (Lin et al. 2019). Sample is restricted to individuals who are age 40 and over and who have any financial investments outside of their retirement accounts in stocks, bonds, mutual funds, or other securities; data are weighted. College or more includes respondents who have achieved at least a bachelor's degree. Income represents household annual income from all sources, such as wages, tips, investment income, public assistance, and retirement plans. Married is a dummy variable taking value 1 if the respondent is married, but not divorced, separated, or widowed, and 0 otherwise. Employed includes respondents who are employed full time or part time, or who are self-employed. Unemployed includes respondents who are unemployed, temporarily laid off, a homemaker, full-time student, or sick/disabled. Statistics read as, "28% of 40- to 61-year-old women investors have an annuity."*

**TABLE 5: Investor Financial Situation**

Age Groups		40–61 years		62+ years	
		Annuity	No annuity	Annuity	No annuity
<b>Access to Liquidity</b>	Lacks emergency savings	0.17	0.25 <sup>a</sup>	0.09	0.12
	No money left over at the end of the month	0.12	0.16 <sup>b</sup>	0.07	0.10
	Financially fragile	0.10	0.10	0.03	0.05
	Too much debt	0.24	0.28	0.07	0.10
<b>Financial Anxiety and Satisfaction</b>	Not satisfied with personal financial condition	0.07	0.14 <sup>a</sup>	0.02	0.05 <sup>a</sup>
	Thinking about personal finances can create anxiety	0.39	0.45	0.19	0.24 <sup>b</sup>
	Concerned the money he/she has or will save won't last	0.25	0.33 <sup>a</sup>	0.09	0.12
<b>Retirement Planning</b>	Tried to figure how much money is needed for retirement	0.74	0.67 <sup>b</sup>	0.73	0.69
	Worry about running out of money in retirement	0.49	0.52	0.22	0.25
<b>Observations</b>		192	508	393	562

Note: All data are from the 2018 NFCS State-by-State and the 2018 NFCS Investor (Lin et al. 2019) datasets. Sample is restricted to individuals who are age 40 and over and who have any financial investments outside of their retirement accounts in stocks, bonds, mutual funds, or other securities; data are weighted. Lacks emergency savings is a dummy variable taking the value 1 if respondent does not have funds that would cover expenses for three months in case of sickness, job loss, economic downturn, or other emergencies, and 0 otherwise. No money left over at the end of the month is a dummy variable taking value 1 if respondent never or rarely has money left over, and 0 otherwise. Respondents are classified as financially fragile if they reported that they certainly or probably could not come up with \$2,000, in response to the following question: "How confident are you that you could come up with \$2,000 if an unexpected need arose within the next month?" Respondents are classified as having too much debt if they responded 5, 6, or 7 on a 7-point Likert scale in agreement to the following statement: "I have too much debt right now." Not satisfied with personal financial condition is based on the following question: "Overall, thinking of your assets, debts, and savings, how satisfied are you with your current personal financial condition?" on a scale from 1 (not at all satisfied) to 10 (extremely satisfied). The percentage of respondents answering 1, 2, or 3 are reported in this table. Thinking about personal finances can create anxiety reports the percentage of people that selected 5, 6, or 7 on a scale from 1 (strongly disagree) to 7 (strongly agree) in response to the following statement: "Thinking about my personal finances can make me feel anxious." Concerned the money he/she has or will save won't last is based on answer options 4 (describes me very well) and 5 (describes me completely) to the following statement: "I am concerned that the money I have or will save won't last." Worry about running out of money in retirement is a dummy variable taking value 1 if respondent answered with 5, 6, or 7 on a 7-point Likert scale in agreement to the following statement: "I worry about running out of money in retirement." <sup>a</sup> indicates that the difference between No Annuity and Annuity is statistically significant at the 0.05 level. <sup>b</sup> indicates that the difference between No Annuity and Annuity is statistically significant at the 0.10 level.

versification question. Surprisingly, we find that younger annuity owners have lower financial literacy levels than younger non-owners. About half (51 percent) of annuity owners and 62 percent of non-owners correctly answered all three basic financial literacy questions. In the older group, annuity owners and non-owners answered all three questions at the same rate (66 percent). This appears to contrast with previous literature that indicates financial literacy is positively linked to annuity take-up (Lambregts and Schut 2020). However, differences in information sources could provide insights into this result.

Across both age groups, when making investment decisions annuity owners are significantly more likely to use professionals while non-owners are more likely to conduct their own research (table 6). In the younger group, 83 percent of annuity owners reported letting a professional choose investments for them, compared to only 48 percent of non-owners. Similarly, 73 percent of annuity owners in the older group let a professional choose investments for them compared to only 52 percent of non-owners. In the younger group, 86 percent of

**TABLE 6: Financial Literacy and Information Sources**

Age Groups		40–61 years		62+ years	
		Annuity	No annuity	Annuity	No annuity
<b>Financial Literacy</b>	Interest question correct	0.82	0.88 <sup>b</sup>	0.87	0.91 <sup>b</sup>
	Inflation question correct	0.69	0.81 <sup>a</sup>	0.86	0.87 <sup>a</sup>
	Risk question correct	0.66	0.75 <sup>a</sup>	0.77	0.75
	Big Three questions correct (interest, inflation, risk)	0.51	0.62 <sup>a</sup>	0.66	0.66
<b>Make Investment Decisions the Following Ways</b>	Let a professional choose investments for me	0.83	0.48 <sup>a</sup>	0.73	0.52 <sup>a</sup>
	Discuss investment options with a professional then make the decisions myself	0.85	0.58 <sup>a</sup>	0.72	0.56 <sup>a</sup>
	Conduct my own research	0.78	0.86 <sup>a</sup>	0.62	0.71 <sup>a</sup>
	Use a web-based, online tool that chooses investments for me	0.38	0.28 <sup>a</sup>	0.13	0.13
	Use a mobile app that chooses investments for me	0.27	0.18 <sup>a</sup>	0.04	0.03
<b>Observations</b>		192	508	393	562

Note: All data are from the 2018 NFCS State-by-State and the 2018 NFCS Investor (Lin et al. 2019) datasets. Sample is restricted to individuals who are age 40 and over and who have any financial investments outside of their retirement accounts in stocks, bonds, mutual funds, or other securities; data are weighted. *Big Three questions correct* is a dummy variable with value 1 if the respondent correctly answered the three basic financial literacy questions (Big Three), which assess understanding of interest rate, inflation, and risk diversification. Variables included under *Make Investment Decision the Following Ways* are dummy variables taking value 1 if respondents selected sometimes or frequently, and 0 otherwise. <sup>a</sup> indicates that the difference between No Annuity and Annuity is statistically significant at the 0.05 level. <sup>b</sup> indicates that the difference between No Annuity and Annuity is statistically significant at the 0.10 level.

non-owners conduct their own research when making investment decisions, compared to 78 percent of annuity owners. The results are similar for the older group, with 71 percent of non-owners conducting their own research compared to 62 percent of annuity owners. For annuity owners, professional advice may act as a substitute for financial literacy. In other words, having an advisor can offset an individual’s lack of financial knowledge. As reported in table 4, annuity owners are more likely to be wealthy, thus they might both have greater access to and be able to afford professionals who can assist them in selecting appropriate annuities.

Univariate analysis indicates that low financial literacy and lack of access to liquidity can be barriers to annuity ownership. Examination of annuity owners shows they are more likely to be wealthy and to have greater access to liquidity; also, despite having lower levels of financial literacy, they may be able to compensate for their lack of knowledge with professional advice. We further examine

the roles of liquidity, financial literacy, and professional advice on annuity ownership in the next section using multivariate regression analysis.

**4.3. FACTORS THAT INFLUENCE ANNUITY OWNERSHIP AND ACCESS TO LIQUIDITY**

To understand the factors that have a significant influence on annuity ownership, we conduct regression analysis using four models (table 7). In the first model, we use a simple specification of demographic variables; in the second model, we examine the relationship between liquidity and annuity ownership; in the third model, we examine the influence of financial literacy; and in the fourth model, we consider the role of financial advice.<sup>3</sup> Additionally, all regressions include demographic variables to control for gender, education, income, age, race/ethnicity, marital status, and employment status.

Across all four specifications, income and age are positively related to annuity ownership. This is consistent

**TABLE 7: Regression Analysis Using Factors That Influence Annuity Ownership**

Variables		Have an annuity			
		Model 1	Model 2	Model 3	Model 4
<b>Gender</b> (Omitted variable: Male)	Female	0.0396* (0.0234)	0.0434* (0.0235)	0.0241 (0.0267)	0.0060 (0.0229)
	<b>Education</b> (Omitted variable: Some college or less)	College or more	-0.0073 (0.0244)	-0.0094 (0.0246)	0.0156 (0.0272)
<b>Income</b> (Omitted variable: \$25,000 or less)	\$25,000-\$49,999	0.1550*** (0.0560)	0.1468*** (0.0564)	0.1641** (0.0649)	0.1209** (0.0548)
	\$50,000-\$99,999	0.1710*** (0.0538)	0.1575*** (0.0541)	0.1861*** (0.0619)	0.1462*** (0.0525)
	> = \$100,000	0.2141*** (0.0566)	0.1968*** (0.0571)	0.2495*** (0.0650)	0.1828*** (0.0553)

3. We are aware that having emergency savings, having financial literacy, and receiving professional advice are choice variables and might bias our regression findings. This should be taken into consideration when interpreting the results in table 7. However, these regression specifications help shed more light onto the relationships between these variables and annuity ownership while also being able to control for important demographic variables such as income

**TABLE 7 (CONTINUED):** Regression Analysis Using Factors That Influence Annuity Ownership

Variables		Have an annuity			
		Model 1	Model 2	Model 3	Model 4
<b>Race/Ethnicity</b> <i>Omitted variable: White)</i>	Black	-0.0584 (0.0585)	-0.0531 (0.0585)	-0.1318* (0.0710)	-0.0713 (0.0564)
	Hispanic	-0.0779 (0.0601)	-0.0716 (0.0601)	-0.0259 (0.0654)	-0.0630 (0.0580)
	Asian	-0.1236** (0.0558)	-0.1142** (0.0565)	-0.1456** (0.0612)	-0.1169** (0.0542)
	Other	0.0514 (0.0931)	0.0468 (0.0944)	0.0224 (0.1079)	0.0660 (0.0924)
<b>Marital Status</b> <i>(Omitted variable: Married)</i>	Not Married	0.0176 (0.0263)	0.0196 (0.0264)	0.0242 (0.0297)	0.0123 (0.0256)
<b>Employment Status</b> <i>(Omitted variable: Employed)</i>	Unemployed	0.0693 (0.0493)	0.0709 (0.0493)	0.0762 (0.0593)	0.0716 (0.0481)
	Retired	0.0452 (0.0319)	0.0438 (0.0321)	0.0449 (0.0359)	0.0455 (0.0309)
<b>Has Emergency Savings<sup>†</sup></b>		0.0669** (0.0330)			
<b>Big Three Questions Correct (interest, inflation, risk)<sup>†</sup></b>			-0.0454 (0.0345)		
<b>Let a Professional Choose Investments for Him/Her<sup>†</sup></b>				0.2510*** (0.0230)	
<b>Constant</b>		0.0783 (0.0574)	0.0368 (0.0613)	0.0721 (0.0688)	-0.0234 (0.0566)
<b>Observations</b>		192	508	393	562
<b>R-squared</b>		0.0396	0.0410	0.0505	0.1054

Note: All data are from the 2018 NFCS State-by-State and the 2018 NFCS Investor (Lin et al. 2019) datasets. Sample is restricted to individuals who are age 40 and over and who have any financial investments outside of their retirement accounts in stocks, bonds, mutual funds, or other securities; data are weighted. College or more includes respondents who have achieved at least a bachelor's degree. Income represents household annual income from all sources, such as wages, tips, investment income, public assistance, and retirement plans. Married is a dummy variable taking value 1 if the respondent is married, but not divorced, separated, or widowed, and 0 otherwise. Employed includes respondents who are employed full time or part time, or who are self-employed. Un-

employed includes respondents who are unemployed, temporarily laid off, a homemaker, full-time student, or sick/disabled. Has emergency savings is a dummy variable taking the value 1 if respondent has funds that would cover expenses for three months in case of sickness, job loss, economic downturn, or other emergencies, and 0 otherwise. Big Three Questions Correct is a dummy variable with value 1 if the respondent correctly answered the three basic financial literacy questions (Big Three), which assess understanding of interest rate, inflation, and risk diversification. Let a professional choose investments for him/her is a dummy variable taking value 1 if respondent answers selected "sometimes" or "frequently," and 0 otherwise. † indicates variable excludes "do not know" and "prefer not to say." Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

with our univariate results, which indicate that individuals who have an annuity are more likely to be older and wealthy. In our second specification, we include emergency savings as a measure of liquidity access and find that it is positively associated with annuity ownership. This indicates that liquidity is likely a significant factor when individuals are considering annuities. Lack of liquidity could be concerning to individuals nearing and in retirement. They might worry that annuitization will limit their ability to cover unexpected expenses, such as medical bills. Our third specification shows that the coefficient for financial literacy is negative, but it is not significant. While previous research has documented a positive relationship between financial literacy and annuity take-up, our sample of annuity owners may be relying on financial professionals to compensate for their

lack of knowledge. Evidence of this is seen in our fourth specification, in which the coefficient for letting a professional choose investments is positive and significant. Additional regression analysis indicates that allowing a professional to choose investments is positively associated with income.<sup>4</sup> Therefore, wealthier individuals are more likely to have access to financial professionals. However, the positive relationship between letting a professional choose investments and annuity ownership is more than an effect of income, since we control for income in our multivariate regression.

To further understand the role of financial literacy, we examine the relationship between financial literacy and the four access-to-liquidity measures. While we do not find that financial literacy has a significant relationship

**TABLE 8: Regression: Factors That Influence Access to Liquidity**

Variables		Has emergency savings	Not financially fragile	Has money left over at the end of the month	Does not have too much debt
<b>Gender</b> (Omitted variable: Male)	Female	-0.0172* (0.0093)	-0.0129* (0.0073)	-0.0233** (0.0101)	-0.0164 (0.0101)
	<b>Education</b> (Omitted variable: Some college or less)	College or more	0.0744*** (0.0098)	0.0318*** (0.0077)	0.0259** (0.0106)
<b>Income</b> (Omitted variable: \$25,000 or less)	\$25,000-\$49,999	0.2318*** (0.0170)	0.2428*** (0.0133)	0.1539*** (0.0184)	0.0867*** (0.0184)
	\$50,000-\$99,999	0.3735*** (0.0168)	0.3961*** (0.0132)	0.3272*** (0.0182)	0.1810*** (0.0181)
	>= \$100,000	0.4562*** (0.0185)	0.4519*** (0.0146)	0.4665*** (0.0201)	0.2641*** (0.0200)

4. Analysis of financial professionals and income is available upon request

**TABLE 8 CONTINUED:** Regression: Factors That Influence Access to Liquidity

Variables		Has emergency savings	Not financially fragile	Has money left over at the end of the month	Does not have too much debt
<b>Age</b> (Omitted variable: 40-61)	62 and over	0.1028*** (0.0118)	0.0614*** (0.0093)	0.0807*** (0.0128)	0.1279*** (0.0128)
	<b>Race/Ethnicity</b> (Omitted variable: White)	Black	-0.0619*** (0.0183)	-0.0927*** (0.0144)	-0.0329* (0.0198)
Hispanic		-0.0490*** (0.0161)	-0.0389*** (0.0126)	-0.0313* (0.0174)	-0.0365** (0.0174)
Asian		0.0112 (0.0193)	0.0021 (0.0152)	-0.0128 (0.0209)	0.0152 (0.0209)
Other		-0.0942*** (0.0303)	-0.0922*** (0.0239)	-0.0830** (0.0329)	-0.1587*** (0.0328)
<b>Marital Status</b> (Omitted variable: Married)	Not Married	-0.0059 (0.0105)	-0.0057 (0.0083)	0.0183 (0.0114)	0.0223* (0.0114)
	<b>Employment Status</b> (Omitted variable: Employed)	Unemployed	-0.0541*** (0.0159)	-0.0961*** (0.0125)	-0.0823*** (0.0172)
Retired		0.1178*** (0.0125)	0.0535*** (0.0098)	0.0395*** (0.0135)	0.1598*** (0.0135)
<b>Financial Literacy</b>	Big Three questions correct (interest, inflation, risk) <sup>†</sup>	0.0228** (0.0109)	0.0532*** (0.0086)	-0.0088 (0.0118)	0.0322*** (0.0118)
	Constant	0.2202*** (0.0195)	0.4150*** (0.0153)	0.1909*** (0.0211)	0.2728*** (0.0211)
<b>Observations</b>		9,342	9,342	9,342	9,342
<b>R-squared</b>		0.1786	0.2332	0.1239	0.1048

Note: All data are from the 2018 NFCS State-by-State and the 2018 NFCS Investor (Lin et al. 2019) datasets. Sample is restricted to individuals who are age 40 and over and who have any financial investments outside of their retirement accounts in stocks, bonds, mutual funds, or other securities; data are weighted. College or more includes respondents who have achieved at least a bachelor's degree. Income represents household annual income from all sources, such as wages, tips, investment income, public assistance, and retirement plans. Married is a dummy variable taking value 1 if the respondent is married, but not divorced, separated, or widowed, and 0 otherwise. Employed includes respondents who are employed full time or part time, or who are self-employed. Unemployed includes respondents who are unemployed, temporarily laid off, a homemaker, full-time student, or sick/disabled. Big Three questions correct is a dummy variable with value 1 if the respondent correctly answered the three basic financial literacy questions (Big Three), which assess understanding of interest rate, inflation, and risk diversification. <sup>†</sup> indicates variable excludes "do not know" and "prefer not to say." Standard errors in parentheses \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

on annuity ownership, we do find it plays an important role in access to liquidity. The regression results in table 8 show that individuals who are financially literate are more likely to have emergency savings, to not be financially fragile, and to not feel they have too much debt. Therefore, financial literacy may lead to enhanced take-up of annuities through improved access to liquidity.

## CONCLUSION AND DISCUSSION

Although economic theory indicates that annuitization is optimal for retirees, annuities have largely been underused. This annuity puzzle, or why individuals take up annuities at a much lower rate than theory predicts, has been a longstanding question in economic research. In an effort to contribute to a better understanding of this issue, in this paper we investigate three factors that may contribute to lack of annuity take-up: access to liquidity, debt obligations, and financial literacy. We analyze individuals' balance sheets, financial situation, and retirement planning to understand the barriers to annuity ownership, the specific socioeconomic characteristics of annuity owners, and the factors that influence annuity ownership. We find that many people who are in the retirement planning phase of the life cycle (individuals ages 40–61) and those who are of retirement age (individuals age 62 and over) are struggling to achieve financial security. Lack of financial knowledge, leveraged assets, debt obligations, and liquidity constraints are all likely barriers to annuity ownership.

Additionally, we find that annuity owners are more likely to be older and wealthy, to have greater access to liquidity, and to experience higher levels of satisfaction with their financial situation than non-owners. Results indicate that having access to liquidity and letting a professional choose investments are both positively associated with annuity ownership. While we do not find any significant relationship between financial literacy and annuity ownership, results do indicate that financial literacy may lead to increased take-up rates through improving individuals' access to liquidity.

The low rates of financial literacy across the general population and among investors indicate that a greater focus on helping individuals gain a fundamental understanding of basic financial concepts could lead to improved outcomes. Specifically, concepts around risk diversification and comprehending risk and uncertainty are of utmost importance for retirement security. Previ-

ous research shows that financially literate individuals are more likely to save and plan for retirement. Furthermore, we find that financially literate households are more likely to have emergency savings, to not be financially fragile, and to not feel burdened by too much debt. Enhanced access to liquidity, then, likely helps individuals to better cope with unexpected expenses and to save for retirement.

Financial advisors could help educate clients on investment decisions and annuities in a way that helps to improve their financial knowledge. Yet not everyone can afford to or wants to consult with a financial advisor. So, stepping up broad-scale efforts to increase financial literacy could contribute to greater retirement preparedness and better understanding of the various financial products available, including annuities. Additionally, given the importance of liquidity in annuity ownership, future research could explore how annuities that combine protection against longevity risk with greater access to liquidity when needed may better serve individual needs and lead to higher take-up rates.

## AUTHORS

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## APPENDIX A

**TABLE A1:** Correlation Matrix of the Access to Liquidity Measures

	Lacks emergency savings	No money left over at the end of the month	Financially fragile	Too much debt
Lacks emergency savings	1			
No money left over at the end of the month	0.4132	1		
Financially fragile	0.4866	0.4647	1	
Too much debt	0.2891	0.2931	0.2778	1

## APPENDIX B

### THE BIG THREE FINANCIAL LITERACY QUESTIONS

#### 1. Interest Rate Question

Suppose you had \$100 in a savings account and the interest rate was 2 percent per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

[More than \$102; Exactly \$102; Less than \$102; Don't know; Prefer not to say]

#### 2. Inflation Question

Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After 1 year, how much would you be able to buy with the money in this account?

[More than today; Exactly the same; Less than today; Don't know; Prefer not to say]

#### 3. Risk Diversification Question

Buying a single company's stock usually provides a safer return than a stock mutual fund.

[True; False; Don't know; Prefer not to say]