Insights: Financial Capability

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What's inside

This issue brief is based on a full paper with the same title.

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The Stability and Predictive Power of Financial Literacy: Evidence From Longitudinal Data

Summary

We administered the FINRA Investor Education Foundation's National Financial Capability Study (NFCS) questionnaire to members of the RAND American Life Panel (ALP) in 2012 and 2018. Using this longitudinal data set, we investigate the evolution of financial literacy over time and shed light on the causal effect of financial knowledge on financial outcomes. Over a six-year observation period, financial literacy appears to be rather stable, with a slight tendency to decline at older ages. We find that financial literacy has significant predictive power for future financial outcomes, even after controlling for baseline financial characteristics and a wide set of demographic and individual characteristics that influence financial decision making.

Introduction

Demographic changes in the population and the shift from defined-benefit to defined-contribution pension plans have placed more saving and investment responsibility on households. As a result, individuals have been confronted with making complex financial plans, while navigating a financial landscape of sophisticated products. In this scenario, it is crucial to understand the extent to which individuals are equipped to deal with complicated financial decisions and how people can be helped to make better choices.

Over the years, a standard approach to measure financial literacy, which is paramount to shed light on these issues, has been developed and adopted by many surveys in the United States. These questions have been included in the National Financial Capability Study (NFCS), funded and directed by the FINRA Investor Education Foundation. Survey data reveal worrisomely low levels of financial knowledge in the population at large, though financial knowledge levels vary substantially by age, sex and education. Importantly, these measures correlate strongly with financial behaviors and outcomes. Yet, given the scarcity of longitudinal data on both financial literacy and financial outcomes, the research literature has not fully established how the level of individual financial knowledge changes over time and predicts financial outcomes.

To address these questions, we rely on two waves of the NFCS, which we administered in the RAND ALP in 2012 and 2018 to a sample of about 1,500 respondents. With repeated observations on the same individuals about six years apart, and a rich set of demographic controls, we can analyze how financial literacy changes over time and how past levels of financial literacy influence future financial outcomes and behaviors. This data set enables us to interpret, with reasonable confidence, any statistically significant relationships as evidence of a causal effect of financial literacy measured in 2012 on financial outcomes measured in 2018. Our empirical approach leverages the fact that financial outcomes in 2018 cannot affect the predetermined level of individual financial knowledge in 2012. Additionally, we control for a wide range of individual characteristics related to both financial outcomes and financial literacy that may bias estimates, if omitted.[1]

This research represents one of the first attempts to collect and analyze longitudinal data on financial literacy and financial outcomes for the U.S. As such, it offers important insights into what shapes household saving and planning for the future, with a specific focus on the role that financial knowledge plays in determining financial decisions and outcomes. In particular, while many studies find a positive correlation between financial literacy and financial outcomes in cross-sectional data, it is largely unknown whether the gap in financial preparedness between those with low and high financial literacy widens or narrows over time. Such knowledge is crucial for devising and implementing interventions that can effectively improve the financial decision-making and financial wellbeing of households, particularly among groups for which resources are relatively scarce and psychological and other hurdles towards saving and planning for the future are more difficult to overcome.

The Stability of Financial Literacy Over Time

In both waves of data (2012 and 2018), we administered a five-question quiz covering fundamental concepts of economics and finance, which have become known as the Big Five. The quiz includes simple calculations of interest in a savings account, the workings of inflation, the relationship between interest rate and bond prices, the relationship between the length of a mortgage and

the overall interest paid over the life of the loan, and the concept of risk diversification. The quiz can be found at www.usfinancialcapability.org/quiz.php. We construct a simple financial literacy index by counting the number of correct responses to the quiz for each individual.

Over our six-year window of analysis, we find that financial literacy remains quite stable, with a slight tendency to decline. Figure 1 highlights the distribution of correct responses across the two waves of data. The average number of correct questions is 3.53 in 2012, dropping slightly to 3.43 in 2018, which is a marginally statistically significant difference. There is little difference in the proportion of respondents answering all questions correctly across the two points in time, though a general leftward shift of the distribution between 2012 and 2018 for scores below five is observed. Nearly half of the respondents (47 percent) have the same score in 2018 as in 2012, and 87 percent have a score in 2018 within plus or minus 1 of their score in 2012.

Figure 1: Distribution of Financial Literacy Across Years
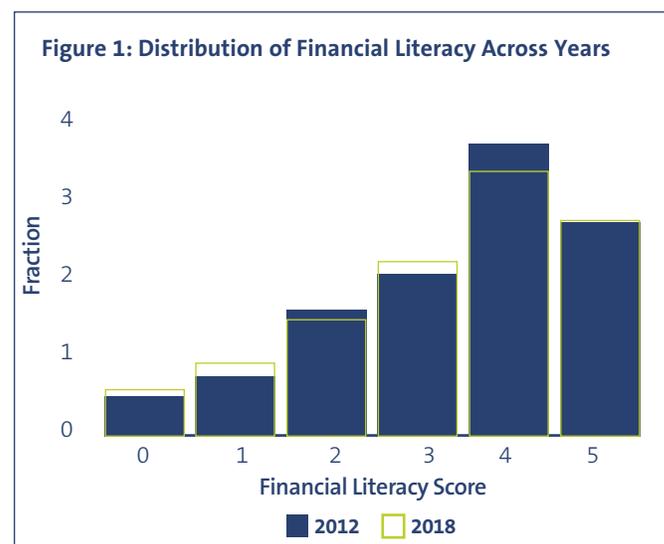
Further analysis reveals that the slight decline in average financial literacy between the two survey waves is driven primarily by reduced financial literacy among older adults. On average, financial literacy increased over time for individuals aged 18-32 in 2012, and decreased for all other age/cohorts, with the largest (and only statistically significant) decline being experienced by adults above the age of 64. This pattern could be partly attributed to cognitive aging.

[1]See the full paper for more details on the estimation strategy.

## The Predictive Power of Financial Literacy for Future Financial Outcomes

In addition to measuring changes over time in individuals' financial knowledge, our longitudinal data allow us to examine the medium term (about six years) predictive power of financial literacy. That is, controlling for observable characteristics, individual-specific traits, and current financial condition, does financial literacy predict future financial outcomes and behaviors? Specifically, we focus on six different financial outcomes, three positive and three negative (Table 1). Among the positive, we consider satisfaction with overall financial condition, ability to meet an unexpected $2,000 expense, and planning for retirement. For negative outcomes, we consider subjective perception about having too much debt, use of alternative financial services, and costly credit card behaviors (see Appendix A for more details on these measures). We regress these financial outcomes measured in 2018 on financial literacy measured in 2012. We control for the financial outcome itself, as observed in 2012, and for a wide range of individual characteristics measured in 2012, namely age, race, gender, marital status, employment status, income, education, cognitive ability, risk aversion and planning attitudes.

Table 1: Positive and Negative Financial Outcomes

Positive Outcomes	Negative Outcomes
Financially satisfied	Too much debt
Can meet $2,000 shock	Use of alternative financial services
Planned for retirement	Costly credit card behaviors

As can be seen in Figure 2, we find that financial literacy has significant predictive power for future, positive financial outcomes, while the associations with future negative financial outcomes are not statistically significant. Specifically, a one unit increase in the 2012 financial literacy index is associated with a 0.13 point increase in financial satisfaction in 2018. This corresponds to almost a 2.5 percent increase relative to mean financial satisfaction in the sample (*i.e.*, 6 on a 10-point scale). Similarly, for every one unit increase in 2012 financial literacy, individuals are 3.5 percentage
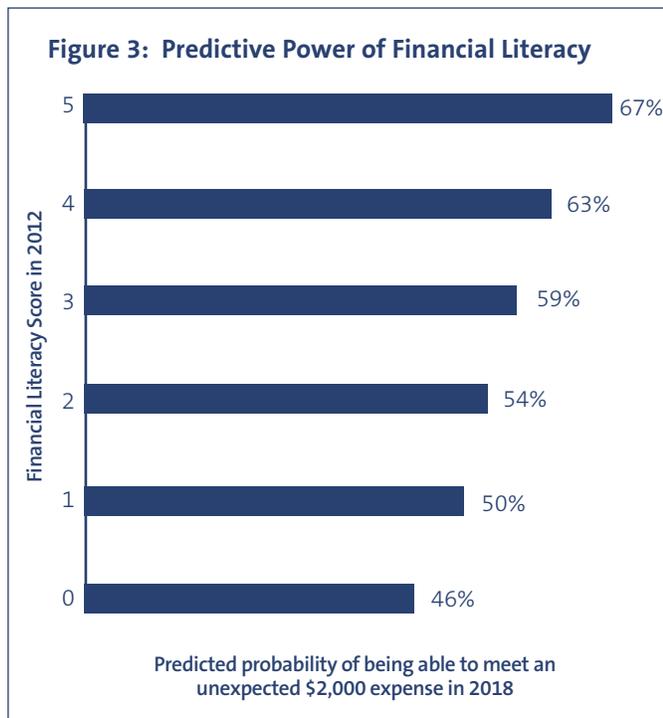
points more likely to have done any retirement planning, a 6 percent increase relative to a sample proportion of 57 percent. An additional correct answer to the financial literacy quiz in 2012 is associated with about a five percentage-point higher likelihood of being able to meet an unexpected $2,000 expense in 2018, representing a sizeable 8 percent increase relative to a sample proportion of 61 percent.
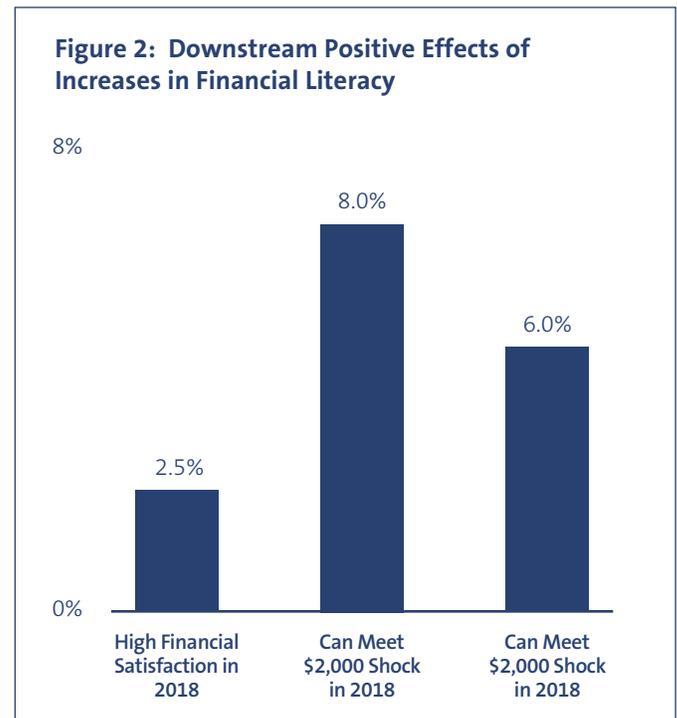
Figure 2: Downstream Positive Effects of Increases in Financial Literacy

Note: Percent increase in 2018 financial behavior relative to the mean for every one-unit increase in 2012 financial literacy score.

Figure 3 shows the predicted probabilities of being able to meet an unexpected $2,000 expense in 2018 based on the financial literacy score in 2012. These probabilities are calculated using the regression equation, which, as noted above, controls for a wide range of demographic and other variables and the ability to meet an unexpected $2,000 expense in 2012. According to the estimated effect described above, the predicted probability of meeting an unexpected expense in 2018 increases monotonically from 46 percent when no financial literacy questions are answered correctly in 2012 to 67 percent when all five financial literacy questions are answered correctly in 2012, after controlling for the variables noted above.
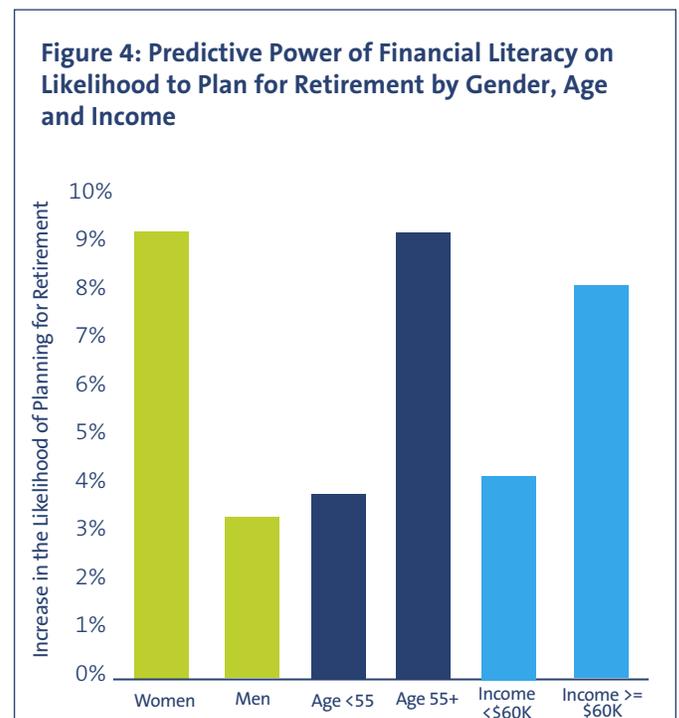
Financial literacy in 2012 is not statistically related to any of the negative financial outcomes in 2018. This suggests that poor financial decision-making may not be driven primarily by differences in financial knowledge, but may instead be attributed mainly to other factors like negative financial shocks and resource scarcity. Failure to avoid these behaviors is more plausibly driven by behavioral factors (for example, present bias, resource constraints) and financial shocks than by lack of financial knowledge.

Figure 3: Predictive Power of Financial Literacy

Financial Literacy Score in 2012 (y-axis):
- 5: 67%
- 4: 63%
- 3: 59%
- 2: 54%
- 1: 50%
- 0: 46%

Predicted probability of being able to meet an unexpected $2,000 expense in 2018

Note: Percent increase in 2018 financial behavior relative to the mean for every one-unit increase in 2012 financial literacy score.

We also investigate how the relationship between financial literacy and future financial outcomes varies across demographic groups. For example, women, individuals age 55 and older, and high-income households seem to benefit the most from better financial knowledge when it comes to retirement planning. Specifically, a one unit increase in the financial literacy score in 2012 leads to an increase in the likelihood of planning for retirement of about 4.5 percentage points for women (a statistically significant effect) and only 2 percentage points for men (a non-statistically significant effect). As reported in

Figure 4, these translate to a 9 percent and 3 percent increase from the corresponding sample proportions of 51 percent and 63 percent. Similarly, the estimated coefficients for financial literacy in 2012 indicate an increase of nearly 5.5 percentage points in the probability of retirement planning among individuals age 55 or older (a 9 percent increase from the sample proportion) and of barely 2 percentage points (3.5 percent increase from the sample proportion) among those younger than 55. Also, for individuals with income at or above $60,000, a higher financial literacy score in 2012 is associated with a 5.6 percentage-point increase in the likelihood of having done some retirement planning by 2018 (an 8 percent increase from the sample proportion of 69 percent). For those with income below $60,000, the estimated increase is only 1.7 percentage points and not statistically significant (a 4 percent increase from the sample proportion of 43 percent). We also found that gender, age, and income had different downstream effects for other dependent variables, though in the interest of space we only report the likelihood to plan for retirement here. See the full paper for these additional findings.

Figure 4: Predictive Power of Financial Literacy on Likelihood to Plan for Retirement by Gender, Age and Income

Increase in the Likelihood of Planning for Retirement (y-axis):
- Women: ~9%
- Men: ~3%
- Age <55: ~3.5%
- Age 55+: ~9%
- Income <$60K: ~4%
- Income >= $60K: ~8%

Note: Percent increase in 2018 likelihood to plan for retirement relative to the sample proportion for every one-unit increase in 2012 financial literacy score.

Concluding Remarks

While prior work has documented numerous associations between financial literacy and positive financial outcomes, relatively little work has used longitudinal data to examine how financial literacy evolves over time. Over the period 2012 – 2018, we find that financial literacy exhibits very limited within-individual variation. It appears to be rather stable, with a slight tendency to decline only at older ages. We find that financial literacy has significant predictive power for future financial satisfaction, ability to meet an unexpected large expense and retirement planning, even after controlling for baseline levels of these outcomes. In contrast, financial literacy is not associated with future negative behaviors, such as carrying too much debt, using alternative financial services, and paying interest or fees on credit cards, after controlling for baseline outcomes and characteristics. These findings, combined with the observed stability of financial literacy over time, suggest that differences in one's stock of financial knowledge can lead to increasing disparities over the life course. Thus, differential levels of financial literacy may contribute to widening inequality among different segments of the population.

Disclaimer

Appendix A

Positive Financial Outcomes

- ▶ Satisfaction with overall financial condition (measured on a 10-point scale where 1 is not at all satisfied and 10 is extremely satisfied)

- ▶ Ability to meet an unexpected $2,000 expense (a binary indicator where 1 means the respondent could probably or certainly come up with money to cover the unexpected expense and 0 means otherwise)

- ▶ Planned for retirement (a binary indicator where 1 means the respondent has spent at least some time planning for retirement and 0 means otherwise)

Positive Financial Outcomes

- ▶ Subjective perception about having too much debt (measured on a 7-point scale where 1 means the respondent does not think they have too much debt and 7 means they strongly believe they have too much debt)

- ▶ Use of alternative financial services (a binary indicator where 1 means the respondent used any of the following: auto title loan, payday loan, rapid refund, pawn shop, or rent-to-own shop and 0 means otherwise)

- ▶ Costly credit card behavior (a binary indicator where 1 means the respondent has paid only the minimum on their credit card, incurred a fee for late payment, incurred an over-the-limit fee, or used their credit card for a cash advance and 0 means otherwise)

The survey questions can be found at www.USFinancialCapability.org.