

ABSTRACT

In this paper, we examine risk comprehension—a basic understanding of uncertain financial outcomes—in the United States. Using data from six years (2018-2023) of the TIAA Institute-GFLEC Personal Finance Index Survey, we find that risk literacy is low. Our analysis shows that only one-third of respondents are risk literate, meaning they could correctly answer two of the three risk comprehension questions. Risk literacy is especially low among women and respondents who are young, have lower income, have less education, have no previous exposure to financial education, and are unemployed. Moreover, data show that risk literacy matters because it can be linked to retirement planning and financial fragility, both of which may affect financial wellbeing. Further, the empirical findings indicate that in addition to a basic understanding of uncertain financial outcomes, information on specific risks, such as longevity risk, is crucial for how people make financial decisions. Thus, financial planners should not only provide their clients with information about risk but also adapt the information to the context that is relevant to their client's situation.

JEL codes: G53, D1, I3

Keywords: risk literacy, longevity literacy, retirement preparedness, financial fragility

RISK LITERACY IN THE US: NEW EVIDENCE AND IMPLICATIONS FOR RETIREMENT PLANNING AND FINANCIAL FRAGILITY

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INTRODUCTION

Basic risk comprehension is essential for managing personal finances and making informed financial decisions. The economic fallout of the global pandemic, financial market volatility, and rising inflation have made it clear that individuals must know how to navigate the many uncertainties that impact financial decision making. Yet, our research shows that risk and concepts related to risk are difficult for people to grasp. For example, of the Big Three financial literacy questions created by Lusardi and Mitchell (2011), significantly fewer respondents knew the correct answer to the risk diversification question while significantly more selected the “don't know” response option.

By analyzing six years of data from the TIAA Institute-GFLEC Personal Finance (P-Fin) Index Survey, this paper sheds light on U.S. adults' risk comprehension, particularly on a basic understanding of uncertain financial outcomes. The paper also provides information about average risk comprehension, the demographic groups that struggle the most, and links between risk comprehension and retirement planning and financial fragility.

We measure survey respondents' risk comprehension in three ways. First, we use three individual questions to assess understanding of uncertain financial outcomes in the contexts of a utility repair, an investment return, and a lottery. Second, we define risk literacy as a composite measure of those three questions. Respondents are classified as risk literate if they can correctly answer at least two out of those three questions. Third, we

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provide analyses on a risk index, which is the number of risk questions answered correctly, as robustness checks.

In line with existing literature, we find that risk comprehension is low. Only one-third of U.S. adults are risk literate, and women, young people, those with lower income and less education, and those who are unemployed show particularly low risk literacy levels. Further, our data show that risk literacy is linked to retirement planning and financial fragility, which is the inability to cope with a financial shock. Our analysis also finds that the comprehension of specific risks, like longevity risk, can play a particular role in retirement planning. Thus, it is important to understand a variety of risks since they impact financial behaviors differently.

Based on this analysis, we provide recommendations for incorporating risk-related concepts into the design of educational resources or financial planning discussions. A low level of risk literacy in a country with well-developed financial markets, like the U.S., is worrisome and indicates there is a critical need to provide education and programs to ensure basic risk comprehension.

The remainder of the paper is organized as follows: Section 2 provides an overview of the risk literature. Section 3 describes our data, and the risk comprehension measures as well as provides summary statistics. Section 4 discusses the main results and Section 5 concludes.

2. BACKGROUND AND LITERATURE REVIEW

Existing research by Mackenzie (2020) points to five basic risks that pre-retirement and retired households face: investment, longevity, long-term care cost, labor, healthcare cost, and political risks. The inability to navigate these five types of risk due to a lack of knowledge can result in adverse financial outcomes. For example, not knowing how long people tend to live in retirement can hinder retirement planning and saving, resulting in retirement income insecurity. In this context, Yakoboski et al. (2023b), using data from the 2023 TIAA Institute–GFLEC Personal Finance Index, demonstrate the poor state of longevity literacy among U.S. adults. In fact, only 12% of survey respondents show strong longevity literacy by knowing how long 65-year-olds live on

average, the likelihood among 65-year-olds of living to at least age 90, and the likelihood of not living beyond age 70. On the other end of the spectrum, 31% have weak longevity literacy, meaning, they demonstrate a complete lack of understanding of the distribution of life expectancy at age 65. This knowledge gap can keep them from planning and preparing adequately for retirement because they are working with a retirement planning horizon that is too short in nature.

Retirement savings can also be hindered by a lack of understanding of other risks, such as inflation risk. In 2022, high inflation rates caused 25% of employed Americans to stop or reduce contributions to retirement savings, impacting all sorts of future earnings (Yakoboski et al., 2023a). The effects were heterogeneous across race and ethnicity; 40% of Hispanics reduced their savings, which was a much higher figure than any other racial group. This shows that the rising cost of living put a heavy burden on household budgets, including retirement savings, which can have long-lasting consequences for retirement security.

Evidence of risk comprehension affecting financial outcomes existed even before the pandemic and the most recent high inflation period. Research finds that overly cautious households are at risk of missing out on potential earnings in their retirement and savings accounts (Coppola et al., 2017; Scholz, Seshadri & Khitatrun, 2006). Although these risks can manifest unexpectedly, being knowledgeable and well-prepared can help defend against their most pernicious effects.

What makes navigating financial decisions with risk and uncertainty more complicated is the fact that these risks are connected. For example, the decision to invest in annuities as a way to hedge against longevity risk—the risk that individuals will outlive their retirement savings—is linked to healthcare cost risks. Peijnenburg et al. (2017) note that healthcare cost risk may explain why take-up rates of annuities are lower than theory suggests they should be. This is because healthcare costs along with multiple other costs may rise for individuals in retirement, which is why many are exposed to long-term care cost risk.¹ Healthcare cost risk is also inherently tied to labor-market risk because most Americans

1. The Preparation for Future Care Needs (PFCN) measure developed by Sørensen and Pinquart (2001) uses current health and daily living information to estimate how prepared older people are for their post-retirement care needs.

rely on employer-sponsored healthcare, which they are at risk of losing if they become unemployed. Further, there are political risks that may affect labor and health-care costs: Medicare or Medicaid funding could be cut, or more generally, contractionary fiscal and monetary policy could lead to sluggish labor market conditions. Moreover, negative life events such as war, economic crises, and physical attacks may impact risk-taking and current economic outcomes both at the macro (Tabelini, 2010) and micro levels (Buccioli & Zarri, 2015).

To be prepared to make sound decisions in an environment with risk and uncertainty, individuals need risk comprehension, i.e., an understanding of risk concepts. In the literature, risk measures are usually composed of two fundamentals: knowledge of financial situations and numeracy. Numeracy is the ability to perform simple calculations. The Berlin Numeracy Test (BNT) is an example of a risk literacy measure that relies on the concept of numeracy. However, the BNT aims to test how respondents comprehend everyday risk and therefore lacks a financial focus. Moreover, Lipkus & Rimer (2001) find that even among highly educated respondents, better numeracy can lead to better answers to risk questions but cannot predict how well the respondent understands the “magnitude or consequences” of the risk. That is why an understanding of financial situations is also necessary. Lusardi (2015) uses a three-question risk literacy measure based on financial knowledge. The questions test the numeracy, risk knowledge, and risk diversification knowledge of respondents. Using the 2009 Global Economic Survey, Lusardi found that less than half of respondents could answer the risk literacy questions correctly, and only about half answered the risk diversification question correctly across five developed countries.

Our paper aims to contribute to the risk literacy literature by analyzing responses to three questions that assess the understanding of uncertain financial outcomes in three different contexts. These three questions assess the combined understanding of financial risk and numeracy. Through these three questions, we also aim to repeatedly test respondents’ numeracy and financial knowledge under different scenarios, both financial

and not, which can help to better gauge a respondent’s understanding of the concepts. We expand our analysis by including a longevity risk literacy measure to capture how well individuals understand average life expectancy. We use our expanded risk comprehension measure to determine how much individuals know and how their knowledge affects their risk preparedness.

3. METHODOLOGY

In this paper, the following research questions are addressed:

1. What are the levels of risk comprehension in the US, and how do they vary among the adult population?
2. What is the relationship between risk comprehension and other areas of functional knowledge?
3. How is risk comprehension linked to retirement planning and financial fragility?
4. What next steps can address low risk comprehension, and what recommendations will be most impactful for financial wellness programs and financial planners?

3.1 DATA SOURCE

The nationally representative data used in this analysis was collected via an annual survey, first fielded in 2017, developed by the TIAA Institute and the Global Financial Literacy Excellence Center (GFLEC), in consultation with Greenwald & Associates. This paper uses six years’ worth of data, from 2018 to 2023.² The TIAA Institute-GFLEC Personal Finance (P-Fin) Index Survey was fielded in January of each year, with a sample drawn from Ipsos KnowledgePanel, which is a large-scale probability-based online panel. Survey respondents are age 18 and older. With the 2021 survey, the observations were increased from around 1,000 to over 3,000, and racial/ethnic groups (Asians, Blacks, and Hispanics) as well as Gen Z were quota-sampled for at least 500 respondents each. Statistics reported here use the weights provided, which make the dataset representative of the

2. After the first fielding in 2017, some of the survey questions were slightly adjusted. Thus, this paper includes the six years from 2018 to 2023, which have consistent question-wordings.

U.S. population. Important to note is that the dataset is a cross-section, i.e., the sample of respondents differs across years, and we are not able to follow the same person over time. The demographic distribution of respondents over the six years is shown in Table A1 of the Appendix and is largely in line with population census data except that the respondents in our sample have slightly higher incomes and are marginally more likely to be married and have children under 18 compared to the 2021 U.S. Census data Bureau.³

The survey includes a comprehensive financial literacy measure, the so-called P-Fin Index, as well as questions on financial decision making and behavior. The P-Fin Index was designed to measure people’s knowledge and understanding of the factors leading to sound financial decision making and effective personal financial management in the U.S. (Yakoboski et al. 2022). With a set of 28 financial literacy questions, the P-Fin Index offers one of the most comprehensive measures of financial literacy currently available. The index is unique in its capacity to examine financial literacy across eight areas of personal finance within which individuals routinely function: earning, consuming, saving, investing, borrowing/managing debt, insuring, comprehending risk, and obtaining information (go-to info sources). There are three or four questions for each functional area and each question is multiple choice with four response options: the correct answer, two incorrect answers, and a “don’t know” option.

3.2 SURVEY QUESTIONS

RISK COMPREHENSION MEASURES

Of the 28 financial literacy questions, this paper focuses on a subsample of three that belong to the comprehending risk functional area. These questions test respondents’ understanding of uncertain financial outcomes in the context of a utility repair, an investment return, and a lottery. The exact wording of these three risk comprehension questions is as follows (with the correct answer in bold):

A) [Repair] There’s a 50/50 chance that Malik’s car will need engine repairs within the next six months, which would cost \$600. At the same time there is a 10% chance that he will need to replace the air conditioning unit in his house, which would cost \$4,000. Which poses the greater financial risk for Malik?

1. The car repair
- 2. The air conditioning replacement**
3. There is no way to tell in advance
4. Don’t know

B) [Return] Investment A will deliver a return of either 10% or 6%, with each outcome equally likely. Investment B will deliver a return of either 12% or 4%, with each outcome equally likely. You can expect to earn more by investing in which?

1. Investment A
2. Investment B
- 3. It does not matter – expected return is the same with each**
4. Don’t know

C) [Lottery] Lottery A pays a prize of \$200 and the chance of winning is 5%. Lottery B pays a prize of \$90,000 and the chance of winning is 0.01%. Expected winnings are greater in which lottery?

- 1. Lottery A**
2. Lottery B
3. They are equal
4. Don’t know

Making sound financial decisions under uncertainty implies a basic understanding of uncertain financial outcomes. Thus, comprehending risk involves understanding that an expected financial outcome depends on the possible outcomes as well as the financial cost/return and likelihood of each outcome occurring. The three questions used to measure risk literacy apply this concept in different contexts.

3. The 2021 U.S. Census Bureau data are available at the following links:
<https://data.census.gov/table?q=population+by+selected+characteristics&tid=ACSDP1Y2021.DP03>
<https://data.census.gov/table?q=demographics+voting+population&tid=ACSST5Y2021.S2902>
<https://data.census.gov/table?q=population+by+selected+characteristics&tid=ACSDP1Y2021.DP02>

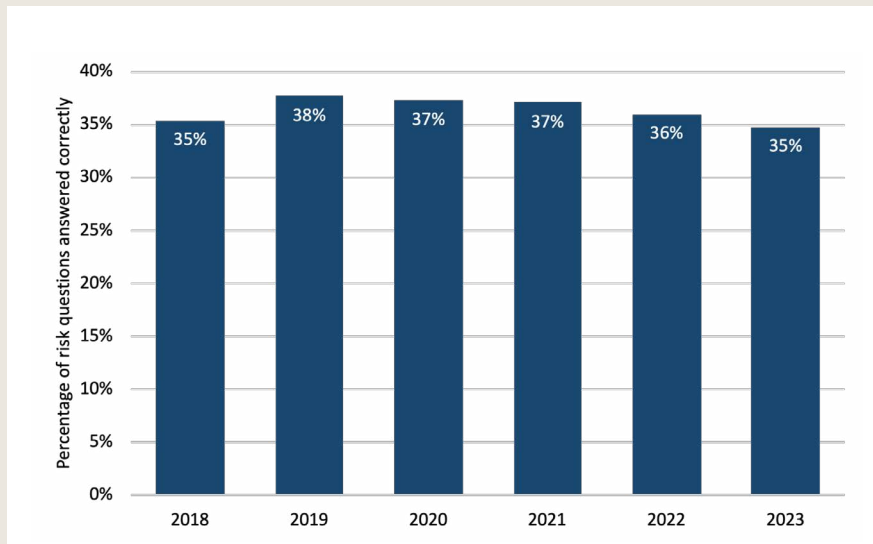


FIGURE 1: *Percent of risk questions answered correctly over six years*

Source: Authors' calculations using the 2018-2023 TIAA Institute-GFLEC P-Fin Index (P-Fin Index).

Notes: All statistics are weighted. This figure shows the average percentage of correctly answered questions in the P-Fin Index each year since 2018.

Our data show that U.S. adults struggle with answering these three questions. Over the past six years, respondents were able to correctly answer, on average, only one of the three questions. (Figure 1).

In this paper, we classify respondents as risk literate when they can correctly answer at least two of those three risk questions. We also report the “don’t know” responses separately.⁴

Additionally, in 2023 the P-Fin Index survey included questions assessing respondents’ longevity risk literacy, which is the understanding of how long people tend to live in retirement. We include longevity literacy, as defined by Yakoboski et al. (2023b), as an additional and specific risk comprehension measure in the second part of our analysis. Longevity literacy is measured by questions that assess understanding of how long 65-year-olds live, on average; of the likelihood of living to an advanced age; and of the likelihood of dying relatively

early.⁵ The exact wording for each question (with separate versions for men and women) is as follows (with the correct answer in bold):

[Life expectancy for men] On average in the U.S., how long will a 65-year-old man live?

1. About 14 more years (age 79)
- 2. About 19 more years (age 84)**
3. About 24 more years (age 89)
4. Don’t know

[Life expectancy for women] On average in the U.S., how long will a 65-year-old woman live?

1. About 17 more years (age 82)
- 2. About 22 more years (age 87)**
3. About 27 more years (age 92)
4. Don’t know

4. People who answered “don’t know” were not dropped from the risk literacy calculations, but instead treated equally to those who answered the questions incorrectly.

5. These questions were designed to assess a general understanding of life expectancy as opposed to how long an individual respondent expects to live. More information on the questions can be found in Yakoboski et al. (2023b).

[Likelihood of living to age 90 for men] In the U.S., what is the likelihood that a 65-year-old man will live at least until age 90?

1. About 10% (1 in 10)
- 2. About 30% (3 in 10)**
3. About 50% (5 in 10)
4. Don't know

[Likelihood of living to age 90 for women] In the U.S., what is the likelihood that a 65-year-old woman will live at least until age 90?

1. About 20% (2 in 10)
- 2. About 40% (4 in 10)**
3. About 60% (6 in 10)
4. Don't know

[Likelihood of not living past 70 for men] In the U.S., what is the likelihood that a 65-year-old man will not live beyond age 70?

1. Under 5%
- 2. Between 5% and 10%**
3. Over 10 %
4. Don't know

[Likelihood of not living past 70 for women] In the U.S., what is the likelihood that a 65-year-old woman will not live beyond age 70?

- 1. Under 5%**
2. Between 5% and 10%
3. Over 10 %
4. Don't know

FINANCIAL LITERACY MEASURE (EXCLUDING RISK)

In addition to measuring risk comprehension, our analysis includes a measure of financial literacy. Financial literacy is measured as the number of correct answers to the 25 P-Fin Index questions representing the functional areas that do not include risk comprehension (which is analyzed separately). Figure 2 shows that U.S. adults

are most knowledgeable about borrowing, saving, and consuming. On average, about 60% of the borrowing questions were answered correctly. This could be linked to the fact that many individuals confront accumulated debt over the course of their lifecycle, often from an early stage of adulthood (e.g., with student loan debt). In contrast, and as mentioned above, only around one-third of the risk comprehension questions were answered correctly. A comparison of all eight functional areas shows that risk comprehension is and has been the topic U.S. adults struggle with the most. Additionally, there are no noticeable changes in the order or percentage of index questions answered correctly over the past six years; the 2018 and 2023 figures are fairly similar.

MEASURES OF FINANCIAL BEHAVIOR

The second part of this paper provides evidence of the relationship between risk comprehension and financial behavior. We investigate two financial behaviors: (1) financial fragility and (2) planning for retirement. Both incorporate aspects of outcome uncertainty that need to be considered when making financial decisions. Financial fragility is the inability to cope with a mid-size shock in a short period of time. It is a self-assessed measure of the capacity to deal with financial shocks, whether with the respondent's own assets or via the capacity to borrow, a network of family and friends, or something else. Those who said that they could certainly or probably not come up with \$2,000 within a month were classified as financially fragile. The exact wording of the question is as follows:

[Financial Fragility] How confident are you that you and your [spouse]/[partner] could come up with \$2,000 if an unexpected need arose within the next month?

1. I am certain I could come up with the full \$2,000
2. I could probably come up with \$2,000
3. I could probably not come up with \$2,000
4. I am certain I could not come up with \$2,000
5. Don't know

Previous research has shown that financial fragility is a proxy for lack of assets and indebtedness (Hasler et al., 2018). Thus, responses to this question provide a comprehensive picture of survey respondents' short- to medium-term financial situation.

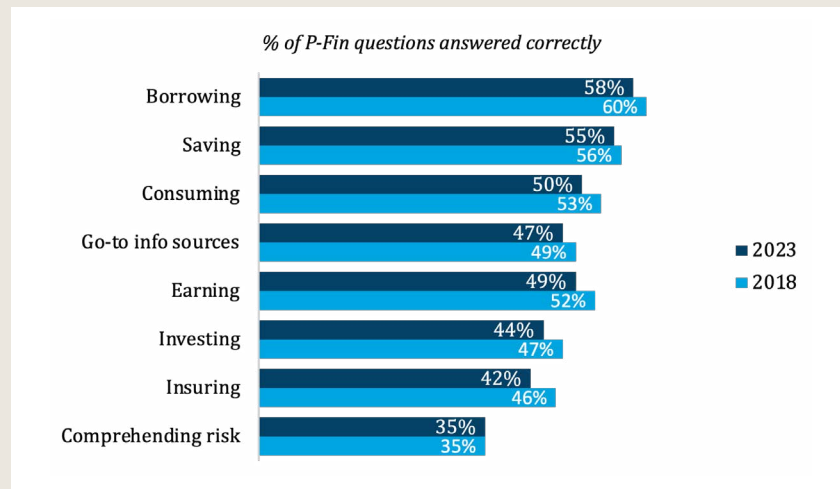


FIGURE 2: Percentage of P-Fin Index questions answered correctly for each functional area

Source: Authors' calculations using the 2018-2023 TIAA Institute-GFLEC P-Fin Index (P-Fin Index).

Note: All statistics are weighted. The P-Fin Index is composed of eight functional areas: borrowing, saving, consuming, go-to info sources, earning, investing, insuring, and comprehending risk. Each functional area is made up of three or four questions that test the respondent's knowledge. This figure shows the average percentage of questions answered correctly within each functional area in 2018 and in 2023.

Insight into whether people are planning for retirement can be attained via responses to the following question:

[Retirement Planning] Have you and your ([spouse]/[partner]) ever tried to figure out how much you need to save for retirement?

1. Yes
2. No

Research has shown that the response to this question is a good indicator of wealth in retirement (Lusardi et al., 2020), and it therefore helps understand the relationship of risk literacy to long-term financial outcomes.

3.3 EMPIRICAL STRATEGY

The goal of this paper is to shed more light on risk comprehension among U.S. adults. First, we conducted descriptive analyses to investigate the distribution of risk literacy across demographic and socio-economic characteristics as well as across exposure to financial education. Then, we complemented those analyses

with two main multivariate regression models. The first model explores the demographic and socio-economic characteristics associated with risk comprehension (RISK), for which we use three specifications: (i) a dummy variable for each risk question (*repair*, *return*, and *lottery*) that equals 1 if the respondent correctly answered the question, and 0 otherwise; (ii) our measure of risk literacy, which takes the value of 1 if the respondent correctly answered at least two of the three questions, and 0 otherwise; and (iii) the number of risk questions answered correctly as an index running from 0 to 3. We adopt the following Ordinary Least Squares (OLS) estimation model:

$$RISK_i = \alpha_i + \beta_1 X_i + \delta_i + \epsilon_i \quad (1)$$

where $RISK_i$ indicates one of the risk knowledge measures for individual i . X_i is the vector of individual controls, which include age, gender, race, income, educational attainment, employment, marital status, and having children. δ_i represents dummies for the six years and ϵ_i is the error term.

The second model is used to investigate the relationship between risk knowledge (*RISK*) and behavioral outcomes with either retirement planning or financial fragility as the dependent variable, y_i .

$$y_i = \alpha_i + \beta_1 X_i + \beta_2 RISK_i + \beta_3 FINLIT_exrisk_i + \beta_4 LONGEVITY_i + \delta_i + \epsilon_i \quad (2)$$

Financial literacy excluding any risk questions (*FINLIT ex risk*) and longevity literacy (*LONGEVITY*) are additional controls. *FINLIT ex risk* is a variable running from 0 to 25, measuring the number of correct answers to the financial literacy questions (which exclude the risk questions).

4. EMPIRICAL FINDINGS

4.1 COMPREHENSION OF RISK

First, we are looking at the three risk comprehension questions separately. Table 1 reports summary statistics for each risk question, both for the full sample over the six years (column 1) and for 2023 (column 2).

Our data show that risk comprehension among U.S. adults is low. Respondents had the least trouble with the lottery question, but less than half of the sample (47%) could correctly answer this question on average over the six years. The percentage of correct responses is even lower for the other two questions. Only around 30% of respondents answered each of them correctly, leaving 70% of respondents answering either incorrectly or with “don’t know.”

One-third of respondents could not answer a single question correctly (Panel D of Table 1). Moreover, only 24% correctly answered two risk questions, and a worryingly low 8% could correctly answer all three questions. According to our definition of risk literacy (i.e., the ability to correctly answer at least two of the three risk questions), just 32% of respondents are risk literate. Thus, our data confirms previous evidence: risk is a topic people struggle with and few demonstrate an understanding of uncertain financial outcomes.

Additionally, in responding to the risk questions, almost 50% of respondents selected the “do not know” response at least once; this result seems to be driven by the large proportion of do not know responses to the return

question (38%). This is in line with other research showing that “don’t know” responses to risk-related questions have always been high and are among the highest across personal finance topics (e.g., Lusardi and Mitchell, 2023; Yakoboski et al., 2020). The most recent results (in 2023) are consistent with the six-year average.

Table 2 reports the distribution of responses to the risk questions across demographics. We find, not surprisingly, that the same groups, as identified in previous literature, display particularly low levels of risk comprehension (Lusardi, 2019; Hasler et al., 2022, 2023; Yakoboski et al., 2022).

The most striking finding is the pronounced gender gap in risk comprehension. Table 2 shows that women seem to struggle the most with the repair and return questions, with only slightly more than one-quarter correctly answering each of those questions. They performed better on the lottery question, with 44% answering correctly, though they are still underperforming compared to their male peers (51%). Overall, only 29% of women are risk literate, compared to 36% of men. This gap is similar to the gender difference in financial literacy, where women are also less knowledgeable than men (Klapper and Lusardi, 2020). One additional finding consistent with financial literacy is that women are disproportionately more likely to answer “do not know” to each risk question. Overall, more than half of U.S. women (53%) responded at least once with “do not know” compared to 39% of men. These findings are important since lower risk comprehension and confidence are consequential, possibly preventing women from investing in the stock market or using other financial products (Bucher-Koenen et al., 2021; Ansar et al., 2023). Similarly, overconfidence among men can affect their financial decision-making (Biais et al., 2005; Daniel and Hirshleifer, 2015).

Our findings also show that risk comprehension increases only slightly with age, with the exception of an understanding of investment returns, about which elderly respondents know significantly more (34%) than younger respondents (26%). This result could be due to older cohorts having more experience with handling risk in the context of investing and having had more savings to invest in the first place. Interestingly, in the context of risk literacy, we do not observe an inverted

	Full sample (%)	2023 (%)
(A) Repair		
Correct	31.7	31.8
Incorrect	46.8	43.2
DK	20.7	23.8
RF	0.9	1.2
(B) Return		
Correct	29.7	27.8
Incorrect	31.5	29.3
DK	37.5	41.3
RF	1.3	1.5
(C) Lottery		
Correct	47.1	44.9
Incorrect	23.3	22.1
DK	28.3	31.6
RF	1.3	1.4
(D) Overall		
Zero correct	32.4	34.7
One correct	35.3	34.3
Two correct	23.9	22.8
Three correct	8.5	8.2
Risk literate (at least 2 correct)	32.4	31
At least 1 DK	46.0	49.8
All DK	14.9	17.7
Number of observations	13,148	3,503

TABLE 1. Summary statistics of the three risk questions

Source: Authors' calculations using the 2018-2023 TIAA-GFLEC Personal Finance Index (P-Fin Index) data, the total sample size is equal to 13,148.

Note: All figures are weighted. DK indicates respondent does not know. *Risk literate* is a dummy variable that takes the value of one if a respondent answers at least two of three risk comprehension questions correctly, zero otherwise. The variable *repair* is based on the following question: [Repair] There's a 50/50 chance that Malik's car will need engine repairs within the next six months, which would cost \$600. At the same time there is a 10% chance that he will need to replace the air conditioning unit in his house, which would cost \$4,000. Which poses the greater financial risk for Malik? Answer options are: (1) The car repair; (2) The air conditioning replacement; (3) There is no way to tell in advance; (4) Don't know; (5) Refuse to answer. The variable *return* is based on the following question: [Return] Investment A will deliver a return of either 10% or 6%, with each outcome equally likely. Investment B will deliver a return of either 12% or 4%, with each outcome equally likely. You can expect to earn more by investing in which? Answer options are: (1) Investment A; (2) Investment B; (3) It does not matter – expected return is the same with each; (4) Don't know; (5) Refuse to answer. The variable *lottery* is based on the following question: [Lottery] Lottery A pays a prize of \$200 and the chance of winning is 5%. Lottery B pays a prize of \$90,000 and the chance of winning is 0.01%. Expected winnings are greater in which lottery? Answer options are (1) Lottery A; (2) Lottery B; (3) They are equal; (4) Don't know; (5) Refuse to answer.

U-shaped pattern across age as reported for financial literacy in other countries (Lusardi and Mitchell, 2011).

Further, we can confirm previous research on financial literacy that finds significant differences across racial and ethnic groups (e.g., Yakoboski et al., 2022; Lusardi

and Mitchell, 2023). Our data show that Hispanic and Black respondents have similar levels of risk literacy and lower risk literacy than White respondents. Around one-quarter of Hispanics and Blacks are risk literate compared to 34% of their White peers.⁶

6. The question wording for the race and ethnicity survey question changed over time. With the 2022 and 2023 P-Fin Index, Asian Americans have been quota-sampled. Thus, earlier years do not allow us to analyze Asian Americans separately. For this reason, Asian Americans are part of the "other" category.

	Repair		Return		Lottery		Overall	
	Correct (%)	DK (%)	Correct (%)	DK (%)	Correct (%)	DK (%)	Risk literacy (%)	>= 1 DK (%)
Total Sample	31.7	20.7	29.7	37.5	47.1	28.3	32.4	46.0
Age								
18-29	32.9	27.8	25.7	40.0	46.7	30.4	31.8	48.4
30-44	33.0	24.9	27.8	38.9	43.8	31.6	30.8	48.3
45-59	32.1	18.7	30.0	36.0	49.3	25.7	33.5	43.4
60+	29.3	13.8	33.8	35.7	48.4	26.2	33.2	44.4
Gender								
Male	35.9	17.4	33.0	31.3	50.5	23.8	36.4	38.7
Female	27.6	23.7	26.6	43.2	43.9	32.6	28.5	52.8
Race/Ethnicity								
White, Non-Hispanic	32.9	18.3	30.6	35.9	49.0	27.4	33.8	44.7
Black, Non-Hispanic	25.5	28.3	24.4	47.7	39.1	34.5	25.0	54.5
Other	35.8	18.7	33.0	31.3	53.7	23.4	37.0	39.0
Hispanic	29.2	25.1	28.5	39.1	42.2	29.7	30.0	48.0
Highest degree obtained								
Less than high school	26.5	33.4	24.6	48.9	31.4	38.4	22.2	59.0
High school	23.1	27.1	25.0	47.7	40.1	35.1	25.2	55.3
Some college	29.9	18.6	28.2	37.6	48.2	28.1	30.8	46.4
Bachelor's degree or higher	41.9	13.0	36.5	25.2	56.8	19.6	42.8	33.7
Household income								
Less than \$25K	21.9	34.5	21.4	53.0	34.5	40.1	20.8	60.6
\$25-50K	25.6	25.9	25.7	45.1	41.2	34.1	25.7	54.8
\$50K-100K	30.2	19.5	27.9	37.5	48.9	26.7	31.6	46.0
\$100K+	38.6	14.7	35.5	29.0	52.4	23.1	39.6	37.3
Marital status								
Married/Living With Partner	33.1	18.6	31.5	35.0	48.7	26.7	34.2	43.6
Single	31.1	26.8	26.0	41.9	44.4	31.3	30.1	50.0
Widowed/Divorced/Separated	26.3	20.1	27.9	41.0	44.4	30.7	27.7	49.8
Has children under 18								
No	31.3	19.4	30.4	37.0	47.9	27.4	32.4	45.3
Yes	32.7	24.2	27.9	38.6	45.0	30.7	32.1	47.7
Employment status								
Employed	34.5	19.7	30.2	35.1	49.0	26.5	34.3	43.2
Retired	28.6	15.3	33.6	36.2	48.0	26.6	32.8	45.1
Unemployed	26.8	32.2	22.0	47.0	39.6	36.7	25.5	56.3

TABLE 2. Distribution of responses to risk questions by demographics

Source: Authors' calculations using the 2018-2023 TIAA-GFLEC Personal Finance Index (P-Fin Index) data, the total sample size is equal to 13,106.

Note: All figures are weighted. DK indicates respondent does not know. The variable *household income* includes the total amount of a household's annual income, including wages, tips, investment income, public assistance, and income from retirement plans. The education variable *highest degree obtained* includes the categories *less than high school*, indicating that the highest degree received is less than a high school diploma; *high school*, indicating that the highest degree received is a high school diploma; *some college*, indicating that respondents have attended a postsecondary institution and earned, at most, a two-year degree (i.e., an associate's degree); and *bachelor's degree or higher*, indicating that respondents have earned a four-year degree or postgraduate degree. The variable *Has children under 18* indicates that the respondent has at least one child under the age of 18 that lives in their household. An individual's *employment status* is defined by three categories: *employed* for those who either have a full- or a part-time occupation or are self-employed; *unemployed* for those who have no occupation at the time of the survey, who are full-time students or full-time homemakers, or who are permanently sick, disabled, or unable to work; and *retired* for those who classify themselves as being retired. Respondents who chose "White or Caucasian" were coded as *White*; respondents who chose "Black or African American" were coded as *Black*; respondents who chose "Hispanic or Latino/a" alone or in combination with any other race were coded as *Hispanic*; and respondents who chose "Asian" or "Native Hawaiian or other Pacific Islander" and others were coded as *Other*. *Risk literacy* is a dummy variable that takes the value of one if a respondent answers at least two of three risk comprehension questions correctly, zero otherwise. The variable *repair* is based on the following question: [Repair] There's a 50/50 chance that Malik's car will need engine repairs within the next six months, which would cost \$600. At the same time there is a 10% chance that he will need to replace the air conditioning unit in his house, which would cost \$4,000. Which poses the greater financial risk for Malik? Answer options are: (1) The car repair; (2) The air conditioning replacement; (3) There is no way to tell in advance; (4) Don't know; (5) Refuse to answer. The variable *return* is based on the following question: [Return] Investment A will deliver a return of either 10% or 6%, with each outcome equally likely. Investment B will deliver a return of either 12% or 4%, with each outcome equally likely. You can expect to earn more by investing in which? Answer options are: (1) Investment A; (2) Investment B; (3) It does not matter - expected return is the same with each; (4) Don't know; (5) Refuse to answer. The variable *lottery* is based on the following question: [Lottery] Lottery A pays a prize of \$200 and the chance of winning is 5%. Lottery B pays a prize of \$90,000 and the chance of winning is 0.01%. Expected winnings are greater in which lottery? Answer options are (1) Lottery A; (2) Lottery B; (3) They are equal; (4) Don't know; (5) Refuse to answer.

	Repair		Return		Lottery		Overall	
	Correct (%)	DK (%)	Correct (%)	DK (%)	Correct (%)	DK (%)	Risk Literacy (%)	>= 1DK (%)
Participated in financial education class								
No	29.2	23.6	28.0	41.8	44.3	31.6	29.9	50.4
Yes	37.6	13.5	33.7	26.9	54.0	20.4	38.4	35.1

TABLE 3. *Distribution of risk literacy questions across financial education exposure*

Source: Authors’ calculations using the 2018-2023 TIAA-GFLEC Personal Finance Index (P-Fin Index) data, the total sample size is equal to 13,148.

Note: All figures are weighted. DK indicates respondent does not know. The variable *participated in financial education class* is based on the question “Have you ever participated in a financial education class or program that was offered in high school or college, in the workplace, or by an organization or institution where you lived?” Answer options are (1) Yes; (2) No, was offered one but did not participate; (3) No, was never offered one; or (4) Refuse to answer. *Risk literacy* is a dummy variable that takes the value of one if a respondent answers at least two of three risk comprehension questions correctly, zero otherwise.

We find that risk comprehension increases with education and income and is higher for those who are employed than for those who are unemployed. Highly educated people are more prepared in each topic and therefore more risk literate; 43% of those with at least a bachelor’s degree are risk literate compared to 22% of those with less than a high school diploma. This finding is not surprising because more education, especially with math skills, can help with understanding uncertain outcomes and calculating expected values/costs and because those with higher education likely have higher incomes and, thus, potentially have more opportunities to save and invest. Moreover, our results show that across education groups, the “don’t know” distributions vary widely. In line with previous evidence related to financial literacy, the percentage of “don’t know” answers falls as educational attainment rises. Overall, the percentage of “don’t know” responses among respondents with less than a high school diploma (59%) is almost double that of those with a bachelor’s degree or higher (34%).

To elaborate on the relationship between risk comprehension and education, we consider respondents who participated in financial education. Those results are reported in Table 3. Respondents who participated in financial education are significantly more likely to correctly answer the risk questions and to respond with a smaller proportion of “don’t know” replies, indicating that financial education can be a solution to the problem of low risk literacy.

Regression analyses complement these descriptive findings and are presented in Table 4. The above-mentioned results are confirmed: women are significantly less likely to be risk literate and to correctly answer the three risk questions than men, even after controlling for other demographic variables such as education, income, and marital status. The coefficients are highly statistically significant, indicating that gender-specific factors impact risk comprehension. What this may mean for programs and initiatives will be discussed in the final section of this paper.

Further, Black respondents show significantly lower risk literacy levels than their White peers (i.e., White respondents with similar socio-demographic characteristics). This may be due to structural barriers that prevent Black Americans from experiencing the same opportunities as White Americans. In line with the univariate findings, Black respondents with higher education and income and who are employed are more likely to be risk literate.

Moreover, confirming our previous findings, risk literacy does not increase with age. Interestingly, though, the younger cohorts (those between the ages of 18 and 29) are more likely to correctly answer the repair question whereas older cohorts (those aged 60 and older) are more likely to correctly answer the investment return question (while controlling for other socio-demographic characteristics such as education and income). This likely means that context, i.e., the situation in which the uncertain financial decision occurs, matters.

VARIABLES	(1) Repair	(2) Return	(3) Lottery	(4) Risk literacy
Age (Ref.: 18-29)				
30-44	-0.031** (0.015)	-0.002 (0.014)	-0.051*** (0.016)	-0.040*** (0.015)
45-59	-0.030** (0.015)	0.017 (0.015)	-0.002 (0.016)	-0.009 (0.015)
60+	-0.041** (0.018)	0.049*** (0.018)	-0.015 (0.019)	-0.007 (0.018)
Gender (Ref.: Male)				
Female	-0.066*** (0.009)	-0.054*** (0.009)	-0.054*** (0.010)	-0.064*** (0.009)
Race/Ethnicity (Ref.: White, Non-Hispanic)				
Black, Non-Hispanic	-0.045*** (0.013)	-0.027** (0.013)	-0.060*** (0.014)	-0.049*** (0.013)
Other	0.003 (0.016)	0.017 (0.016)	0.037** (0.017)	0.014 (0.016)
Hispanic	-0.014 (0.013)	0.019 (0.012)	-0.015 (0.014)	0.007 (0.013)
Highest degree obtained (Ref.: Less than high school)				
High school	-0.046*** (0.018)	-0.006 (0.018)	0.069*** (0.019)	0.017 (0.017)
Some college	0.006 (0.019)	0.012 (0.018)	0.136*** (0.020)	0.055*** (0.018)
Bachelor's degree or higher	0.099*** (0.019)	0.072*** (0.019)	0.205*** (0.020)	0.149*** (0.019)
Household Income (Ref.: Less than \$25K)				
\$25-50K	0.022 (0.015)	0.025* (0.015)	0.037** (0.017)	0.027* (0.015)
\$50K-100K	0.042*** (0.015)	0.033** (0.014)	0.081*** (0.017)	0.059*** (0.015)
\$100K+	0.084*** (0.015)	0.089*** (0.015)	0.074*** (0.017)	0.100*** (0.015)
Marital status (Ref.: Married)				
Single	-0.002 (0.013)	-0.004 (0.013)	-0.016 (0.014)	-0.003 (0.013)
Widowed/divorced/separated	-0.012 (0.013)	-0.009 (0.013)	-0.001 (0.014)	-0.015 (0.013)

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TABLE 4. Risk questions and risk literacy regressions

VARIABLES	(1) Repair	(2) Return	(3) Lottery	(4) Risk literacy
Has children under the age of 18 (Ref.: No)				
Yes	0.013	0.005	-0.002	0.019*
	(0.011)	(0.011)	(0.012)	(0.011)
Employment status (Ref.: Employed)				
Retired	-0.010	0.028**	0.010	0.016
	(0.014)	(0.014)	(0.015)	(0.014)
Unemployed	-0.023*	-0.030**	-0.020	-0.022*
	(0.013)	(0.012)	(0.014)	(0.013)
Year (Ref.: 2018)				
2019	0.020	0.047**	-0.005	0.037*
	(0.021)	(0.021)	(0.023)	(0.021)
2020	0.015	0.016	0.014	0.021
	(0.022)	(0.021)	(0.023)	(0.022)
2021	0.018	0.017	0.006	0.026
	(0.017)	(0.017)	(0.019)	(0.017)
2022	0.018	-0.018	-0.006	0.005
	(0.017)	(0.017)	(0.019)	(0.017)
2023	0.014	-0.025	-0.033*	-0.008
	(0.017)	(0.017)	(0.019)	(0.017)
Constant	0.303***	0.232***	0.351***	0.230***
	(0.028)	(0.027)	(0.030)	(0.027)
Observations	13,106	13,106	13,106	13,106
R-squared	0.041	0.030	0.041	0.043

TABLE 4. Risk questions and risk literacy regressions

Source: Authors' calculations using the 2018-2023 TIAA-GFLEC Personal Finance Index (P-Fin Index) data.

Note: All regressions include weights. The variable *household income* includes the total amount of a household's annual income, including wages, tips, investment income, public assistance, and income from retirement plans. The education variable *highest degree obtained* includes the categories *less than high school*, indicating that the highest degree received is less than a high school diploma; *high school*, indicating that the highest degree received is a high school diploma; *some college*, indicating that respondents have attended a postsecondary institution and earned, at most, a two-year degree (i.e., an associate's degree); and *bachelor's degree or higher*, indicating that respondents have earned a four-year degree or postgraduate degree. The variable *Has children under 18* indicates that the respondent has at least one child under the age of 18 that lives in their household. An individual's *employment status* is defined by three categories: *employed* for those who either have a full- or a part-time occupation or are self-employed; *unemployed* for those who have no occupation at the time of the survey, who are full-time students or full-time homemakers, or who are permanently sick, disabled, or unable to work; and *retired* for those who classify themselves as being retired. Respondents who chose "White or Caucasian" were coded as *White*; respondents who chose "Black or African American" were coded as *Black*; respondents who chose "Hispanic or Latino/a" alone or in combination with any other race were coded as *Hispanic*; and respondents who chose "Asian" or "Native Hawaiian or other Pacific Islander" and others were coded as *Other*. *Risk literacy* is a dummy variable that takes the value of one if a respondent answers at least two of three risk comprehension questions correctly, zero otherwise. The variable *repair* is based on the following question: [Repair] There's a 50/50 chance that Malik's car will need engine repairs within the next six months, which would cost \$600. At the same time there is a 10% chance that he will need to replace the air conditioning unit in his house, which would cost \$4,000. Which poses the greater financial risk for Malik? Answer options are: (1) The car repair; (2) The air conditioning replacement; (3) There is no way to tell in advance; (4) Don't know; (5) Refuse to answer. The variable *return* is based on the following question: [Return] Investment A will deliver a return of either 10% or 6%, with each outcome equally likely. Investment B will deliver a return of either 12% or 4%, with each outcome equally likely. You can expect to earn more by investing in which? Answer options are: (1) Investment A; (2) Investment B; (3) It does not matter - expected return is the same with each; (4) Don't know; (5) Refuse to answer. The variable *lottery* is based on the following question: [Lottery] Lottery A pays a prize of \$200 and the chance of winning is 5%. Lottery B pays a prize of \$90,000 and the chance of winning is 0.01%. Expected winnings are greater in which lottery? Answer options are: (1) Lottery A; (2) Lottery B; (3) They are equal; (4) Don't know; (5) Refuse to answer.

We also analyzed variation over the six years of data and found that risk literacy has been stagnant, confirming the findings of Figure 1. Moreover, using the risk index (the number of risk questions answered correctly) as an alternative to the risk literacy measure, we find that our results are robust (Table A2 of the Appendix).

4.2 LINK TO RETIREMENT PLANNING AND FINANCIAL FRAGILITY

Next, we examine whether risk comprehension matters by investigating its relationship to retirement planning and financial fragility, two indicators of short- and long-term financial decision making and preparedness. Table 5 reports the results of OLS regressions; the results reported in columns 1 and 3 include the three risk questions while the results in columns 2 and 4 include the risk literacy measure.

We find that risk-literate respondents, on average, are 4 percentage points more likely to plan for retirement and approximately 3 percentage points less likely to be financially fragile, compared to those who could not correctly answer at least two of the three risk questions. Thus, risk literacy is a strong indicator of retirement preparedness and the ability to cope with a financial shock.

When comparing the three risk questions, we found each question to be differently related to financial behaviors (column 1 for retirement planning and 3 for financial fragility). The investment return and lottery questions contribute only to (and in similar magnitude to) the likelihood of the respondent planning for retirement. In contrast, the repair question has the strongest correlation to the likelihood of being financially fragile, followed by the return and then the lottery question. This result may indicate that the context in which risk occurs and is understood influences financial behavior: someone who understands uncertain financial outcomes in the context of a utility repair might be more likely to save for financial shocks and, hence, be less financially fragile. That knowledge, however, does not seem to correlate with the likelihood of planning for retirement.

Overall, these results are robust with our third risk measure, the risk index. We find that the more risk questions respondents answer correctly, the more likely they are to plan for retirement and the less likely they are to be financially fragile (Table A3 of the Appendix). For retired respondents in our sample, there is a discrepancy in time between their planning for retirement (which was done before they retired) and our risk literacy measurement (which was done when they were retired), so we ran the same analysis for the restricted sample of 25- to 65-year-olds who are not retired. We found similar results (Table A4 of the Appendix).

In addition to and in line with previous research, Table 5 shows that the likelihood of planning for retirement increases with age, income, education, and for married respondents with no children and is lower for Black and Hispanic respondents compared to their White peers. This holds for the likelihood of being able to cope with financial shocks (the reverse of being financially fragile). Moreover, more respondents seemed to be financially fragile in 2021, 2022, and 2023 than in 2018, which is most likely due to the COVID-19 pandemic and its economic consequences.

Expanding on this initial regression, we added a financial literacy measure (which excludes the risk comprehension concepts). Table 6 shows that financial literacy has a strong and positive relationship with planning for retirement and is negatively associated with financial fragility: respondents with higher financial literacy are more likely to plan for retirement and less likely to be financially fragile.⁷

However, risk literacy loses its statistical significance when a broad measure of financial literacy, measured by competence in the remaining seven functional areas, is included in the analysis. Thus, the personal finance concepts related to saving, investing, and insuring seem to have a stronger correlation to retirement planning and financial fragility than our risk literacy measure. This raises the question of whether this finding is related to the type and specificity of risk we asked about. Maybe a more comprehensive measure of risk comprehension could have a stronger relationship to those behavioral outcomes.

7. Regression results with the functional areas as separate independent variables are available upon request.

	(1) Retirement planning	(2) Retirement planning	(3) Financial fragility	(4) Financial fragility
At least 2 risk correct				
Risk literacy		0.044*** (0.009)		-0.026*** (0.009)
Risk questions				
Repair	0.015 (0.010)		-0.035*** (0.009)	
Return	0.028*** (0.010)		-0.019** (0.009)	
Lottery	0.030*** (0.009)		-0.016* (0.008)	
Age (Ref.: 18-29)				
30-44	0.069*** (0.014)	0.068*** (0.014)	-0.009 (0.014)	-0.008 (0.014)
45-59	0.145*** (0.015)	0.145*** (0.015)	-0.002 (0.015)	-0.002 (0.015)
60+	0.174*** (0.018)	0.175*** (0.018)	-0.065*** (0.017)	-0.064*** (0.017)
Gender (Ref.: Male)				
Female	0.006 (0.009)	0.004 (0.009)	0.010 (0.008)	0.012 (0.008)
Race/Ethnicity (Ref.: White, Non-Hispanic)				
Black, Non-Hispanic	-0.033** (0.013)	-0.034*** (0.013)	0.065*** (0.014)	0.066*** (0.014)
Other	-0.014 (0.016)	-0.013 (0.016)	-0.007 (0.014)	-0.008 (0.014)
Hispanic	-0.049*** (0.012)	-0.049*** (0.012)	0.027** (0.013)	0.028** (0.013)
Highest degree obtained (Ref.: Less than high school)				
High school	0.017 (0.017)	0.017 (0.017)	-0.091*** (0.020)	-0.090*** (0.020)
Some college	0.094*** (0.018)	0.097*** (0.018)	-0.134*** (0.020)	-0.135*** (0.020)
Bachelor's degree or higher	0.206*** (0.019)	0.209*** (0.018)	-0.210*** (0.020)	-0.213*** (0.020)
Household Income (Ref.: Less than \$25K)				
\$25-50K	0.011 (0.015)	0.013 (0.015)	-0.192*** (0.018)	-0.193*** (0.018)
\$50K-100K	0.078*** (0.014)	0.080*** (0.014)	-0.292*** (0.017)	-0.294*** (0.017)
\$100K+	0.188*** (0.015)	0.190*** (0.015)	-0.357*** (0.017)	-0.360*** (0.017)
Marital status (Ref.: Married)				
Single	-0.095*** (0.012)	-0.096*** (0.012)	0.034*** (0.013)	0.034*** (0.013)

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TABLE 5. Retirement planning, financial fragility and risk regressions

	(1) Retirement planning	(2) Retirement planning	(3) Financial fragility	(4) Financial fragility
Widowed/divorced/separated	-0.075***	-0.075***	0.043***	0.043***
	(0.013)	(0.013)	(0.013)	(0.013)
Has children under the age of 18 (Ref.: No)				
Yes	-0.024**	-0.025**	0.033***	0.033***
	(0.011)	(0.011)	(0.011)	(0.011)
Employment status (Ref.: Employed)				
Retired	-0.000	0.000	-0.026**	-0.026**
	(0.014)	(0.014)	(0.013)	(0.013)
Unemployed	-0.050***	-0.051***	0.109***	0.110***
	(0.012)	(0.012)	(0.014)	(0.014)
Year (Ref.: 2018)				
2019	0.002	0.001	0.004	0.004
	(0.020)	(0.020)	(0.020)	(0.020)
2020	0.004	0.005	0.020	0.019
	(0.021)	(0.021)	(0.020)	(0.020)
2021	0.009	0.009	0.059***	0.058***
	(0.017)	(0.017)	(0.016)	(0.016)
2022	-0.009	-0.009	0.035**	0.035**
	(0.016)	(0.016)	(0.016)	(0.016)
2023	-0.018	-0.019	0.053***	0.053***
	(0.016)	(0.016)	(0.016)	(0.016)
Constant	0.116***	0.128***	0.645***	0.630***
	(0.027)	(0.027)	(0.029)	(0.029)
Mean	0.386	0.386	0.281	0.281
Observations	13,065	13,065	12,458	12,458
R-squared	0.155	0.155	0.178	0.177

TABLE 5. Retirement planning, financial fragility and risk regressions

Source: Authors' calculations using the 2018-2023 TIAA-GFLEC Personal Finance Index (P-Fin Index) data.

Note: All regressions include weights. The variable *household income* includes the total amount of a household's annual income, including wages, tips, investment income, public assistance, and income from retirement plans. The education variable *highest degree obtained* includes the categories *less than high school*, indicating that the highest degree received is less than a high school diploma; *high school*, indicating that the highest degree received is a high school diploma; *some college*, indicating that respondents have attended a postsecondary institution and earned, at most, a two-year degree (i.e., an associate's degree); and *bachelor's degree or higher*, indicating that respondents have earned a four-year degree or postgraduate degree. The variable *Has children under 18* indicates that the respondent has at least one child under the age of 18 that lives in their household. An individual's *employment status* is defined by three categories: *employed* for those who either have a full- or a part-time occupation or are self-employed; *unemployed* for those who have no occupation at the time of the survey, who are full-time students or full-time homemakers, or who are permanently sick, disabled, or unable to work; and *retired* for those who classify themselves as being retired. Respondents who chose "White or Caucasian" were coded as *White*; respondents who chose "Black or African American" were coded as *Black*; respondents who chose "Hispanic or Latino/a" alone or in combination with any other race were coded as *Hispanic*; and respondents who chose "Asian" or "Native Hawaiian or other Pacific Islander" and others were coded as *Other*. The variable *retirement planning* is based on the question "Have you and your ([spouse]/[partner]) ever tried to figure out how much you need to save for retirement?" Answer options are: (1) Yes, (2) No. The variable *financial fragility* is based on the question "How confident are you that you and your [spouse]/[partner] could come up with \$2,000 if an unexpected need arose within the next month Answer options are (1) I am certain I could come up with the full \$2,000; (2) I could probably come up with \$2,000; (3) I could probably not come up with \$2,000; (4) I am certain I could not come up with \$2,000; (5) Don't know. It equals to one if the respondents could probably or certainly not come up with \$2,000, missing if they answered "don't know", 0 otherwise. *Risk literacy* is a dummy variable that takes the value of one if a respondent answers at least two of three risk comprehension questions correctly, zero otherwise. The variable *repair* is based on the following question: [Repair] There's a 50/50 chance that Malik's car will need engine repairs within the next six months, which would cost \$600. At the same time there is a 10% chance that he will need to replace the air conditioning unit in his house, which would cost \$4,000. Which poses the greater financial risk for Malik? Answer options are: (1) The car repair; (2) The air conditioning replacement; (3) There is no way to tell in advance; (4) Don't know; (5) Refuse to answer. The variable *return* is based on the following question: [Return] Investment A will deliver a return of either 10% or 6%, with each outcome equally likely. Investment B will deliver a return of either 12% or 4%, with each outcome equally likely. You can expect to earn more by investing in which? Answer options are: (1) Investment A; (2) Investment B; (3) It does not matter - expected return is the same with each; (4) Don't know; (5) Refuse to answer. The variable *lottery* is based on the following question: [Lottery] Lottery A pays a prize of \$200 and the chance of winning is 5%. Lottery B pays a prize of \$90,000 and the chance of winning is 0.01%. Expected winnings are greater in which lottery? Answer options are: (1) Lottery A; (2) Lottery B; (3) They are equal; (4) Don't know; (5) Refuse to answer.

VARIABLES	(1) Retirement planning	(2) Financial fragility
Financial literacy (excluding risk)		
FINLIT ex risk	0.012*** (0.001)	-0.008*** (0.001)
At least 2 risk correct		
Risk literacy	-0.001 (0.010)	0.002 (0.009)
Age (Ref.: 18-29)		
30-44	0.065*** (0.014)	-0.005 (0.014)
45-59	0.129*** (0.015)	0.008 (0.015)
60+	0.150*** (0.018)	-0.049*** (0.017)
Gender (Ref.: Male)		
Female	0.022** (0.009)	0.000 (0.008)
Race/Ethnicity (Ref.: White, Non-Hispanic)		
Black, Non-Hispanic	0.004 (0.013)	0.041*** (0.014)
Other	-0.001 (0.016)	-0.015 (0.014)
Hispanic	-0.023** (0.012)	0.010 (0.013)
Highest degree obtained (Ref.: Less than high school)		
High school	0.005 (0.017)	-0.082*** (0.020)
Some college	0.062*** (0.018)	-0.113*** (0.020)
Bachelor's degree or higher	0.144*** (0.019)	-0.172*** (0.021)
Household Income (Ref.: Less than \$25K)		
\$25-50K	-0.002 (0.014)	-0.185*** (0.018)
\$50K-100K	0.048*** (0.014)	-0.275*** (0.017)
\$100K+	0.148*** (0.015)	-0.334*** (0.017)
Marital status (Ref.: Married)		
Single	-0.094*** (0.012)	0.034*** (0.013)
Widowed/divorced/separated	-0.074*** (0.013)	0.043*** (0.013)
Has children under the age of 18 (Ref.: No)		
Yes	-0.022**	0.031***

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TABLE 6. Behaviors and financial literacy regression over six years

VARIABLES	(1) Retirement planning	(2) Financial fragility
	(0.011)	(0.011)
Employment status (Ref.: Employed)		
Retired	-0.000 (0.014)	-0.025** (0.013)
Unemployed	-0.044*** (0.012)	0.107*** (0.014)
Year (Ref.: 2018)		
2019	0.001 (0.020)	0.004 (0.020)
2020	0.000 (0.021)	0.021 (0.019)
2021	0.011 (0.017)	0.056*** (0.016)
2022	-0.004 (0.016)	0.031** (0.015)
2023	-0.008 (0.016)	0.045*** (0.016)
Constant	0.036 (0.027)	0.695*** (0.029)
Observations	13,065	12,458
R-squared	0.173	0.185

TABLE 6. Behaviors and financial literacy regression over six years

Source: Authors' calculations using the 2018-2023 TIAA-GFLEC Personal Finance Index (P-Fin Index) data.

Note: All regressions include weights. The variable *household income* includes the total amount of a household's annual income, including wages, tips, investment income, public assistance, and income from retirement plans. The education variable *highest degree obtained* includes the categories *less than high school*, indicating that the highest degree received is less than a high school diploma; *high school*, indicating that the highest degree received is a high school diploma; *some college*, indicating that respondents have attended a postsecondary institution and earned, at most, a two-year degree (i.e., an associate's degree); and *bachelor's degree or higher*, indicating that respondents have earned a four-year degree or postgraduate degree. The variable *Has children under 18* indicates that the respondent has at least one child under the age of 18 that lives in their household. An individual's *employment status* is defined by three categories: *employed* for those who either have a full- or a part-time occupation or are self-employed; *unemployed* for those who have no occupation at the time of the survey, who are full-time students or full-time homemakers, or who are permanently sick, disabled, or unable to work; and *retired* for those who classify themselves as being retired. Respondents who chose "White or Caucasian" were coded as *White*; respondents who chose "Black or African American" were coded as *Black*; respondents who chose "Hispanic or Latino/a" alone or in combination with any other race were coded as *Hispanic*; and respondents who chose "Asian" or "Native Hawaiian or other Pacific Islander" and others were coded as *Other*. The variable *retirement planning* is based on the question "Have you and your ([spouse]/[partner]) ever tried to figure out how much you need to save for retirement?" Answer options are: (1) Yes, (2) No. The variable *financial fragility* is based on the question "How confident are you that you and your ([spouse]/[partner]) could come up with \$2,000 if an unexpected need arose within the next month?" Answer options are (1) I am certain I could come up with the full \$2,000; (2) I could probably come up with \$2,000; (3) I could probably not come up with \$2,000; (4) I am certain I could not come up with \$2,000; (5) Don't know. It equals to one if the respondents could probably or certainly not come up with \$2,000, missing if they answered "don't know", 0 otherwise. *FINLIT ex risk* is a variable running from 0 to 25 measuring the number of correct answers on the financial literacy questions (which exclude the risk questions). *Risk literacy* is a dummy variable that takes the value of one if a respondent answers at least two of three risk comprehension questions correctly, zero otherwise.

As an initial attempt to test this hypothesis, we analyzed new questions in the 2023 dataset about a specific risk: *longevity risk literacy*. In 2023, only 12% of U.S. adults have strong longevity literacy, meaning they could correctly answer each of the three longevity literacy questions. In other words, barely 1 in 10 adults demonstrate an understanding of how long 65-year-olds live on average, as

well as the likelihood of living to an advanced age versus the likelihood of dying relatively early. On the other end of the spectrum, 31% of respondents either answered with "don't know" or incorrectly in the wrong direction of the retirement planning horizon⁸ to each question. Thus, they demonstrate a complete lack of understanding of the distribution of life expectancy at age 65.

8. They underestimated average life expectancy, underestimated the likelihood of living to an advanced age, and overestimated the likelihood of early death.

VARIABLES	(1) Retirement planning	(2) Financial fragility
Financial literacy (excluding risk)		
FINLIT ex risk	0.010*** (0.002)	-0.007*** (0.001)
At least 2 risk correct		
Risk literacy	-0.014 (0.019)	-0.000 (0.017)
Longevity risk literacy		
LONGEVITY	0.024*** (0.009)	-0.001 (0.008)
Age (Ref.: 18-29)		
30-44	0.038 (0.026)	-0.050* (0.027)
45-59	0.126*** (0.028)	-0.015 (0.028)
60+	0.151*** (0.034)	-0.095*** (0.033)
Gender (Ref.: Male)		
Female	0.019 (0.017)	-0.021 (0.016)
Race/Ethnicity (Ref.: White, Non-Hispanic)		
Black, Non-Hispanic	0.012 (0.024)	0.025 (0.025)
Other	-0.018 (0.026)	-0.045* (0.023)
Hispanic	-0.032 (0.022)	-0.028 (0.023)
Highest degree obtained (Ref.: Less than high school)		
High school	0.022 (0.030)	-0.098*** (0.038)
Some college	0.099*** (0.033)	-0.131*** (0.039)
Bachelor's degree or higher	0.175*** (0.035)	-0.168*** (0.039)
Household Income (Ref.: Less than \$25K)		
\$25-50K	-0.055* (0.028)	-0.156*** (0.035)
\$50K-100K	0.001 (0.028)	-0.296*** (0.032)
\$100K+	0.089*** (0.030)	-0.343*** (0.033)
Marital status (Ref.: Married)		
Single	-0.052** (0.023)	0.036 (0.024)
Widowed/divorced/separated	-0.042	0.053**

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TABLE 7. Behaviors, risk, and longevity regressions (2023 data only)

VARIABLES	(1) Retirement planning	(2) Financial fragility
	(0.026)	(0.025)
Has children under the age of 18		
Yes	0.017	0.037*
	(0.020)	(0.020)
Employment status (Ref.: Employed)		
Retired	-0.034	0.015
	(0.028)	(0.025)
Unemployed	-0.056**	0.100***
	(0.023)	(0.027)
Constant	0.044	0.786***
	(0.046)	(0.049)
Observations	3,478	3,306
R-squared	0.157	0.184

TABLE 7. Behaviors, risk, and longevity regressions (2023 data only)

Source: Authors' calculations using 2023 TIAA-GFLEC Personal Finance Index (P-Fin Index) data.

Note: All regressions include weights. The variable *household income* includes the total amount of a household's annual income, including wages, tips, investment income, public assistance, and income from retirement plans. The education variable *highest degree obtained* includes the categories *less than high school*, indicating that the highest degree received is less than a high school diploma; *high school*, indicating that the highest degree received is a high school diploma; *some college*, indicating that respondents have attended a postsecondary institution and earned, at most, a two-year degree (i.e., an associate's degree); and *bachelor's degree or higher*, indicating that respondents have earned a four-year degree or postgraduate degree. The variable *Has children under 18* indicates that the respondent has at least one child under the age of 18 that lives in their household. An individual's *employment status* is defined by three categories: *employed* for those who either have a full- or a part-time occupation or are self-employed; *unemployed* for those who have no occupation at the time of the survey, who are full-time students or full-time homemakers, or who are permanently sick, disabled, or unable to work; and *retired* for those who classify themselves as being retired. Respondents who chose "White or Caucasian" were coded as *White*; respondents who chose "Black or African American" were coded as *Black*; respondents who chose "Hispanic or Latino/a" alone or in combination with any other race were coded as *Hispanic*; and respondents who chose "Asian" or "Native Hawaiian or other Pacific Islander" and others were coded as *Other*. The variable *retirement planning* is based on the question "Have you and your ([spouse]/[partner]) ever tried to figure out how much you need to save for retirement?" Answer options are: (1) Yes, (2) No. The variable *financial fragility* is based on the question "How confident are you that you and your [spouse]/[partner] could come up with \$2,000 if an unexpected need arose within the next month Answer options are: (1) I am certain I could come up with the full \$2,000; (2) I could probably come up with \$2,000; (3) I could probably not come up with \$2,000; (4) I am certain I could not come up with \$2,000; (5) Don't know. It equals to one if the respondents could probably or certainly not come up with \$2,000, missing if they answered "don't know", 0 otherwise. *FINLIT ex risk* is a variable running from 0 to 25 measuring the number of correct answers on the financial literacy questions (which exclude the risk questions). *Risk literacy* is a dummy variable that takes the value of one if a respondent answers at least two of three risk comprehension questions correctly, zero otherwise. *LONGEVITY* is a variable running from 0 to 3 measuring how many of the following questions a respondent answers correctly: "On average in the U.S., how long will a 65-year-old man live?" Answer options are: (1) About 14 more years (age 79); (2) About 19 more years (age 84); (3) About 24 more years (age 89); (4) Don't know. "On average in the U.S., how long will a 65-year-old woman live?" Answer options are: (1) About 17 more years (age 82); (2) About 22 more years (age 87); (3) About 27 more years (age 92); (4) Don't know. "In the U.S., what is the likelihood that a 65-year-old man will live at least until age 90?" Answer options are: (1) About 10% (1 in 10); (2) About 30% (3 in 10); (3) About 50% (5 in 10); (4) Don't know. "In the U.S., what is the likelihood that a 65-year-old woman will live at least until age 90?" Answer options are: (1) About 20% (2 in 10); (2) About 40% (4 in 10); (3) About 60% (6 in 10); (4) Don't know. "In the U.S., what is the likelihood that a 65-year-old man will not live beyond age 70?" Answer options are: (1) Under 5%; (2) Between 5% and 10%; (3) Over 10%; (4) Don't know. "In the U.S., what is the likelihood that a 65-year-old woman will not live beyond age 70?" Answer options are: (1) Under 5%; (2) Between 5% and 10%; (3) Over 10%; (4) Don't know.

Adding longevity risk literacy to a broad measure of financial literacy does make a difference, as shown in Table 7. We find that those with longevity literacy are significantly more likely to plan for retirement, while longevity literacy plays no significant role for financial fragility.

These results indicate that a broad risk comprehension measure, which accounts for different aspects of risk alongside an understanding of uncertain financial

outcomes may be better at capturing the knowledge that explains various financial behaviors. Further, it is apparent that context matters: those with an understanding of how long people tend to live upon reaching retirement age are more likely to have figured out how much they need to save for retirement. Developing and testing a more comprehensive measure of risk will be explored in future research.

5. CONCLUSION

In this paper, we examine risk comprehension in the U.S. and its link to financial behavior. Using six years of data (2018-2023) and different risk comprehension specifications, our findings show that risk literacy has been and continues to be low. Only one-third of U.S. adults are risk literate, meaning they are able to correctly answer at least two of three questions that assess their understanding of uncertain financial outcomes in different contexts. The even lower risk literacy levels we identified among respondents who are women, are younger, have lower income, have less education, and are unemployed indicate the need for access to programs and initiatives that teach risk-related concepts to everyone but especially those with lower risk literacy.

Our findings also show not only that risk literacy is important but also that specific risk knowledge makes the difference. In fact, those with longevity risk literacy are significantly more likely to plan for retirement compared to those who do not know how long people tend to live upon reaching retirement age. Further, we find that having participated in financial education offered by a school, a workplace, or another organization or institution is positively associated with risk literacy. This indicates a need for financial education resources that help people increase their risk literacy and make savvy financial decisions.

The following are recommendations to be considered when creating such resources:

- **Personalize to the audience:** Every person has unique needs and preferences, and the large gender difference in risk literacy has shown that women might approach and learn about risk-related topics differently than men. Tailoring the narratives and language used in educational resources will result in greater learning success and higher engagement.
- **Adjust the context:** The financial context in which risk-related concepts are taught needs to be relatable. For example, we found that younger cohorts had a better understanding of uncertain financial outcomes in the context of a utility repair whereas older cohorts better understood risk in the context of

an investment return decision. This implies that the situation in which the uncertain financial decision needs to be made is important and should be taken into account when designing educational resources or interacting with clients.

- **Use a multi-faceted approach to risk:** Our research suggests that a baseline understanding of uncertain financial outcomes is important and relevant for financial decision making. Additionally, information on specific risks, such as longevity risk, impacts related financial behaviors such as retirement planning. Thus, in addition to covering the baseline risk-related topics, information on specific risks should be added as needed.
- **Convey relevant information:** Our findings suggest that learning by doing is not an effective way to acquire knowledge of risk-related concepts. This is supported by our findings that risk comprehension does not increase with age. Therefore, for people to understand risk and make informed financial decisions, concrete information is essential.
- **Assess math skills and provide tools:** One barrier to risk comprehension could be the struggle with probabilities and numeracy. Successful programs should include a comprehensive approach to finance, including numeracy skills such as expected value calculation.
- **Promote lifelong learning:** Because financial decisions and circumstances change over the life cycle, exposure to financial risk (for example, inflation) also changes. Thus, offering educational resources on a regular basis can ensure that important and complex risk-related concepts are revisited in relevant contexts.
- **Add need-based learning:** Resources specific to the audience's needs should be provided before important financial decisions are made.
- **Make it simple:** Previous research shows that simple language improves learning outcomes and engagement with resources. For example, simple tools such as short videos have proven to be effective at helping people understand complex topics such as risk (Heinberg et al., 2014; Clark et al., 2016).

- **Consider previous experiences:** Negative experiences in financial and personal contexts can shape behavior and affect trust in financial institutions. Developing different narratives could help people secure financial information and gain trust in the financial system.

By sharing our research and providing the recommendations listed above, we intend to inform the financial services industry, policy, and programs designed to support and enhance the risk literacy and financial wellbeing of Americans. Risk comprehension is crucial for making financial decisions, especially during periods of heightened economic uncertainty. An avenue for future research could be the development and testing of risk comprehension measures that assess understanding of risk-specific topics such as long-term care cost risk, labor risk, healthcare cost risk, and political risk and the effects that this understanding has on people's financial wellbeing.

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APPENDIX

	2018 (%)	2019 (%)	2020 (%)	2021 (%)	2022 (%)	2023 (%)
Age						
18-29	21.07	21.08	20.89	20.12	20.21	19.75
30-44	24.92	25.02	25.05	25.46	25.56	25.93
45-59	26.01	25.35	24.73	24.81	23.85	23.97
60+	28.00	28.55	29.32	29.61	30.38	30.35
Gender						
Male	48.24	48.44	48.34	48.24	48.49	48.78
Female	51.76	51.56	51.66	51.76	51.51	51.22
Race/Ethnicity						
White, Non-Hispanic	64.02	63.49	63.24	63.03	62.61	62.17
Black, Non-Hispanic	11.79	11.87	11.67	11.82	12.00	12.06
Hispanic	15.92	16.24	16.47	16.50	16.90	17.21
Other	8.26	8.40	8.61	8.65	8.49	8.56
Highest degree obtained						
Less than high school	11.08	10.90	10.50	11.16	9.55	9.33
High school	28.93	28.64	28.36	27.38	28.29	29.31
Some college	28.55	28.20	27.77	30.02	27.09	26.48
Bachelor's degree or higher	31.45	32.26	33.38	31.44	35.07	34.88
Household income						
Less than \$25K	15.07	14.50	13.56	12.46	12.80	12.40
\$25-50K	19.82	19.12	18.11	17.61	16.98	16.06
\$50K-100K	31.14	30.61	30.95	31.39	29.53	28.57
\$100K+	33.97	35.77	37.37	38.54	40.69	42.97
Marital status						
Married/Living with Partner	63.96	61.71	63.03	62.20	62.80	63.45
Single	21.51	22.30	21.99	22.42	23.64	22.46
Widowed/Divorced/Separated	14.53	15.98	14.98	15.38	13.56	14.09
Has children under 18						
No	75.28	73.52	76.47	77.30	70.69	68.87
Yes	24.72	26.48	23.53	22.70	29.31	31.13
Employment status						
Employed	58.69	56.45	56.28	55.06	57.05	56.93
Retired	25.45	27.06	25.57	26.65	26.49	26.48
Unemployed	15.86	16.49	18.15	18.29	16.46	16.58
Observations	1,012	1,008	1,008	3,035	3,582	3,503

TABLE A1: Sociodemographic distribution over 6 years

Source: Authors' calculations using the 2018-2023 TIAA Institute-GFLEC P-Fin Index (P-Fin Index), the total sample size is equal to 13,148.

Note: All statistics are weighted. The variable *household income* includes the total amount of a household's annual income, including wages, tips, investment income, public assistance, and income from retirement plans. The education variable *highest degree obtained* includes the categories less than high school, indicating that the highest degree received is less than a high school diploma; *high school*, indicating that the highest degree received is a high school diploma; *some college*, indicating that respondents have attended a postsecondary institution and earned, at most, a two-year degree (i.e., an associate's degree); and *bachelor's degree or higher*, indicating that respondents have earned a four-year degree or postgraduate degree. The variable *Has children under 18* indicates that the respondent has at least one child under the age of 18 that lives in their household. An individual's *employment status* is defined by three categories: *employed* for those who either have a full- or a part-time occupation or are self-employed; *unemployed* for those who have no occupation at the time of the survey, who are full-time students or full-time homemakers, or who are permanently sick, disabled, or unable to work; and *retired* for those who classify themselves as being retired. Respondents who chose "White or Caucasian" were coded as *White*; respondents who chose "Black or African American" were coded as *Black*; respondents who chose "Hispanic or Latino/a" alone or in combination with any other race were coded as *Hispanic*; and respondents who chose "Asian" or "Native Hawaiian or other Pacific Islander" and others were coded as *Other*.

VARIABLES	(1) Risk index (0-3)
Age (Ref.: 18-29)	
30-44	-0.085*** (0.030)
45-59	-0.016 (0.031)
60+	-0.007 (0.036)
Gender (Ref.: Male)	
Female	-0.174*** (0.017)
Race/Ethnicity (Ref.: White, Non-Hispanic)	
Black, Non-Hispanic	-0.132*** (0.026)
Other	0.057* (0.032)
Hispanic	-0.010 (0.025)
Highest degree obtained (Ref.: Less than high school)	
High school	0.017 (0.035)
Some college	0.153*** (0.036)
Bachelor's degree or higher	0.376*** (0.038)
Household Income (Ref.: Less than \$25K)	
\$25-50K	0.084*** (0.031)
\$50K-100K	0.156*** (0.030)
\$100K+	0.247*** (0.031)
Marital status (Ref.: Married)	
Single	-0.021 (0.026)
Widowed/divorced/separated	-0.022 (0.025)
Has children under the age of 18 (Ref.: No)	
Yes	0.016 (0.022)
Employment status (Ref.: Employed)	
Retired	0.028 (0.027)
Unemployed	-0.074*** (0.026)

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TABLE A2. Risk index regression

VARIABLES	(1) Risk index (0-3)
Year (Ref.: 2018)	
2019	0.062 (0.042)
2020	0.045 (0.042)
2021	0.041 (0.034)
2022	-0.006 (0.033)
2023	-0.044 (0.033)
Constant	0.886*** (0.056)
Observations	13,106
R-squared	0.072

TABLE A2. Risk index regression

Source: Authors' calculations using 2023 TIAA-GFLEC Personal Finance Index (P-Fin Index) data.

Note: All regressions include weights. The variable *household income* includes the total amount of a household's annual income, including wages, tips, investment income, public assistance, and income from retirement plans. The education variable *highest degree obtained* includes the categories *less than high school*, indicating that the highest degree received is less than a high school diploma; *high school*, indicating that the highest degree received is a high school diploma; *some college*, indicating that respondents have attended a postsecondary institution and earned, at most, a two-year degree (i.e., an associate's degree); and *bachelor's degree or higher*, indicating that respondents have earned a four-year degree or postgraduate degree. The variable *Has children under 18* indicates that the respondent has at least one child under the age of 18 that lives in their household. An individual's *employment status* is defined by three categories: *employed* for those who either have a full- or a part-time occupation or are self-employed; *unemployed* for those who have no occupation at the time of the survey, who are full-time students or full-time homemakers, or who are permanently sick, disabled, or unable to work; and *retired* for those who classify themselves as being retired. Respondents who chose "White or Caucasian" were coded as *White*; respondents who chose "Black or African American" were coded as *Black*; respondents who chose "Hispanic or Latino/a" alone or in combination with any other race were coded as *Hispanic*; and respondents who chose "Asian" or "Native Hawaiian or other Pacific Islander" and others were coded as *Other*. The variable *risk index* takes the values zero, one, two, or three depending on how many risk comprehension questions a respondent answered correctly.

	(1) Retirement planning	(2) Financial fragility
Number of risk correct		
Risk index (0-3)	0.025*** (0.005)	-0.023*** (0.004)
Age (Ref.: 18-29)		
30-44	0.069*** (0.014)	-0.009 (0.014)
45-59	0.145*** (0.015)	-0.002 (0.015)
60+	0.174*** (0.018)	-0.064*** (0.017)
Gender (Ref.: Male)		
Female	0.006 (0.009)	0.010 (0.008)
Race/Ethnicity (Ref.: White, Non-Hispanic)		
Black, Non-Hispanic	-0.033** (0.013)	0.065*** (0.014)
Other	-0.014 (0.016)	-0.007 (0.014)
Hispanic	-0.049*** (0.012)	0.027** (0.013)
Highest degree obtained (Ref.: Less than high school)		
High school	0.017 (0.017)	-0.090*** (0.020)
Some college	0.095*** (0.018)	-0.133*** (0.020)
Bachelor's degree or higher	0.207*** (0.019)	-0.209*** (0.020)
Household Income (Ref.: Less than \$25K)		
\$25-50K	0.012 (0.015)	-0.192*** (0.018)
\$50K-100K	0.078*** (0.014)	-0.292*** (0.017)
\$100K+	0.188*** (0.015)	-0.357*** (0.017)
Marital status (Ref.: Married)		
Single	-0.095*** (0.012)	0.033*** (0.013)
Widowed/divorced/separated	-0.075*** (0.013)	0.043*** (0.013)
Has children under the age of 18 (Ref.: No)		
Yes	-0.024** (0.011)	0.033*** (0.011)
Employment status (Ref.: Employed)		
Retired	0.000	-0.025**

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TABLE A3. Behaviors and risk index regressions

	(1) Retirement planning	(2) Financial fragility
	(0.014)	(0.013)
Unemployed	-0.050***	0.109***
	(0.012)	(0.014)
Year (Ref.: 2018)		
2019	0.002	0.004
	(0.020)	(0.020)
2020	0.004	0.020
	(0.021)	(0.020)
2021	0.009	0.058***
	(0.017)	(0.016)
2022	-0.009	0.035**
	(0.016)	(0.016)
2023	-0.018	0.052***
	(0.016)	(0.016)
Constant	0.116***	0.645***
	(0.027)	(0.029)
Observations	13,065	12,458
R-squared	0.155	0.178

TABLE A3. Behaviors and risk index regressions

Source: Authors' calculations using the 2018-2023 TIAA-GFLEC Personal Finance Index (P-Fin Index) data.

Note: All regressions include weights. The variable *household income* includes the total amount of a household's annual income, including wages, tips, investment income, public assistance, and income from retirement plans. The education variable *highest degree obtained* includes the categories *less than high school*, indicating that the highest degree received is less than a high school diploma; *high school*, indicating that the highest degree received is a high school diploma; *some college*, indicating that respondents have attended a postsecondary institution and earned, at most, a two-year degree (i.e., an associate's degree); and *bachelor's degree or higher*, indicating that respondents have earned a four-year degree or postgraduate degree. The variable *Has children under 18* indicates that the respondent has at least one child under the age of 18 that lives in their household. An individual's *employment status* is defined by three categories: *employed* for those who either have a full- or a part-time occupation or are self-employed; *unemployed* for those who have no occupation at the time of the survey, who are full-time students or full-time homemakers, or who are permanently sick, disabled, or unable to work; and *retired* for those who classify themselves as being retired. Respondents who chose "White or Caucasian" were coded as *White*; respondents who chose "Black or African American" were coded as *Black*; respondents who chose "Hispanic or Latino/a" alone or in combination with any other race were coded as *Hispanic*; and respondents who chose "Asian" or "Native Hawaiian or other Pacific Islander" and others were coded as *Other*. The variable *retirement planning* is based on the question "Have you and your ([spouse]/[partner]) ever tried to figure out how much you need to save for retirement?" Answer options are: (1) Yes, (2) No. The variable *financial fragility* is based on the question "How confident are you that you and your ([spouse]/[partner]) could come up with \$2,000 if an unexpected need arose within the next month?" Answer options are: (1) I am certain I could come up with the full \$2,000; (2) I could probably come up with \$2,000; (3) I could probably not come up with \$2,000; (4) I am certain I could not come up with \$2,000; (5) Don't know. It equals to one if the respondents could probably or certainly not come up with \$2,000, missing if they answered "don't know", 0 otherwise. The variable *risk index* takes the values zero, one, two, or three depending on how many risk comprehension questions a respondent answered correctly.

	(1) Retirement planning	(2) Retirement planning	(3) Retirement planning	(4) Financial fragility	(5) Financial fragility	(6) Financial fragility
Number of risk correct						
Risk index (0-3)	0.027*** (0.006)			-0.029*** (0.006)		
At least 2 risk correct						
Risk literacy			0.046*** (0.013)			-0.037*** (0.011)
Risk comprehension questions						
Repair		0.025* (0.013)			-0.035*** (0.012)	
Return		0.021 (0.013)			-0.030** (0.012)	
Lottery		0.034*** (0.012)			-0.021* (0.011)	
Age (Ref.: 25-44)						
45-65	0.103*** (0.012)	0.103*** (0.012)	0.103*** (0.012)	-0.008 (0.011)	-0.008 (0.011)	-0.008 (0.012)
Gender (Ref.: Male)						
Female	0.009 (0.012)	0.009 (0.012)	0.008 (0.012)	0.018* (0.011)	0.018 (0.011)	0.021* (0.011)
Race/Ethnicity (Ref.: White, Non-Hispanic)						
Black, Non-Hispanic	-0.009 (0.017)	-0.009 (0.017)	-0.010 (0.017)	0.013 (0.017)	0.013 (0.017)	0.015 (0.017)
Other	-0.039* (0.021)	-0.039* (0.021)	-0.038* (0.021)	-0.012 (0.017)	-0.012 (0.017)	-0.013 (0.017)
Hispanic	-0.058*** (0.015)	-0.058*** (0.016)	-0.059*** (0.016)	0.016 (0.016)	0.016 (0.016)	0.017 (0.016)
Highest degree obtained (Ref.: Less than high school)						
High school	-0.006 (0.023)	-0.007 (0.023)	-0.007 (0.023)	-0.092*** (0.027)	-0.092*** (0.027)	-0.091*** (0.027)
Some college	0.081*** (0.025)	0.080*** (0.025)	0.083*** (0.025)	-0.117*** (0.028)	-0.118*** (0.028)	-0.119*** (0.028)
Bachelor's degree or higher	0.188*** (0.026)	0.188*** (0.026)	0.192*** (0.025)	-0.204*** (0.028)	-0.204*** (0.028)	-0.209*** (0.028)
Household Income (Ref.: Less than \$25K)						
\$25-50K	-0.004 (0.021)	-0.004 (0.021)	-0.003 (0.021)	-0.187*** (0.027)	-0.187*** (0.027)	-0.188*** (0.027)
\$50K-100K	0.059*** (0.021)	0.059*** (0.021)	0.061*** (0.021)	-0.322*** (0.025)	-0.322*** (0.025)	-0.324*** (0.025)
\$100K+	0.196*** (0.023)	0.196*** (0.023)	0.198*** (0.023)	-0.410*** (0.025)	-0.410*** (0.025)	-0.414*** (0.025)
Marital status (Ref.: Married)						
Single	-0.089*** (0.016)	-0.088*** (0.016)	-0.088*** (0.016)	0.039** (0.016)	0.039** (0.016)	0.039** (0.016)

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TABLE A4: Behaviors and risk comprehension regressions for subsample of 25-65 year-old non-retirees

	(1) Retirement planning	(2) Retirement planning	(3) Retirement planning	(4) Financial fragility	(5) Financial fragility	(6) Financial fragility
Widowed/divorced/separated	-0.024 (0.019)	-0.024 (0.019)	-0.023 (0.019)	0.065*** (0.019)	0.065*** (0.019)	0.065*** (0.019)
Has children under the age of 18 (Ref.: No)						
Yes	-0.014 (0.013)	-0.014 (0.013)	-0.014 (0.013)	0.027** (0.012)	0.027** (0.012)	0.027** (0.012)
Employment status (Ref.: Employed)						
Unemployed	-0.049*** (0.016)	-0.049*** (0.016)	-0.050*** (0.016)	0.097*** (0.017)	0.097*** (0.017)	0.098*** (0.017)
Year (Ref.: 2018)						
2019	0.009 (0.026)	0.009 (0.026)	0.009 (0.026)	0.016 (0.025)	0.016 (0.025)	0.014 (0.025)
2020	0.002 (0.028)	0.002 (0.028)	0.003 (0.028)	0.027 (0.026)	0.027 (0.026)	0.026 (0.026)
2021	0.021 (0.022)	0.021 (0.022)	0.021 (0.022)	0.068*** (0.021)	0.069*** (0.021)	0.068*** (0.021)
2022	-0.014 (0.022)	-0.014 (0.022)	-0.014 (0.022)	0.049** (0.020)	0.049** (0.020)	0.049** (0.020)
2023	-0.011 (0.022)	-0.010 (0.022)	-0.011 (0.022)	0.048** (0.020)	0.048** (0.020)	0.048** (0.020)
Constant	0.170*** (0.035)	0.169*** (0.035)	0.182*** (0.034)	0.671*** (0.036)	0.671*** (0.036)	0.655*** (0.036)
Observations	7,214	7,214	7,214	6,902	6,902	6,902
R-squared	0.143	0.143	0.142	0.197	0.197	0.195

TABLE A4: Behaviors and risk comprehension regressions for subsample of 25-65 year-old non-retirees

Source: Authors' calculations using the 2018-2023 TIAA-GFLEC Personal Finance Index (P-Fin Index) data.

Note: All regressions include weights. The variable *household income* includes the total amount of a household's annual income, including wages, tips, investment income, public assistance, and income from retirement plans. The education variable *highest degree obtained* includes the categories *less than high school*, indicating that the highest degree received is less than a high school diploma; *high school*, indicating that the highest degree received is a high school diploma; *some college*, indicating that respondents have attended a postsecondary institution and earned, at most, a two-year degree (i.e., an associate's degree); and *bachelor's degree or higher*, indicating that respondents have earned a four-year degree or postgraduate degree. The variable *Has children under 18* indicates that the respondent has at least one child under the age of 18 that lives in their household. An individual's *employment status* is defined by three categories: *employed* for those who either have a full- or a part-time occupation or are self-employed; *unemployed* for those who have no occupation at the time of the survey, who are full-time students or full-time homemakers, or who are permanently sick, disabled, or unable to work; and *retired* for those who classify themselves as being retired. Respondents who chose "White or Caucasian" were coded as *White*; respondents who chose "Black or African American" were coded as *Black*; respondents who chose "Hispanic or Latino/a" alone or in combination with any other race were coded as *Hispanic*; and respondents who chose "Asian" or "Native Hawaiian or other Pacific Islander" and others were coded as *Other*. The variable *retirement planning* is based on the question "Have you and your ([spouse]/[partner]) ever tried to figure out how much you need to save for retirement?" Answer options are: (1) Yes, (2) No. The variable *financial fragility* is based on the question "How confident are you that you and your [spouse]/[partner] could come up with \$2,000 if an unexpected need arose within the next month?" Answer options are: (1) I am certain I could come up with the full \$2,000; (2) I could probably come up with \$2,000; (3) I could probably not come up with \$2,000; (4) I am certain I could not come up with \$2,000; (5) Don't know. It equals to one if the respondents could probably or certainly not come up with \$2,000, missing if they answered "don't know", 0 otherwise. The variable *risk index* takes the values zero, one, two, or three depending on how many risk comprehension questions a respondent answered correctly. *Risk literacy* is a dummy variable that takes the value of one if a respondent answers at least two of three risk comprehension questions correctly, zero otherwise. The variable *repair* is based on the following question: [Repair] There's a 50/50 chance that Malik's car will need engine repairs within the next six months, which would cost \$600. At the same time there is a 10% chance that he will need to replace the air conditioning unit in his house, which would cost \$4,000. Which poses the greater financial risk for Malik? Answer options are: (1) The car repair, (2) The air conditioning replacement, (3) There is no way to tell in advance, (4) Don't know, (5) Refuse to answer. The variable *return* is based on the following question: [Return] Investment A will deliver a return of either 10% or 6%, with each outcome equally likely. Investment B will deliver a return of either 12% or 4%, with each outcome equally likely. You can expect to earn more by investing in which? Answer options are: (1) Investment A, (2) Investment B, (3) It does not matter - expected return is the same with each, (4) Don't know, (5) Refuse to answer. The variable *lottery* is based on the following question: [Lottery] Lottery A pays a prize of \$200 and the chance of winning is 5%. Lottery B pays a prize of \$90,000 and the chance of winning is 0.01%. Expected winnings are greater in which lottery? Answer options are (1) Lottery A, (2) Lottery B, (3) They are equal, (4) Don't know, (5) Refuse to Answer.