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Financial Literacy and Financial Behavior among Young Adults: Evidence and Implications

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Abstract
This paper uses data from the 2009 National Financial Capability Study to examine financial literacy and financial behavior in a sample of approximately 4,500 young adults age 25 to 34. The paper finds that most young adults lack basic financial knowledge. Financial literacy is especially low among certain demographic groups, such as women, minorities, and lower-income or less-educated people. A high level of education, however, is not a guarantee of financial literacy. Only 49% of young respondents with a college education and 60% of young respondents with postgraduate education could correctly answer three simple questions designed to assess financial literacy. Results show that respondents who display higher financial literacy or higher confidence in their math or personal finance knowledge have better financial outcomes: they are less likely to use high-cost borrowing methods, and they are more likely to plan for retirement or have set aside savings for emergencies.

Keywords
financial literacy, financial behavior, numeracy, young

Cover Page Footnote
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Introduction

In the last twenty years financial markets have become increasingly complex. Today's financial firms offer their clients a variety of products, many of which are new and often fairly complex. Investment opportunities have expanded beyond national borders, permitting individuals to invest in a broad range of assets, and borrowing opportunities, both traditional and nontraditional, have multiplied. These dramatic changes in the financial system have occurred in conjunction with structural changes in social welfare policy. The shift from defined benefit to defined contribution pensions has gradually decreased employer involvement in providing retirement security to workers, meaning that individuals have to decide both how much to save and how to allocate their retirement wealth. This new financial landscape means that individuals today have greater responsibility for their financial well-being than in the past. Wise and timely saving and investment decisions can be key for financial security, while the consequences of financial mistakes can be dire.

This study focuses on a specific segment of the population: young adults age 25 to 34. Young adults today have ample borrowing opportunities and access to a wide range of financial products even before entering the job market. A study from Sallie Mae (2009) reports that in 2009 84% of the student population had credit cards, an increase of approximately 8 percentage points since 2004. Even among undergraduates, only 2% had no credit history.

This paper documents that despite being financially active, most young adults are ill-equipped to deal with ever-increasing financial responsibility. Young Americans display very low levels of financial literacy, especially among certain demographic subgroups, such as women and minorities. Financial literacy is shown to increase with education, but even respondents with high levels of education display very low financial literacy: only 49% of young respondents with a college education and 60% of young respondents with postgraduate education could correctly answer three simple questions designed to assess financial literacy. Considering that two out of these three financial literacy questions test quantitative knowledge typically addressed in basic quantitative reasoning courses, the study shows that most young adults make financial decisions and deal with complex financial products despite lacking basic financial and quantitative knowledge.

Furthermore, this paper looks closely at the relationship between financial literacy and three subsets of financial behavior that relate to day-to-day and long-term financial management and can be critical to young adults' financial well-being: using high-cost methods of borrowing, holding a buffer stock of savings, and planning for retirement. The empirical evidence shows that financial literacy

is an important predictor of these financial behaviors, even controlling for demographic and economic characteristics. Specifically, financial literacy is shown to increase young adults' likelihood of having precautionary savings and planning for retirement, while it decreases the likelihood of using high-cost borrowing methods. This relationship is robust to numerous sociodemographic controls and different specifications.

This paper contributes to the literature in two ways. First, it reports new data on financial behavior among young adults, with a special focus on short-term borrowing and short-term and long-term saving. Second, the paper documents subjective evaluations of financial knowledge among young American adults, showing the divergence between subjective and objective evaluations of financial literacy and their strong association with financial decision making.

The reminder of the paper is organized as follows. The next section provides a review of previous research. Following that, the paper presents data from the National Financial Capability Study (NFCS). The two subsequent sections discuss descriptive statistics and sample demographics as well as present the empirical findings. The final section summarizes the findings and provides concluding remarks.

Background

Young adults are increasingly burdened by debt. In 2009, college seniors graduated with average credit card debt of more than $4,100, up from $2,900 almost four years previously, and close to one-fifth of college seniors carried balances greater than $7,000 (Sallie Mae 2009). Students who borrowed for college and earned bachelor's degrees in 2011 graduated with an average of $26,600 in student loan debt, a 5% increase from the previous year (Institute for College Access & Success 2011). Likelihood of student loan repayment has also deteriorated: the overall number of borrowers past due on their student loan payments has grown from under 10% in 2004 to 17% in 2012, and young adults are the segment that has shown the highest rise in default episodes on these loans (New York Federal Reserve 2013). Studying the characteristics of undergraduate and graduate borrowers with outstanding student loan balances of over $100,000, a NERA Consulting report (2012) found that about 65% of surveyed respondents misunderstood or were surprised by aspects of their student loans or the student loan process, and about two-thirds of private loan borrowers, including those who took out both private and federal loans, said that they did not understand the major differences between their private and federal options. About 20% of respondents misunderstood or were surprised by repayment terms, 20% misunderstood or were surprised by the amount of their monthly payments, and 15% misunderstood or were surprised by their loans' interest rates.

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Concerns about the degree of financial savvy of young people are confirmed by different studies and surveys. For example, many young adults have reported that they do not feel adequately prepared to make good financial choices when it comes to using debt wisely (28%), saving for the future (40%), or investing their money (43%) (Schwab Moneywise 2009). Looking to actual financial knowledge, Lusardi and Mitchell (2008, 2011a, 2011b, 2011c) show that the capacity to do a simple interest rate calculation and the knowledge of inflation and risk diversification are strikingly low among the young (a finding confirmed by Lusardi, Mitchell, and Curto 2010).

The financial literacy literature has linked financial knowledge to several indicators of financial behavior. For example, those who are less financially literate are found to be less likely to plan for retirement (Lusardi and Mitchell 2007, 2008, 2009, 2011a, 2011c), less likely to accumulate wealth (Stango and Zinman 2009; Van Rooij et al. 2012), and less likely to participate in the stock market (Van Rooij et al. 2011; Yoong 2011). Moreover, less financially literate individuals are found to be more likely to pay high interest and fees on their debt (Lusardi and Tufano 2009) and to use high-cost methods of borrowing (Lusardi and de Bassa Scheresberg 2013).

Data

The data used in this paper are drawn from the US National Financial Capability Study (NFCS). [1] The study was fielded in the United States in 2009 and consists of three linked surveys: (1) the National Survey, a nationally projectable telephone survey of 1,488 American adults; (2) the State-by-State Survey, a state-by-state online survey of approximately 28,000 American adults; and (3) the Military Survey, an online survey of 800 military service members and spouses. This paper uses the state-by-state online survey to make use of a large sample of young adults.

The NFCS contains information on four key components of financial capability: (1) making ends meet, (2) planning ahead, (3) managing financial products, and (4) financial knowledge and decision-making. In addition, it provides a rich set of demographic information, including gender, ethnicity, age, education, income, marital and employment status, number of children, and state of residence. A detailed description of the data is reported in Lusardi (2011) and on the FINRA Investor Education website, where the data can be freely downloaded.[2]

[1] The data collection and design of the survey instruments were supported by the FINRA Investor Education Foundation.

[2] The NFCS website is http://www.usfinancialcapability.org/

To study young adults, the sample has been restricted to respondents age 25 to 34. This ensures that most respondents are likely to have completed their education. Moreover, these are individuals who likely have engaged or will engage in important financial decisions, such as buying a home, buying a car, or contributing to a retirement account. Some observations (466) are excluded from the sample because information is missing on one or more controls used in this study. The final sample amounts to 4,468 observations.

Table 1
Summary statistics, demographic characteristics

	Mean
Male	51%
Female	49%
White	57%
African-American	12%
Hispanic	21%
Asian American	7%
Other ethnicity	2%
Age 25–29	48%
Age 30–34	52%
Married	51%
Single	41%
Separated	8%
Widow/-er	0.2%
Number of children	1.2
Employed	61%
Self-employed	7%
Unemployed	10%
Income less than USD 15K	12%
Income USD 15–25K	12%
Income USD 25–35K	15%
Income USD 35–50K	17%
Income USD 50–75K	20%
Income USD 75–100K	12%
Income USD 100–150K	8%
Income more than USD 150K	4%
Less than high school education	3%
High school	24%
Some college	39%
College	23%
Postgraduate	10%
N	4,468

Note: All statistics are weighted

Table 1 reports descriptive statistics.[3] About 50% of respondents are male, and 57% are white. Approximately half of the respondents are married and 41% are single. Ten percent of young adults are unemployed and 24% have an annual household income lower than $25,000. A third of respondents reported having a college degree or postgraduate education.

[3] The sample used in this study was weighted to match the US adult population (age 18 and up) by age, gender, ethnicity, education, and census division. For more information, see the report by FINRA Investor Education Foundation (2009).

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Tests for sample selection show that the observations that were excluded due to missing information are more likely to represent vulnerable groups: excluded respondents have, on average, lower income, lower educational attainment, and are more likely to be unemployed. Excluded respondents are also less likely to be Asian American or Hispanic.[4]

Descriptive Findings

Most young adults deal regularly with a variety of financial instruments; 94% of respondents have a bank account, and 72% have one or more credit cards to finance everyday expenses. Also, more than four in five of those who own a house currently have a mortgage on it.

These high levels of financial activity are accompanied by many signs of financial distress. For example, more than one-third of respondents reported occasionally overdrawing their checking account, and 16% reported having withdrawn money from their retirement account. About 60% of respondents with credit cards incurred significant charges in the twelve months prior to the study, i.e., in some months they paid the minimum payment only, exceeded their credit limit, used the card for a cash advance, or paid a late payment fee.

Signs of financial distress are associated with financial decisions that relate to both the asset and the liability side of the balance sheet. To examine how young adults make financial decisions, the paper focuses on three indicators of short-term and long-term financial behavior: use of high-cost methods of borrowing, holding precautionary savings, and planning for retirement.

Use of high-cost borrowing methods is examined by analyzing whether respondents used payday loans, pawn shops, auto title loans, refund anticipation loans, or rent-to-own shops in the five years prior to the study.
Specifically, respondents were asked the following question:

> *Please tell me if you've done any of the following in the past five years:*
> *Have you taken out an auto title loan?*
> *Have you taken out a short term "payday" loan?*
> *Have you gotten an advance on your tax refund (This is sometimes called a "refund anticipation loan" or "rapid refund")?*
> *Have you used a pawn shop?*
> *Have you used a rent-to-own store?*

The set of possible answers to each of these questions is *yes*, *no*, *do not know*, and *refuse to say*. An indicator variable is constructed that takes the value of one

[4] The two samples were compared by looking at the statistical significance of differences in means.

if the respondent has used one of these methods of borrowing in the five years prior to the survey, and zero otherwise.

Using this definition, data show that as many as 35% of young adults participating in the NFCS used at least one high-cost method of borrowing in the five years prior to the study (Table 2). This finding is worrisome as alternative financial services normally charge very high interest rates, and past evidence has documented that use of these borrowing methods is especially frequent among individuals with low financial literacy (Lusardi and de Bassa Scheresberg 2013). Analyzing data on payday lending, Elliehausen and Lawrence (2001) and Elliehausen (2005) report that most payday borrowers cannot accurately recall annual percentage rates despite being able to report finance charges, suggesting that most borrowers consider charges rather than annual percentage rates (APRs) in making borrowing decisions. Demographic statistics show that more-frequent users of high-cost borrowing methods are the younger cohort (ages 25 to 29), minorities (African-Americans and Hispanics), and those with low educational attainment (less than a college degree).

Table 2
Financial Outcomes

	High-cost borrowing	Emergency savings	Planning for retirement
All	35%	30%	35%
Age			
25–29	37%	30%	32%
29–34	33%	31%	37%
Gender			
Men	31%	37%	39%
Women	38%	24%	30%
Ethnicity			
White	33%	29%	35%
African-American	49%	24%	31%
Hispanic	36%	31%	34%
Asian American	15%	52%	36%
Other ethnicity	45%	21%	34%
Education			
Less than high school	56%	17%	17%
High school	47%	22%	25%
Some college	39%	24%	32%
College	20%	43%	43%
Postgraduate	11%	50%	54%

Note: All statistics are weighted.

Another variable of interest is precautionary savings. Respondents were asked the following question, with possible answers being *yes*, *no*, *do not know*, and *refuse to say*:

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Have you set aside emergency or rainy day funds that would cover your expenses for three months in case of sickness, job loss, economic downturn, or other emergencies?

Data show that the majority of young adults surveyed in the NFCS do not have a buffer stock of savings: less than one-third of respondents reported having rainy day funds that would cover their expenses for three months in case of sickness, job loss, economic downturn, or other emergencies. This result is consistent with other studies. For example, Lusardi et al. (2011) found that very few Americans could come up with $2,000 in thirty days. Many young adults are not only unprepared to deal with unexpected shocks but are also not planning for the long run. Respondents were asked the following question, again with possible answers being *yes*, *no, do not know,* and *refuse to say*:

Have you ever tried to figure out how much you need to save for retirement?

Only 35% responded that they have tried to figure out how much they need to save for their retirement, despite the fact that many respondents are likely to be in jobs in which they have had to decide whether to contribute to a retirement plan, how much to put into the account, and how to invest those savings. These statistics are worrisome considering that retirement planning has been shown to be a strong predictor of retirement wealth; those who plan for retirement have much higher amounts of wealth than those who do not plan (Lusardi 1999).

To understand how adequately young adults are equipped with the knowledge required to make these financial decisions, this paper looks at two distinct sets of financial literacy measures: subjective and objective assessment questions. Subjective assessment questions include two questions in which respondents are asked to evaluate their personal financial knowledge:[5]

On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?

and

How strongly do you agree or disagree with the following statement? "I am pretty good at math."

Both questions are assessed on a scale from 1 to 7. In the first question, 1 indicates very low knowledge and 7 indicates very high knowledge. In the second

[5] The original questionnaire includes two other questions on self-assessed financial ability. These questions measure on a scale from 1 to 7 how strongly the respondent agrees with the statements "I am good at dealing with day-to-day financial matters" and "I regularly keep up with economic and financial news." This paper does not make use of these questions because it focuses on financial literacy and numeracy.

question, 1 means that the respondent strongly disagrees with the statement and 7 means that the respondent strongly agrees with it. More than a third of respondents assessed their financial knowledge to be between 1 and 4, with an average score of 4.8 (Table 3). Self-confidence in math skills is higher, with the average score being 5.5. Only 23% of respondents gave themselves a score of between 1 and 4 in math confidence and many gave themselves high scores. The average confidence in math skills is never lower than 5 across all education groups.

Table 3
Self-confidence in math and financial knowledge

	Self-assessed financial knowledge	How much do you agree with the following sentence? "I am good at math."
All	4.8	5.5
Age		
25–29	4.8	5.5
29–34	4.9	5.5
Gender		
Men	5.0	5.8
Women	4.7	5.3
Ethnicity		
White	4.8	5.5
African-American	5.0	5.7
Hispanic	4.8	5.4
Asian American	5.0	5.7
Other ethnicity	4.7	5.5
Education		
Less than high school	4.4	5.4
High school	4.7	5.2
Some college	4.8	5.5
College	5.1	5.7
Postgraduate	5.2	5.9

Notes: Scores are on a scale from 1 to 7. All statistics are weighted.

The survey also included a set of basic financial knowledge questions designed to objectively assess respondents' financial literacy. These questions were first designed by Lusardi and Mitchell for the US Health and Retirement Study (2008, 2011a) and since then have been included in numerous studies performed in the United States and abroad (for an international comparison of financial literacy, see Lusardi and Mitchell 2011b).

The wording of the three financial knowledge questions is as follows (correct answers are indicated with two asterisks):

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1. *Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?*
   *More than $102 ***
   Exactly $102
   Less than $102
   Do not know
   Refuse to answer

2. *Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?*
   More than today
   Exactly the same
   *Less than today ***
   Do not know
   Refuse to answer

3. *Please tell me whether this statement is true or false. "Buying a single company's stock usually provides a safer return than a stock mutual fund."*
   True
   *False ***
   Do not know
   Refuse to answer

These questions test knowledge that is at the basis of most financial decisions. Specifically: (i) numeracy and capacity to do calculations related to interest rates; (ii) understanding of inflation; and (iii) understanding of risk diversification and of stocks and mutual funds.

Respondent's subjective financial knowledge assessments do not mirror the results of the objective financial literacy measures. Many respondents gave themselves high scores, yet did not demonstrate a high level of financial literacy. While almost 80% of respondents correctly answered the interest rate question, only 55% correctly answered the question about inflation, and just half of respondents were able to correctly answer the risk diversification question (Table 4).[6] Overall, only 34% of young adults were able to correctly answer all three financial literacy questions, and one in two respondents answered at least once with "do not know."

[6] The percentage of respondents who refused to answer the financial literacy questions is very low (lower than 1% in each of the questions).

Table 4
Financial Literacy

	Interest		Inflation		Risk		Overall	
	Correct	DK	Correct	DK	Correct	DK	3 Correct	>1 DK
All	79%	10%	55%	23%	50%	43%	34%	50%
Age								
25–29	78%	10%	51%	25%	47%	45%	30%	53%
29–34	80%	9%	58%	21%	53%	41%	37%	48%
Gender								
Men	85%	7%	65%	15%	59%	33%	45%	39%
Women	74%	12%	43%	31%	41%	52%	22%	61%
Ethnicity								
White	82%	9%	58%	22%	51%	43%	37%	49%
African-American	70%	11%	43%	28%	42%	44%	20%	57%
Hispanic	77%	11%	49%	25%	47%	45%	29%	52%
Asian American	83%	7%	62%	19%	63%	30%	46%	41%
Other ethnicity	83%	6%	57%	18%	50%	44%	32%	50%
Education								
Less than high school	62%	22%	32%	40%	21%	70%	10%	75%
High school	70%	15%	40%	32%	35%	56%	18%	65%
Some college	80%	9%	52%	24%	48%	45%	31%	54%
College	88%	5%	68%	14%	64%	29%	49%	36%
Postgraduate	89%	5%	76%	11%	72%	21%	60%	27%

Note: All statistics are weighted.

Similar findings have been documented in other studies of young respondents. Lusardi et al. (2010) examine data from the National Longitudinal Survey of Youth on individuals aged 23–28 and find that only 27% of respondents were able to correctly answer the same three financial literacy questions as were used in the NFCS.

Even though the overall level of financial literacy among young adults is low, there are considerable differences among demographic groups. Older respondents in this age cohort (those age 30–34) perform better than their younger peers, and men provide more correct responses than women. As noted in other studies (Lusardi and Mitchell 2008; Mottola 2012), women tend to answer more frequently with "do not know": this answer was selected at least once by 61% of women. There are also marked differences among ethnic groups. On average, white and Asian American respondents score better on all three questions. Finally, there is an important educational divide in financial literacy: among those who do not have a college degree, just 25% responded correctly to all three questions, as opposed to 52% of those who have a college degree or postgraduate education. However, even at high levels of education, financial literacy is lacking: only 60% of respondents with postgraduate education answered all three of the questions correctly, and more than one-fourth answered with "do not know" at least once.

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Results of Multivariate Analysis

Financial Literacy

This section discusses results from multiple multivariate regressions designed to assess how sociodemographic characteristics and risk preferences interact with financial literacy. Table 5 reports the estimates for financial literacy. The sample consists of 4,468 observations for which data are available for all variables, and the same specification is used for all regressions. Dependent variables are dummy variables characterizing respondents who correctly answer the interest, inflation, and risk questions or answer "do not know" to each of these questions. [7] Covariates include controls for gender, income, education, marital status, employment status, ethnicity, age, and number of children. Geographical differences are accounted for by using dummies for each US state.[8]

Empirical estimates show a number of interesting patterns. First, there is a strong gender difference in the responses to the financial literacy questions. Even after accounting for a large set of demographic and economic characteristics, women are less likely to correctly answer each of the three financial literacy questions. Moreover, women are much more likely to answer "do not know." The gender difference is greater for the inflation question, to which female respondents are found to be 20 percentage points less likely to answer correctly and 13 percentage points more likely to indicate "do not know." A smaller difference is found for the interest rate question. Here, the gender difference is 11 percentage points, and women are 6 percentage points more likely to answer with "do not know." Finally, women are 13 percentage points less likely to correctly answer the risk diversification question.

Sharp differences are also found across race/ethnicity. Compared to white respondents, African-American, Hispanic, and Asian American respondents are 3 to 11 percentage points less likely to correctly answer the financial literacy question, while differences are not significant for "do not know" responses. [9]

[7] Dummy variables for correct answers take the value of one if the respondent has indicated the correct answer to the question, and zero otherwise. Similarly, dummy variables for "do not know" answers take the value of one if the respondent has answered "do not know" to the question, zero otherwise.

[8] Coefficients for state dummies are not reported in the table.

[9] The difference in correct answers to the risk diversification question is not statistically significant for Asian Americans. Also, differences are never statistically significant for the category "other ethnicities," possibly because of the small size of the group (it represents only 2.5% of the total sample).

Table 5
Multivariate Regressions, Financial Literacy

	(1) Interest correct	(2) Interest DK	(3) Inflation correct	(4) Inflation DK	(5) Risk correct	(6) Risk DK
Female	-0.110***	0.057***	-0.200***	0.132***	-0.126***	0.126***
	(0.013)	(0.009)	(0.015)	(0.013)	(0.015)	(0.015)
African-American	-0.099***	0.013	-0.106***	0.050**	-0.068***	-0.002
	(0.020)	(0.015)	(0.024)	(0.021)	(0.024)	(0.024)
Hispanic	-0.035**	0.015	-0.087***	0.015	-0.038*	0.013
	(0.017)	(0.012)	(0.020)	(0.017)	(0.020)	(0.020)
Asian American	-0.057**	0.010	-0.089***	0.053**	0.000	-0.022
	(0.025)	(0.019)	(0.030)	(0.026)	(0.030)	(0.030)
Other ethnicity	0.021	-0.038	0.006	-0.041	0.012	-0.019
	(0.038)	(0.028)	(0.045)	(0.039)	(0.045)	(0.045)
Age 30–34	0.000	0.006	0.048***	-0.017	0.038***	-0.019
	(0.012)	(0.009)	(0.014)	(0.013)	(0.015)	(0.014)
Single	-0.020	-0.001	-0.010	0.002	-0.023	0.030*
	(0.015)	(0.011)	(0.018)	(0.015)	(0.018)	(0.018)
Separated	0.003	-0.027	-0.003	-0.017	-0.035	0.035
	(0.023)	(0.017)	(0.028)	(0.024)	(0.028)	(0.028)
Widow	-0.200*	0.173**	0.307**	-0.056	-0.007	-0.005
	(0.118)	(0.087)	(0.139)	(0.122)	(0.140)	(0.139)
One child	-0.002	0.001	-0.072***	0.055***	-0.040*	0.011
	(0.017)	(0.013)	(0.020)	(0.018)	(0.020)	(0.020)
Two children	-0.029	0.013	-0.050**	-0.005	-0.051**	0.022
	(0.018)	(0.013)	(0.021)	(0.018)	(0.021)	(0.021)
Self-employed	-0.028	-0.004	-0.014	0.017	0.027	0.010
	(0.023)	(0.017)	(0.027)	(0.024)	(0.027)	(0.027)
Unemployed	0.023	-0.000	0.004	0.015	-0.016	0.018
	(0.021)	(0.015)	(0.024)	(0.021)	(0.024)	(0.024)
Income USD 15–25K	0.066***	-0.056***	0.090***	-0.039	0.000	0.016
	(0.025)	(0.018)	(0.029)	(0.025)	(0.029)	(0.029)
Income USD 25–35K	0.056**	-0.057***	0.055*	-0.038	-0.004	0.012
	(0.024)	(0.018)	(0.028)	(0.025)	(0.029)	(0.028)
Income USD 35–50K	0.067***	-0.054***	0.089***	-0.043*	0.065**	-0.010
	(0.024)	(0.018)	(0.028)	(0.024)	(0.028)	(0.028)
Income USD 50–75K	0.113***	-0.076***	0.108***	-0.091***	0.089***	-0.040
	(0.024)	(0.018)	(0.028)	(0.025)	(0.028)	(0.028)
Income USD 75–100K	0.159***	-0.099***	0.185***	-0.102***	0.088***	-0.028
	(0.027)	(0.020)	(0.032)	(0.028)	(0.032)	(0.032)
Income USD 100–150K	0.126***	-0.093***	0.197***	-0.097***	0.123***	-0.047
	(0.031)	(0.023)	(0.037)	(0.032)	(0.037)	(0.037)
Income over USD 150K	0.111***	-0.096***	0.079*	-0.051	0.087*	-0.040
	(0.038)	(0.028)	(0.045)	(0.039)	(0.045)	(0.045)
High school	0.067*	-0.059**	0.054	-0.071**	0.121***	-0.142***
	(0.034)	(0.025)	(0.041)	(0.035)	(0.041)	(0.041)
Some college	0.162***	-0.121***	0.164***	-0.140***	0.243***	-0.240***
	(0.034)	(0.025)	(0.040)	(0.035)	(0.040)	(0.040)
College	0.212***	-0.143***	0.275***	-0.210***	0.334***	-0.349***
	(0.036)	(0.026)	(0.042)	(0.037)	(0.043)	(0.042)
Post graduate	0.221***	-0.141***	0.348***	-0.235***	0.388***	-0.401***
	(0.039)	(0.029)	(0.046)	(0.041)	(0.047)	(0.046)
Risk preference: medium	-0.004	0.005	0.040**	-0.072***	0.085***	-0.094***
	(0.014)	(0.011)	(0.017)	(0.015)	(0.017)	(0.017)
Risk preference: high	-0.041***	0.031***	0.027	-0.096***	0.138***	-0.219***
	(0.016)	(0.012)	(0.019)	(0.016)	(0.019)	(0.019)
Constant	0.631***	0.227***	0.351***	0.416***	0.214***	0.688***
	(0.063)	(0.046)	(0.074)	(0.065)	(0.075)	(0.074)
State dummies	YES	YES	YES	YES	YES	YES
Observations	4,468	4,468	4,468	4,468	4,468	4,468
R-squared	0.087	0.050	0.161	0.102	0.151	0.150

Note: Coefficients for state dummies and coefficients for three children and four or more children are not reported in the table. Baseline categories dropped in the regression: male, white, age 18–24, , respondent is married, no financially dependent children, employed, income less than $15,000, less than high school education, low risk preference, and state of Alabama. Standard errors in parentheses. All statistics are weighted. *** p<0.01, ** p<0.05, * p<0.1.

The older cohort (respondents age 30–34) is about 4 percentage points more likely to correctly answer the inflation and risk diversification question, while there is an insignificant difference for the interest question. This is interesting because the inflation and the risk diversification questions require a certain degree of financial knowledge and familiarity with terms such as *inflation* and *stock mutual funds*, while the interest question is quite basic and requires more numerical ability than financial knowledge.

Income and education are important predictors of financial literacy. With respect to the reference groups, financial literacy increases sharply with the level of income and education, while "do not know" answers decline when considering higher levels of income and education.[10] Importantly, there continue to be large differences in financial literacy between those who have college degrees, a postgraduate education, even some college, and those whose education is limited to a high school degree.

A preference for high levels of investment risk is negatively correlated with correctly answering the interest question, while it is positively correlated to correct answers to the risk diversification question.

Self-Assessed Math Ability and Financial Knowledge

Similar findings are reported when looking at self-assessed financial knowledge. As shown in the regressions reported in Table 6, even after controlling for many socioeconomic indicators, women give themselves lower math and financial knowledge assessments than men. There are no significant differences, however, among ethnic groups, and there is no significant age difference. Single respondents tend to give themselves higher financial knowledge scores. Interestingly, being unemployed is negatively associated with self-confidence in math and finance skills. Further, the coefficient estimates for income are statistically significant and positive, consistent with previous findings.

Financial Behavior

An important question is whether financial literacy can be linked to financial behavior. Table 7 reports results of multivariate regressions in which high-cost borrowing, precautionary savings, and planning for retirement are used as dependent variables. Each of the dependent variables is a dummy variable that takes the value one or zero, where zero also includes "do not know" and "prefer not to say" responses. Regressions (1–3) use the same specification as in Tables 5 and 6, plus a control for having experienced a large income shock in the twelve

[10] The coefficients for income and education are calculated with respect to the reference groups of individuals with annual income lower than $15,000 and no high school education. See Table 5 footnote for the full list of reference groups.

Table 6
Multivariate Regressions, Self-Assessed Math and Personal Finance Knowledge

	(1) Self-assessed knowledge	(2) "I am good at math"
Female	-0.435***	-0.144***
	(0.053)	(0.040)
African-American	0.093	0.173***
	(0.085)	(0.063)
Hispanic	-0.072	-0.012
	(0.070)	(0.053)
Asian American	-0.002	-0.036
	(0.106)	(0.079)
Other ethnicity	0.129	-0.023
	(0.159)	(0.119)
Age 30–34	-0.061	-0.036
	(0.051)	(0.038)
Single	0.116*	-0.063
	(0.063)	(0.047)
Separated	0.155	-0.127*
	(0.098)	(0.073)
Widow	-1.812***	0.145
	(0.494)	(0.369)
One child	0.034	0.067
	(0.072)	(0.054)
Two children	0.160**	0.085
	(0.075)	(0.056)
Self-employed	0.059	0.110
	(0.096)	(0.072)
Unemployed	-0.005	-0.113*
	(0.086)	(0.064)
Income USD 15–25K	0.074	0.238***
	(0.103)	(0.077)
Income USD 25-35K	0.000	0.140*
	(0.101)	(0.075)
Income USD 35–50K	0.264***	0.375***
	(0.099)	(0.074)
Income USD 50–75K	0.289***	0.454***
	(0.100)	(0.075)
Income USD 75–100K	0.493***	0.551***
	(0.113)	(0.084)
Income USD 100–150K	0.480***	0.549***
	(0.131)	(0.098)
Income over USD 150k	0.491***	0.538***
	(0.158)	(0.118)
High school	-0.181	0.093
	(0.144)	(0.108)
Some college	0.142	0.148
	(0.142)	(0.106)
College	0.248*	0.311***
	(0.150)	(0.112)
Postgraduate	0.289*	0.272**
	(0.165)	(0.123)
Risk preference: medium	0.125**	0.242***
	(0.060)	(0.044)
Risk preference: high	0.254***	0.722***
	(0.067)	(0.050)
Constant	5.207***	4.102***
	(0.263)	(0.196)
State dummies	YES	YES
Observations	4,468	4,468
R-squared	0.073	0.130

Notes: Coefficients for state dummies and coefficients for three children and four or more children are not reported in the table. Baseline categories dropped in the regression: male, white, age 18–24, respondent is married, no financially dependent children, employed, income lower than $15,000, less than high school education, low risk preference, and state of Alabama. Standard errors in parentheses. All statistics are weighted. *** p<0.01, ** p<0.05, * p<0.1.

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Table 7
Financial Behavior and Financial Literacy

	(1) HC borrowing	(2) Emergency fund	(3) Retirement plan	(4) HC borrowing	(5) Emergency fund	(6) Retirement plan
All three questions correct	-0.064***	0.030**	0.159***	-0.059***	0.025*	0.155***
	(0.015)	(0.015)	(0.016)	(0.015)	(0.015)	(0.016)
Female	0.007	-0.055***	-0.014	0.012	-0.062***	-0.019
	(0.014)	(0.014)	(0.015)	(0.014)	(0.014)	(0.015)
Black	0.100***	-0.013	0.032	0.084***	-0.003	0.040*
	(0.022)	(0.022)	(0.023)	(0.022)	(0.022)	(0.023)
Hispanic	-0.032*	0.047**	0.024	-0.036**	0.051***	0.027
	(0.019)	(0.018)	(0.019)	(0.019)	(0.018)	(0.019)
Asian	-0.072**	0.122***	-0.079***	-0.073***	0.122***	-0.078***
	(0.028)	(0.027)	(0.029)	(0.028)	(0.027)	(0.028)
Other ethnicity	0.061	-0.048	-0.006	0.055	-0.041	-0.000
	(0.042)	(0.041)	(0.043)	(0.042)	(0.041)	(0.043)
Age 30–34	-0.032**	-0.010	0.006	-0.026**	-0.016	0.002
	(0.014)	(0.013)	(0.014)	(0.013)	(0.013)	(0.014)
Single	0.043**	-0.043***	-0.003	0.020	-0.024	0.012
	(0.017)	(0.016)	(0.017)	(0.017)	(0.016)	(0.017)
Separated	0.069***	-0.098***	-0.015	0.032	-0.070***	0.005
	(0.026)	(0.025)	(0.026)	(0.026)	(0.025)	(0.027)
Widow	0.127	0.159	-0.099	0.128	0.164	-0.094
	(0.131)	(0.127)	(0.133)	(0.129)	(0.127)	(0.132)
One child	0.109***	-0.046**	-0.005	0.109***	-0.048***	-0.007
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Two children	0.127***	-0.077***	0.008	0.128***	-0.078***	0.006
	(0.020)	(0.019)	(0.020)	(0.020)	(0.019)	(0.020)
Self-employed	-0.040	0.024	0.029	-0.033	0.026	0.032
	(0.025)	(0.025)	(0.026)	(0.025)	(0.025)	(0.026)
Unemployed	-0.028	0.001	-0.061**	-0.031	0.012	-0.052**
	(0.023)	(0.023)	(0.024)	(0.023)	(0.023)	(0.024)
Income USD 15–25K	0.134***	-0.034	0.076***	0.143***	-0.036	0.077***
	(0.027)	(0.027)	(0.028)	(0.027)	(0.027)	(0.028)
Income USD 25–35K	0.029	0.011	0.072***	0.059**	-0.011	0.058**
	(0.027)	(0.026)	(0.027)	(0.027)	(0.026)	(0.027)
Income USD 35–50K	0.050*	0.018	0.078***	0.090***	-0.015	0.055**
	(0.026)	(0.026)	(0.027)	(0.027)	(0.026)	(0.027)
Income USD 50–75 K	-0.044*	0.067***	0.149***	0.010	0.019	0.114***
	(0.027)	(0.026)	(0.027)	(0.027)	(0.027)	(0.028)
Income USD 75–100 K	-0.077**	0.176***	0.222***	-0.011	0.118***	0.179***
	(0.030)	(0.029)	(0.031)	(0.031)	(0.030)	(0.031)
Income USD 100–150K	-0.098***	0.188***	0.260***	-0.026	0.125***	0.214***
	(0.035)	(0.034)	(0.035)	(0.036)	(0.035)	(0.036)
Income over USD 150 K	-0.087**	0.293***	0.332***	-0.012	0.227***	0.282***
	(0.042)	(0.041)	(0.043)	(0.043)	(0.042)	(0.044)
High school	-0.039	0.015	0.048	-0.014	-0.000	0.039
	(0.038)	(0.037)	(0.039)	(0.038)	(0.037)	(0.039)
Some college	-0.093**	0.000	0.072*	-0.069*	-0.013	0.065*
	(0.038)	(0.037)	(0.038)	(0.038)	(0.037)	(0.038)
College	-0.174***	0.080**	0.106***	-0.143***	0.058	0.092**
	(0.040)	(0.039)	(0.040)	(0.040)	(0.039)	(0.041)
Postgraduate	-0.217***	0.075*	0.155***	-0.189***	0.055	0.144***
	(0.044)	(0.043)	(0.045)	(0.044)	(0.043)	(0.045)

(*table continues on next page*)

Risk preference: medium	-0.019	0.082***	0.061***	-0.015	0.079***	0.058***
	(0.016)	(0.015)	(0.016)	(0.016)	(0.015)	(0.016)
Risk preference: high	0.044**	0.138***	0.185***	0.054***	0.129***	0.178***
	(0.018)	(0.017)	(0.018)	(0.018)	(0.017)	(0.018)
Income shock	0.163***	-0.087***	0.058***	0.159***	-0.080***	0.064***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Home ownership				-0.115***	0.092***	0.073***
				(0.015)	(0.015)	(0.015)
No health insurance				0.005	-0.048***	-0.041**
				(0.017)	(0.016)	(0.017)
Banked				-0.140***	0.070**	0.028
				(0.029)	(0.029)	(0.030)
Constant	0.385***	0.286***	-0.073	0.501***	0.244***	-0.088
	(0.070)	(0.068)	(0.071)	(0.072)	(0.071)	(0.074)
Observations	4,468	4,468	4,468	4,468	4,468	4,468
R-squared	0.189	0.172	0.160	0.205	0.183	0.166

Notes: Coefficients for state dummies and coefficients for 3 children and 4 or more children are not reported in the table. Baseline categories dropped in the regression: male, White, age 18-24, , respondent is married, no financially dependent children, employed, income lower than 15,000 dollars, less than high school education, low risk preference, and state of Alabama. Standard errors in parentheses. All statistics are weighted. *** p<0.01, ** p<0.05, * p<0.1

months prior to the fielding of the survey. The last three columns (4–6) include additional controls for home ownership, having health insurance, and being banked. [11] Most important, the regression included a measure of financial literacy that is a dummy variable equal to one if respondents have correctly answered all three financial literacy questions, zero otherwise.

Results show that financial literacy is negatively correlated with use of high-cost borrowing methods while positively correlated with having precautionary savings and planning for retirement. Adding controls as in Columns 4–6 does not affect the statistical significance of financial literacy, even though the coefficient estimates decrease by about 0.5 percentage points. It is also important to note that financial literacy has an effect beyond the effect of education; both variables are statistically significant in all regressions, thereby suggesting that they capture different variations in the data.

Women are less likely to have precautionary savings than men, while African-Americans are more likely than whites to use high-cost borrowing methods. Asian Americans are less likely than whites to use high-cost borrowing and are more likely to have emergency funds, though less likely to plan for retirement. Age is correlated significantly only for high-cost borrowing: being older is associated with a decline in this type of borrowing. Being single or separated increases the chance of high-cost borrowing and decreases the likelihood of having emergency savings, as does having children. Interestingly,

[11] Respondents are classified as "banked" if they reported having a checking account, a savings account, a money market account, or a CD at the time of the survey. Respondents were classified as "insured" if they were covered by health insurance at the time of the survey.

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these demographic characteristics are not significantly correlated with planning for retirement, suggesting that other factors may be at work.

Income and education are positively associated with financial outcomes: those with high income and high education are much less likely to use high-cost methods of borrowing and are more likely to have a stock of precautionary savings and to plan for retirement.[12] Furthermore, having experienced a large income shock in the twelve months prior to the survey was fielded is associated with greater likelihood of using high-cost borrowing and a lower likelihood of having emergency savings. However, those who experienced a shock are more likely to plan for retirement, as documented in other papers and among other age groups (Lusardi 2003; Lusardi and Mitchell 2011c).

Finally, proxies for wealth, such as owning a home and having a checking account, are positively correlated with having precautionary savings and negatively correlated with using high-cost methods of borrowing. On the other hand, lack of health insurance predicts lack of precautionary savings and lack of planning for retirement.

Table 8 reports the same regressions but this time using self-assessed knowledge in math and finance as a variable of interest. The multivariate regression specifications shown here are the same as in Table 7; for the sake of brevity only the coefficient estimates of self-assessed literacy are reported. As can be noted from the table, self-assessed knowledge in finance and math are significantly correlated with financial outcomes and in a way similar to the financial literacy indicator: they decrease the likelihood of using high-cost methods of borrowing while they increase the likelihood of having emergency savings or planning for retirement. However, self-assessed math knowledge is not a statistically significant predictor of high-cost borrowing behavior (Columns 1 and 4).

A possible concern with the robustness of the estimates reported in the paper relate to the fact that financial literacy could be measured with error (Alessie et al. 2011; Van Rooij et al. 2011, 2012; Lusardi and Mitchell 2009). Other concerns relate to the fact that reverse causality caused by unobserved characteristics could lead to biased estimates. For example, family influence may increase both young adults' likelihood of having precautionary savings and financial knowledge. Without controlling for family influence, a positive coefficient does not imply a positive effect of financial literacy on precautionary saving. It is also possible that people gain financial knowledge by planning for retirement, instead of the other way around. Therefore, to safely draw the conclusion that financial literacy causes

[12] However, in Columns (4–6) the coefficients related to income are not statistically significant for high-cost borrowing, and the coefficients related to education are not statistically correlated to having precautionary savings.

Table 8
Financial Behavior and Self-Assessed Knowledge of Personal Finance and Math

	(1) HC borrowing	(2) Emergency fund	(3) Retirement plan	(4) HC borrowing	(5) Emergency fund	(6) Retirement plan
Panel A:						
"Good at math"	-0.006	0.008**	0.020***	-0.004	0.007*	0.019***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
R-squared	0.186	0.172	0.145	0.202	0.183	0.152
Panel B:						
Self. Fin. Knowledge	-0.016***	0.047***	0.041***	-0.011**	0.043***	0.038***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
R-squared	0.188	0.187	0.151	0.203	0.195	0.157
Controlling for banked status, home ownership, health insurance	NO	NO	NO	YES	YES	YES
State dummies	YES	YES	YES	YES	YES	YES
Observations	4,468	4,468	4,468	4,468	4,468	4,468

Note: Coefficients for state dummies and coefficients for three children and four or more children are not reported in the table. Baseline categories dropped in the regression: male, white, age 18–24, , respondent is married, no financially dependent children, employed, income less than $15,000, less than high school education, low risk preference, and state of Alabama. Standard errors in parentheses. All statistics are weighted. *** p<0.01, ** p<0.05, * p<0.1.

changes in financial behavior, other estimation methods, such as instrument variables (IV) or properly designed survey data may be used. A few studies in the literature have tried to account for these problems by using IV estimation, and they consistently report IV estimates of the effects of financial literacy that are larger than the ordinary least squares (OLS) estimates (Lusardi and Mitchell 2009; Alessie et al. 2011; Van Rooij et al. 2011, 2012).

Implications and Conclusions

This paper examines the level of financial literacy among young adults in the United States and finds that financial illiteracy is widespread in this population: only 34% of young adult respondents could correctly answer all three financial literacy questions. Financial illiteracy is found to be particularly low among women and minorities, as highlighted in past studies (for example, Lusardi and Mitchell 2008). Even after accounting for many sociodemographic characteristics, the difference in financial literacy between women and men remains sizeable and highly statistically significant, suggesting that women could be ideal targets for financial education programs. Finally, even though financial literacy is shown to increase with education, the level of financial literacy is found to be very low even among respondents with high levels of schooling.

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The paper also analyzes how financial literacy relates to three financial behaviors that are important for young adults' financial well-being: use of high-cost borrowing methods, having a stock of precautionary savings, and planning for retirement. Results show that respondents who display higher financial literacy or higher confidence in math or personal finance knowledge are less likely to use high-cost borrowing and more likely to plan for retirement or to have set aside savings for emergencies.

These results suggest that promoting financial literacy and financial education among the young could be particularly important. Policies aimed at improving financial literacy could help young people minimize the costs incurred in managing their debt and improve their financial cushion in case of an income shock or other emergency and greatly enhance their retirement security.

To summarize, there is a growing gulf between the amount of financial responsibility given to young individuals and their demonstrated ability to manage financial decisions and take advantage of financial opportunities. Hence, financial illiteracy remains a significant obstacle to both financial market efficiency and to full participation of young people in the current financial environment.

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