Old Age and the Decline in Financial Literacy

Abstract: We investigate whether knowledge of basic concepts essential to effective financial choice declines after age 60. Consistent with prior studies of cognitive decline in old age, we find that financial literacy scores decline by about 1% each year after age 60. Results from regressions by respondent groups and financial literacy topic areas suggest that the decline is not related to cohort effects or differences in gender or educational attainment. Confidence in financial decision making abilities does not decline with age. Increasing confidence and reduced abilities can explain poor credit and investment choices by older respondents.

JEL: *D14 (Personal Finance), D12 (Consumer Economics: Empirical Economics)*
Keywords: *Aging, Financial Literacy, Cognitive Ability, Household Finance*

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1. Introduction

Households age 60 and over hold 51% of all financial wealth in the United States (Figure 1). The percentage of the U.S. households over the age of 60 is predicted to increase as the baby boom cohort and greater longevity contribute to population aging (Day, 2010). Greater reliance on funding retirement through defined contribution plans tasks older Americans with greater responsibility for managing their own retirement assets and employing distribution strategies (Butrica, Iams, Smith and Toder, 2009). Despite the importance of sound financial decision making among older Americans, little is known about how age affects financial literacy.

Advanced age leads to predictable declines in cognitive abilities. The abilities to reason, retrieve information from long-term memory, and perform quantitative tasks are closely related to financial decision making. Empirical evidence suggests that mathematical skills begin declining in young adulthood and problem solving that requires experience and knowledge, also known as crystallized intelligence, peaks just before retirement age (McArdle, Ferrer-Caja, Hamagami & Woodcock, 2002). For example, academic knowledge peaks at ages 60 and declines through older adulthood (McArdle et al., 2002). Salthouse (2010) reviews a growing body of evidence from cross-sectional studies that consistently show a decline in cognitive functioning with advanced age among various decision-making domains.

Financial decision making is a form of crystallized intelligence that requires both memory and problem-solving skills. Agarwal, Driscoll, Gabaix and Laibson (2009) show that the quality of credit decisions among borrowers erodes with the decline in crystallized intelligence after peaking in the mid-50s. Despite evidence of improved general investment skill with age, investment performance declines significantly after age 70 (Korniotis and Kumar, 2011). Age is negatively related to decision-making skills closely related to financial literacy

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such as the reliance on decision rules and resistance to framing (De Bruin, Parker and Fischhoff, 2010).

Financial literacy may be conceptualized as specific human capital that can be used by an individual to make effective financial decisions. This stock of human capital is composed of both endowed skill, for example numerical ability, and attained knowledge. Optimal attained financial human capital is a function of both perceived benefit from spending time and effort on its acquisition and the costs of reading books, attending classes, talking with peers, or searching online to collect information. It is reasonable to assume that household characteristics such as education, financial asset ownership and homeownership will influence the expected benefits and costs from an investment in financial literacy. While individuals spend a lifetime acquiring financial knowledge, the ability to use this knowledge may decline with age as memory and reasoning ability fades.

A few recent studies explore both the concept of financial literacy and measurement among older households. Lusardi, Mitchell and Curto (2009) identify differences in financial knowledge among older respondents in a subsample of the 2008 Health and Retirement Study. While the authors focus on how demographics impact knowledge scores, they note that respondents over 75 were less likely to understand basic investment concepts such as stock diversification and the importance of mutual fund fees. Consistent with a loss in fluid intelligence, respondents over 75 also score lower on numeracy questions.

Variation in financial literacy within a population is to be expected since each individual has different innate cognitive ability and motives to attain financial information. If the average decline in cognitive ability were caused by a severe decline among some older individuals who are more likely to experience cognitive disease, variation in cognitive ability would increase with

age. Salthouse (2010), however, finds that standard deviation of cognitive ability does not increase with age. In fact, factors that are related to higher financial literacy such as education, race, income and wealth, are also negatively related to mortality risk (Bond-Huie, Krueger, Rogers and Hummer, 2003), suggesting a bias toward higher financial literacy scores among those who have reached advanced age.

It is possible that financial literacy may have been lower in prior age cohorts who may have had lower levels of equity market participation or reduced responsibility for funding retirement. Longer-living women who ceded financial decision making to their spouse earlier in life may also have lower levels of financial literacy due to specialization of household labor. Malmendier and Nagel (2011) find that equity market experience may explain cohort variation in equity market participation rates. Differences in motivation to invest in financial information by a cohort, or by longer-living women who see less value in learning about basic financial knowledge, will lead to bias in observed declines in mean financial literacy.

This study adds to the existing literature on financial decision making and age by estimating the actual decline in financial knowledge and the ability to apply knowledge in order to make effective financial decisions. Studies that provide evidence of a decline in investment performance with advanced age (Korniotis and Kumar, 2011) and in credit decision making (Agarwal et al., 2009) do not directly estimate the decline in financial literacy that may be driving reduced observed performance in decision making ability. Performance studies are also not able to accurately control for important demographic characteristics, such as gender, race, and education that may impact observed behavior through differences in mortality rates or cohort differences in human capital investment. We also use an improved measure of financial literacy

among a much larger population of older households than previous financial literacy studies, and specifically focus on modeling the decline in financial literacy with advanced age.

Using a new financial literacy test of basic, insurance, investments and credit knowledge needed to make basic financial decisions, we find a statistically strong and consistent decline in financial literacy among older respondents. In addition to providing the first direct test of age on financial literacy, this study explores the impact of age on financial decision-making confidence. We conduct a number of empirical analyses to address possible cohort or longevity-based biases and find that the observed financial literacy decline is robust among four financial domains and various respondent groups. We also find that confidence in financial decision making ability increases with age among all domains, which has important policy implications.

2. Methods

2.1 Financial Literacy Assessment

The objective of the financial literacy instrument is to measure both financial knowledge and the ability to appropriately apply knowledge effectively. A research team initiated development of a financial literacy instrument, tested 89 potential questions and analyzed responses with the goal of choosing questions that were not biased in terms of age, gender, race and socioeconomic status, had an unambiguous correct response, and correlated well with other high quality questions. An eight-member panel of national experts in financial literacy and its assessment reviewed the project (including goals, design, model, instrument, scoring, and results) in order to assess the proposed methods and assessment instrument.

A final instrument of 20 items covering 4 content areas (basics, borrowing, investment and insurance) includes the best performing financial literacy questions according to reliability and validity statics and the recommendations of the expert panel. In December, 2009 through

February, 2001, the 20-item survey was included as a module in the Consumer Finance Monthly Survey conducted by the Center for Human Resources Research at Ohio State University. The sample in this study includes financial literacy responses from 3,603 respondents during this time period and complete information on all instrument items allowed for financial literacy scores to be generated for 3,275 respondents.

The financial literacy instrument contains 20 items covering the four content areas of personal finance. There are two knowledge questions, two ability questions, and one confidence question for each of the four personal finance content areas. Basic personal finance concepts include elements such as time value of money, purchasing power, and personal finance accounting. Intertemporal transfers of resources include both borrowing (bringing future resources into the present for consumption through the use of revolving credit and installment loans) and investment (saving present resources for future consumption through the use of saving accounts and investing through stocks, bonds, or mutual funds). Insurance questions include insurance instruments and risk management techniques.

Construct validity estimates for our financial literacy assessment instrument are higher than for previous financial literacy instruments, and the sample size is more than twice as large as any previous literacy module (Hung, Parker and Yoong, 2009). Cronbach Alpha estimates and correlations among questions can be found in Appendix A.

2.2 Modeling Financial Literacy

Financial literacy is modeled as a function of demand for financial human capital. We assume that respondent financial literacy is a function of both attained human capital and fluid intelligence. The decision to spend the direct and indirect costs of attaining financial knowledge

is a function of the time and transaction costs and the discounted expected utility from increased consumption in future periods from making more effective financial decisions.

Higher education may proxy both a lower cost of information acquisition, a lower rate of time preference, or may involve direct exposure to financial information via business or economics coursework – all of which will increase expected financial literacy. Home ownership may be related to financial literacy both through experience with related financial products (for example insurance concepts), and by increasing the expected return to investment in tax rules. Likewise, stock ownership may involve a fixed information cost that suggests a greater expected benefit from investment in financial human capital (Peress, 2004). The use of tax-sheltered accounts requires an initial financial human capital investment and may help explain greater investment knowledge among those who actively saved during the 1980s and 1990s when the use of sheltering instruments expanded in the U.S. We use a question that asks respondents whether they have "any money in tax advantaged accounts including IRAs, Keogh plans, variable annuities or 529 plans" or "money in retirement plans through former employers such as a 401(k) or 403(b)." Financial wealth will increase the expected future payout from investing time and effort into making more informed financial decisions (Peress, 2004). Although respondents are asked to calculate their net worth, only a minority of respondents over 60 are able to provide this information (667 out of 1,757). For this reason we do not include net worth in the majority of our multivariate analysis to maintain sample size. However we do run a separate regression among those who did provide net worth information. A majority of respondents provide income information, so we control for top income quintile to capture the incentive to invest in financial information among those with the most money to manage. To

some extent, home ownership, stock ownership, the ownership of tax sheltered accounts and marital status will capture financial resource availability.

Racial differences may be attributable to differences in financial human capital inherited from parents or to differences in the frequency of financial knowledge transfer in social interactions (Brown, Izkovic, Smith and Weisbenner, 2008). Women may have lower financial literacy if households allocate financial decisions to the spouse with a lower relative cost of financial capital acquisition (Croson and Gneezy, 2009).

We first estimate mean financial literacy score by age, censored due to low sample sizes (under 10 respondents per year) after age 88. Financial literacy score is estimated as the percent correct among respondents for each year of age, as well as percent of questions correct from each of the four financial literacy score topic areas (basics, borrowing, investing and insurance). We also estimate average confidence, measured on a scale of 1 to 10, in each topic area and in total for each year of age. In order to estimate the consistency of the relation, we model financial literacy percent correct and confidence as a linear function of age. Empirical estimation of the marginal change in average cognitive test score is common in the cognitive aging literature (Salthouse, 2010).

In order to estimate the impact of age on financial literacy among individuals, we model the percent correct on financial literacy topic areas and total score (percent correct of 16 questions) as a function of age and control variables. Interaction variables of age measured as a continuous variable multiplied by whether the respondent is age 60-69, 70-79, or 80 years of age or older are substituted for a linear age variable to account for possible slope differences in the effect of age on financial literacy.

We estimate censored sample regressions as a robustness check in the event that characteristics of the over-60 sample may bias age results. The first censored sample includes only the minority (663) of respondents who provide net worth data in order to estimate whether results from the full sample regression change when we account for wealth. Because rates of educational attainment have risen in the United States during the 20th century (U.S. Census Bureau, 2010), we censor our sample only to older respondents who have a college or graduate school education. Because longevity is higher among women than men, and men may choose to invest in financial knowledge as a result of specialized labor in household production, our results may be biased by a larger proportion of older, less knowledgeable women. For this reason, we include a regression censored only to males. Finally, cohort differences in rates of return on stock investments may drive variation in equity market participation (Malmendier and Nagel, 2010). If households over 60 are less inclined to invest in equities due to their poor performance in the 1970s, this may have influenced the decision to seek out investment information. To eliminate this bias, we censor only to households who directly hold stock or mutual fund investments.

Another potential criticism of estimating the relation between age and financial literacy is the possibility that older households were less likely to be exposed to financial instruments less common in their peak borrowing and saving life cycle years. One exception is insurance products. Cohort ownership rates of life insurance are higher among older households than among the baby boomer cohort (Chen, Wong and Lee, 2001). In addition, insurance products were a common sheltered savings vehicle prior to the 401(k) and IRA era that began in the 1980s. The four financial literacy questions related to household insurance present less potential cohort bias than other topic areas. We estimate regressions on the percent correct (out of four

questions) from within each of the four financial literacy topic areas, including insurance, investments, borrowing and basics in order to detect possible differences in the marginal effect of aging against knowledge in different literacy domains.

Confidence in financial ability is measured through a question asking respondents to rate on a scale of 1 to 10 how confident they are in making decisions within each of the four financial literacy topic areas. We model confidence in each topic area, and the summed total of all four topic areas, as a function of age, financial literacy within that topic area (or total financial literacy score), and control variables. Coefficient estimates indicate the marginal effect of age on financial confidence controlling for actual ability.

3. Results

Figure 2 shows a steady decline in average financial literacy scores with age. While measured financial literacy declines with age, confidence in financial decision making does not. The linear decline in average financial literacy is confirmed when age is regressed against financial literacy score (Table 1). There is a 2.8% annual decline in average financial literacy score between the ages of 60 and 88, and the relation is remarkably consistent (R-squared of 0.90). Confidence in financial decision making ability increases slightly with age, but the relation is not consistent.

Figure 3 shows the consistency of the age effect on financial literacy topic area. The decline in financial literacy is confirmed when age is regressed against questions related to financial basics, borrowing, investment and insurance (Table 1). The strongest age effect is observed in the investment topic and the weakest in the insurance topic, however the effect is large (at least 2% annual decline) and consistent (minimum R-squared 0.74) within each domain. The only observed relation between age and confidence is within the topic area of insurance.

Table 2 shows average percent of correct responses to financial literacy questions by respondent characteristics. Financial literacy scores in each topic area decline with age. Percent correct for respondents age 60-69 is more than twice as high for investment questions as respondents age 80 or above. There is a similar decline in literacy score for basics, borrowing and insurance, and the total literacy score drops by 23% for respondents in their 70s and by 47% for respondents in their 80s. We observe higher financial literacy scores for characteristics that either decrease the cost of financial knowledge investment or increase the perceived benefit. Literacy in each domain increases monotonically with education, income, and net worth. Homeowners, stock investors and those who own tax sheltered accounts have higher literacy scores, as do whites, males, and married respondents.

Table 3 shows regression results with and without control variables that estimate the decline in financial literacy score by individuals. Because financial literacy should vary widely among respondents of the same age, the consistency of the relation between age and financial literacy is lower (R-squared 0.17) but still strong and statistically significant. Each year of age is associated with a 1.39 percent decline in the total financial literacy score. When the linear effect of age is measured among three age cohorts (respondents in their 60s, 70s and 80 or older), there appears to be very little change in the marginal decline within each cohort. The age effect declines slightly to 1.07 percent per year when control variables are included in the model, but the effect is no less consistent. The model with control variables explains 39% of the variation in observed financial literacy. Results are similar when age is measured in cohorts. Subsequent regressions measure age as a linear variable since cohort effects appear negligible.

Table 4 shows censored sample multivariate analyses of financial literacy. Among households that provide net worth data, the marginal effect of age on financial literacy is similar

(0.97 percent per year) to the model estimated without using wealth as a control variable. The top two quintiles of net worth are associated with higher financial literacy, drawing some statistical power from the homeowner, tax sheltered account and stock ownership variables. Results from the censored sample of college educated respondents show a stronger marginal effect of age on financial literacy (1.20 percent per year). The annual decline in financial literacy is nearly identical in a sample of men (1.04 percent per year) compared to a full sample of male and female respondents. Among stock or mutual fund owners, the annual decline in financial literacy is slightly smaller (0.89 percent), but also statistically significant. It is worth noting that the final three censored regressions include only respondents within groups that have a higher average financial literacy, and their annual decline appears no different than the decline observed in the full sample.

Table 5 shows financial literacy regression results for individual topic areas. The annual decline in financial literacy scores is consistent among all four topic areas, and the magnitude of the effect is comparable (ranging from a 0.97 percent decline per year for basics to a 1.21 percent decline in borrowing knowledge). All results are statistically significant. Insurance knowledge, which would increase with age if results are driven by cohort financial instrument familiarity effects, declines with age at the same rate as basic financial knowledge.

Table 6 shows multivariate analyses of confidence in managing money, managing credit and debt, using investment products and using insurance. For all four financial topics, confidence increases significantly with age. Respondents who score higher on basic financial literacy questions are no more confident about managing money than respondents with lower scores. However, a higher knowledge score is associated with greater confidence in managing credit, investments and insurance. The only variable that consistently predicts confidence in all

four areas is homeownership. While age is related to increased financial confidence, the multivariate models explain little variation in financial confidence and the marginal effect of age is weak compared to other variables (the effect of an additional 20 years of age is roughly equal to homeownership in predicting total confidence).

4. Conclusions

This study is the first to directly measure the decline in financial literacy in advanced age using a new financial literacy instrument and a large, nationally representative sample. We find a consistent linear annual decline in average financial literacy score of about 2% among respondents over 60. In order to correct for a number of potential biases due to differences in longevity and incentives to invest in financial knowledge, we conduct a number of multivariate analyses that measure the change in financial literacy among individual respondents. The effect of age on financial literacy score is strong and consistent in all models. Financial literacy scores decline by slightly over one percent per year in the whole sample and among cohorts within censored-sample regressions that correct for possible biases related to differences in longevity or the expected productivity of investment in financial knowledge.

These results add to the literature on observed declines in financial performance with advanced age by providing evidence of the first-order effect that may be driving these results. For example, Korniotis and Kumar (2011) show a decline in investment performance that appears to mirror observed declines in cognitive ability by age. Our study shows that this decline in performance may be attributed directly to a decline in financial knowledge and the ability to apply knowledge correctly to financial decision making scenarios. We are also able to better control for possible confounding effects closely related to financial knowledge by using more accurate measures of education and race. For example, the proportion of individuals with a

college degree declines among older cohorts, which may explain the decline in financial literacy and investment performance. We find that college educated respondents over 60 experience a decline in financial literacy with age that is similar in magnitude to the full sample.

Multivariate analyses censored by financial literacy with four topic areas provides the most convincing evidence that our results are not driven by cohort effects. Life insurance ownership rates are higher among older age cohorts (Chen, Wong and Lee, 2002). Three of the four insurance questions test knowledge and application of life insurance concepts (the fourth tests knowledge of insurance deductibles). The magnitude of annual decline in scores on insurance knowledge is identical to the decline in general financial literacy (1% per year) and similar to the annual decline in investment literacy (1.1%). We also find a similar annual decline among stockowners (0.9%), which provides evidence that cohort effects related to differences are equity market participation are not driving the decline in financial literacy.

A decline in financial skills may not lead to poor financial outcomes if individuals recognize and anticipate the decline. For example, recognition of diminished investment skills may increase demand for annuitization or the delegation of important financial decisions to a trusted advisor. Studies of trading frequency provide some evidence that older investors are less overconfident than younger investors (Barber and Odean, 2001). This study finds the opposite. On the aggregate and within all financial decision making domains, advanced age increases confidence in financial decision making abilities. The largest marginal effects are within the investments and insurance domains.

There appears to be an inclination to reject evidence of declining mental abilities among the aged within similar decision making domains. For example, older drivers generally do not perceive a decline in their driving skills despite predictable declines in sensory ability with

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advanced age (Holland and Rabbitt, 1992). However, Holland and Rabbitt discover that those who did perceive a decline in their abilities, and those who took an objective test that provided evidence of a decline, modify their driving behavior to reduce the likelihood of getting into an accident. It is possible that increased awareness of the natural decline in cognitive abilities essential to making effective financial decisions will lead to increased demand for more passive financial instruments such as annuities or passive investment vehicles that automatically rebalance. It may also increase demand for professional services such as financial planning, accounting and legal assistance that substitute for one's own decision making ability. The simultaneous decline in financial literacy and increase in decision making confidence with advanced age also has implications for national retirement policy. Programs such as social security which automatically annuitize retirement income and do not require a retiree to manage withdrawal and investment may improve social welfare (Diamond, 2004). Policy that increases the decision making responsibilities of older households will result in outcomes that deviate further from welfare optimization with each year of advanced age if individuals do not recognize this decline.

Appendix A. Financial Literacy Instrument Statistics (Cronbach Alpha = 0.873)

Financial Literacy Item	Mean Correct%	Correlation with Total	Alpha w/o Variable
Net worth is equal to: (K1-BAS)	56.3	0.593	0.862
If your assets increase by $5,000 and your liabilities decrease by $3,000, your net worth would (A1-BAS)	68.6	0.516	0.865
Which bank account is likely to pay the highest interest rate on money saved? (K2-BAS)	67.9	0.551	0.864
Savings accounts and money market accounts are most appropriate for (A2-BAS)	52.7	0.553	0.864
To reduce the total finance costs paid over the life of an auto loan, you should choose a loan with the (K3-BOR)	47.8	0.638	0.860
If you always pay the full balance on your credit card, which of the following is least important? (A3-BOR)	51.2	0.583	0.862
On which type of loan is interest never tax deductible? (K4-BOR)	60.6	0.614	0.861
Which type of mortgage would allow a first-time home buyer to qualify for the highest loan amount? (A4-BOR)	36.9	0.453	0.868
The benefit of owning investments that are diversified is that it (K5-INV)	25.4	0..445	0.868
A young investor willing to take moderate risk for above-average growth would be most interested in: (A5-INV)	46.4	0.537	0.864
The main advantage of a 401(k) plan is that it: (K6-INV)	46.1	0.352	0.872
To ensure that some of your retirement savings will not be subject to income tax upon withdrawal, you would contribute to: (A6-INV)	34.0	0.426	0.869
If you have an insurance policy with a higher deductible, the premiums will be (K7-INS)	32.6	0.485	0.867
Which of the following types of insurance is most important for single workers without children? (A7-INS)	38.5	0.528	0.865
Which policy provides the most coverage at the lowest cost for a young family? (K8-INS)	58.8	0.471	0.867
Which household would typically have the greatest life insurance needs? (A8-INS)	61.3	0.427	0.869

Appendix B: Financial Literacy Questionnaire

For the first four questions respond using a scale from 0 to 10, where 0 means no confidence and 10 means a great deal of confidence.

1. How confident are you with managing money? *(C1-BAS)*

2. How confident are you with managing credit and debt *(C2-BOR)*

3. How confident are you with using investment products? *(C3-INV)*

4. How confident are you with using insurance products? *(C4-INS)*

5. Net worth is equal to: *(K1-BAS)*
    1 Total assets
    2 Total assets plus liabilities
    3 Total assets minus liabilities

6. If your assets increase by $5,000 and your liabilities decrease by $3,000, your net worth would *(A1-BAS)*
    1 Increase by $2,000
    2 Increase by $8,000
    3 Increase by $3,000

7. Which bank account is likely to pay the highest interest rate on money saved? *(K2-BAS)*
    1 Savings account
    2 Six month CD or certificate of deposit
    3 Three year CD

8. Savings accounts and money market accounts are most appropriate for *(A2-BAS)*
    1 Long-term investments like retirement
    2 Emergency funds and short-term goals
    3 Earning a high rate of return

9. To reduce the total finance costs paid over the life of an auto loan, you should choose a loan with the *(K3-BOR)*
    1 Lowest monthly payment
    2 Longest repayment term
    3 Shortest repayment

10. If you always pay the full balance on your credit card, which of the following is least important? *(A3-BOR)*
    1 Annual interest rate
    2 Annual fees
    3 Line of credit

11. On which type of loan is interest never tax deductible? *(K4-BOR)*
      1 A home equity loan
      2 An adjustable rate mortgage
      3 A personal vehicle loan

12. Which type of mortgage would allow a first-time home buyer to qualify for the highest loan amount? *(A4-BOR)*
      1 Fixed-rate mortgage
      2 Adjustable-rate mortgage
      3 Reverse mortgage

13. The benefit of owning investments that are diversified is that it *(K5-INV)*
      1 Reduces risk
      2 Increases return
      3 Reduces tax liability

14. A young investor willing to take moderate risk for above-average growth would be most interested in: *(A5-INV)*
      1 Treasury bills
      2 Money market mutual funds
      3 Balanced stock funds

15. The main advantage of a 401(k) plan is that it: *(K6-INV)*
      1 Provides a high rate of return with little risk
      2 Allows you to shelter retirement savings from taxation
      3 Provides a well diversified mix of investment assets

16. To ensure that some of your retirement savings will not be subject to income tax upon withdrawal, you would contribute to: *(A6-INV)*
      1 A Traditional IRA or Individual Retirement Account
      2 A Roth IRA
      3 A 401(k) plan

17. If you have an insurance policy with a higher deductible, the premiums will be *(K7-INS)*
      1 Higher
      2 Lower
      3 The same

18. Which of the following types of insurance is most important for single workers without children? *(A7-INS)*
      1 Life insurance
      2 Disability income insurance
      3 Dental insurance

19. Which policy provides the most coverage at the lowest cost for a young family? *(K8-INS)*
    1 Renewable term life
    2 Whole life
    3 Universal life

20. Which household would typically have the greatest life insurance needs? *(A8-INS)*
    1 A middle-class retired couple
    2 A middle-aged working couple with children in college
    3 A single-earner family with two young children in pre-school

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Table 1

This table measures change in average financial literacy score measured from 16 multiple-choice questions. These questions measure competency in four literacy domains – basic financial knowledge, borrowing, investment and insurance. Respondents are asked to rate their confidence on a 10 point scale in each domain. Age from 60 through 88 is regressed against average financial literacy and against average confidence for respondents of that age. R-Squared measures the adjusted R-Squared of age as a single independent variable against literacy or confidence.

Financial Literacy Measure	Yearly Change (%)	T-statistic	R-Squared
Overall Financial Literacy Score (16 Questions, %))	-2.8	15.55***	0.90
Overall Confidence in Literacy	0.2	2.02*	0.10
Basic Literacy	-2.4	12.66***	0.86
Borrowing Literacy	-2.8	16.70***	0.91
Investment Literacy	-3.4	13.68***	0.87
Insurance Literacy	-2.0	8.92***	0.74
Confidence in Managing Money	0.1	1.19	0.01
Confidence in Credit	-0.1	-0.70	0.00
Confidence in Investing	0.2	0.99	0.00
Confidence in Insurance	0.6	3.44***	0.28

***,**,* indicate significance at the 0.01, 0.05 and 0.10 levels, respectively

Table 2

Financial literacy is measured in percent correct from 16 questions in a sample of respondents 60 years of age and above from the Consumer Finance Monthly survey. Age is measured both as a linear variable and interacted with age cohorts to capture possible differences in marginal effect by age. Tax sheltered account indicates whether the respondent owned any tax-sheltered savings vehicle.

	Total Score %	Basics %	Borrowing %	Investment %	Insurance %
Age 60-69	59.12	59.18	60.52	53.02	63.77
Age 70-79	45.43	44.62	46.72	39.05	51.32
Age 80 or above	31.30	32.79	31.49	23.57	37.36
Education					
<High School	25.00	23.23	28.98	15.71	32.08
High School	35.03	34.54	39.16	27.01	39.40
Some College	48.46	48.20	50.58	40.02	55.05
College	58.45	59.07	57.62	53.65	63.48
Graduate	62.48	63.74	60.01	58.70	67.47
White	50.24	50.51	51.08	43.98	55.38
Non-White	38.69	37.15	42.18	29.75	45.67
Male	55.65	56.69	55.81	50.64	59.48
Female	44.22	43.61	46.03	36.59	50.67
Homeowner	50.81	50.77	51.95	44.64	55.89
Not Homeowner	34.72	35.86	35.60	25.26	42.15
Married	55.08	55.51	55.89	49.68	59.23
Unmarried	42.37	42.07	43.81	34.59	49.01
Tax Sheltered Acct.	61.53	62.38	60.15	58.29	65.31
No Tax Sheltered	39.12	38.66	42.12	29.97	45.74
Stock/MF Owner	65.13	66.06	63.56	63.64	67.27
No Stock/MF	45.35	45.24	47.08	37.66	51.42
Lowest Income	35.03	32.20	37.80	26.70	43.40
Quintile 2 Income	37.14	37.96	40.51	27.24	42.86
Quintile 3 Income	52.60	51.69	53.39	44.92	60.38
Quintile 4 Income	59.90	60.81	59.96	54.45	64.41
Highest Income	66.19	67.21	66.50	61.44	69.64
Lowest Net Worth	37.41	35.93	42.22	26.85	44.63
Quintile 2 NW	42.96	42.96	48.33	30.74	49.81
Quintile 3 NW	49.63	50.55	50.55	40.99	56.43
Quintile 4 NW	62.31	61.85	64.07	58.15	65.19
Highest Net Worth	68.98	68.89	65.00	69.26	72.78

Table 3

Financial literacy is measured in percent correct from 16 questions in a sample of respondents 60 years of age and above from the Consumer Finance Monthly survey. Age is measured both as a linear variable and interacted with age cohorts to capture possible differences in marginal effect by age. Tax sheltered account indicates whether the respondent owned any tax-sheltered savings vehicle.

	Linear Age Effect	**Cohort Age Effect**	**Linear Age Effect**	**Cohort Age Effect**
Age	-1.39***		-1.07***	
Age*60-69		-1.31***		-0.86***
Age*70-79		-1.32***		-0.87***
Age*80 or above		-1.33***		-0.92***
Education				
<High School			-6.05***	-6.19***
Some College			9.91***	9.97***
College			16.04***	16.19***
Graduate			18.89***	18.90***
High Income			3.95**	4.12**
White			9.07***	9.04***
Male			5.27***	5.22***
Homeowner			3.45*	3.44*
Married			2.42**	2.28**
Tax Sheltered Account			11.10***	11.16***
Stock/MF Owner			6.65***	6.74***
Sample Size	1,757	1,757	1,725	1,725
Adjusted R^2	0.17	0.16	0.39	0.39

***,**,* indicate significance at the 0.01, 0.05 and 0.10 levels, respectively

Table 4

Financial literacy is measured in percent correct from 16 questions in a sample of 1,757 respondents 60 years of age and above from the Consumer Finance Monthly survey. The first column includes only respondents who have valid net worth data. The second column includes only respondents with a college degree or above. The third column includes only male respondents. The fourth column includes respondents who own stocks or mutual funds.

	Net Worth	College	Males	Stock/MF Owners
Age	-0.97***	-1.20***	-1.04***	-0.89***
Net Worth				
Quintile 2	0.08			
Quintile 3	2.30			
Quintile 4	7.78**			
Top Quintile	7.81**			
Education				
<High School	-3.95		2.56	17.13
Some College	10.62***		11.46***	6.65
College	16.63***		20.13***	14.94***
Graduate	17.32***		23.99***	15.83***
High Income	2.18	3.62*	3.55*	0.52
White	9.50***	6.90**	7.03***	14.06***
Male	4.54**	9.47***		4.88**
Homeowner	4.18	6.60**	8.09***	-2.37
Married	1.57	1.55	3.39*	3.01
Tax Sheltered Account	7.48***	7.64***	13.06***	8.03***
Stock/MF Owner	4.92**	6.12***	4.41**	
Sample Size	663	759	730	322
Adjusted R^2	0.42	0.30	0.41	0.24

***,**,* indicate significance at the 0.01, 0.05 and 0.10 levels, respectively

Table 5

Financial literacy is measured in percent correct within four topic categories from within a 16 question survey for respondents age 60 or above. Each topic includes two knowledge and two application questions. Questions are available in Appendix B.

	Basics	**Borrowing**	**Investment**	**Insurance**
Age	-0.97***	-1.21***	-1.09***	-0.99***
Education				
<High School	-7.16**	-6.87**	-6.04**	-4.14
Some College	10.16***	7.96***	8.88***	12.65***
College	16.91***	11.74***	17.41***	18.11***
Graduate	20.19***	13.01***	21.05***	21.32***
High Income	4.50**	4.92**	2.70	3.70*
White	10.65***	7.34***	10.75***	7.55***
Male	6.47***	4.57***	6.65***	3.39**
Homeowner	1.49	5.47**	4.23*	2.60
Married	3.00**	2.49*	3.06**	1.13
Tax Sheltered Account	12.22***	7.30***	15.42***	9.47***
Stock/MF Owner	6.74***	5.67***	10.40***	3.79*
Sample Size	1,725	1,725	1,725	1,725
Adjusted R^2	0.31	0.25	0.35	0.24

***,**,* indicate significance at the 0.01, 0.05 and 0.10 levels, respectively

Table 6

Confidence in making financial decisions within each financial domain are self assessed by respondents on a scale of 1 to 10. Respondents are asked how confident they are at "managing money," "managing credit and debt," "using investment products," and "using insurance products." Total confidence is the sum total of all four confidence measures. Score measures the objective financial knowledge percent correct for each dependent variable category.

	Total Confidence	Managing Money	Managing Credit	Using Investments	Using Insurance
Age	0.36***	0.13**	0.16**	0.50***	0.55***
Knowledge Score	0.09***	0.00	0.04**	0.12***	0.05**
Education					
<High School	-0.77	1.46	-2.09	-1.66	-0.66
Some College	-3.61**	-2.10	-2.54	-1.86	-5.03**
College	-1.90	-2.17	-0.60	1.77	-4.79*
Graduate	-4.35***	-3.61**	-2.55	-2.56	-5.84**
High Income	0.75	0.87	0.11	1.42	2.23
White	-1.55	-1.33	1.19	-5.23*	-1.15
Male	0.35	0.13	-0.52	2.22	-0.98
Homeowner	7.43***	4.96***	5.13***	11.37***	7.06***
Married	0.34	0.07	0.05	1.42	0.08
Tax Sheltered Account	4.49***	2.18**	4.41***	7.97***	1.92
Stock/MF Owner	2.55*	0.97	1.65	5.72***	3.12
Sample Size	1,485	1,698	1,675	1,554	1,588
Adjusted R^2	0.06	0.01	0.02	0.07	0.02

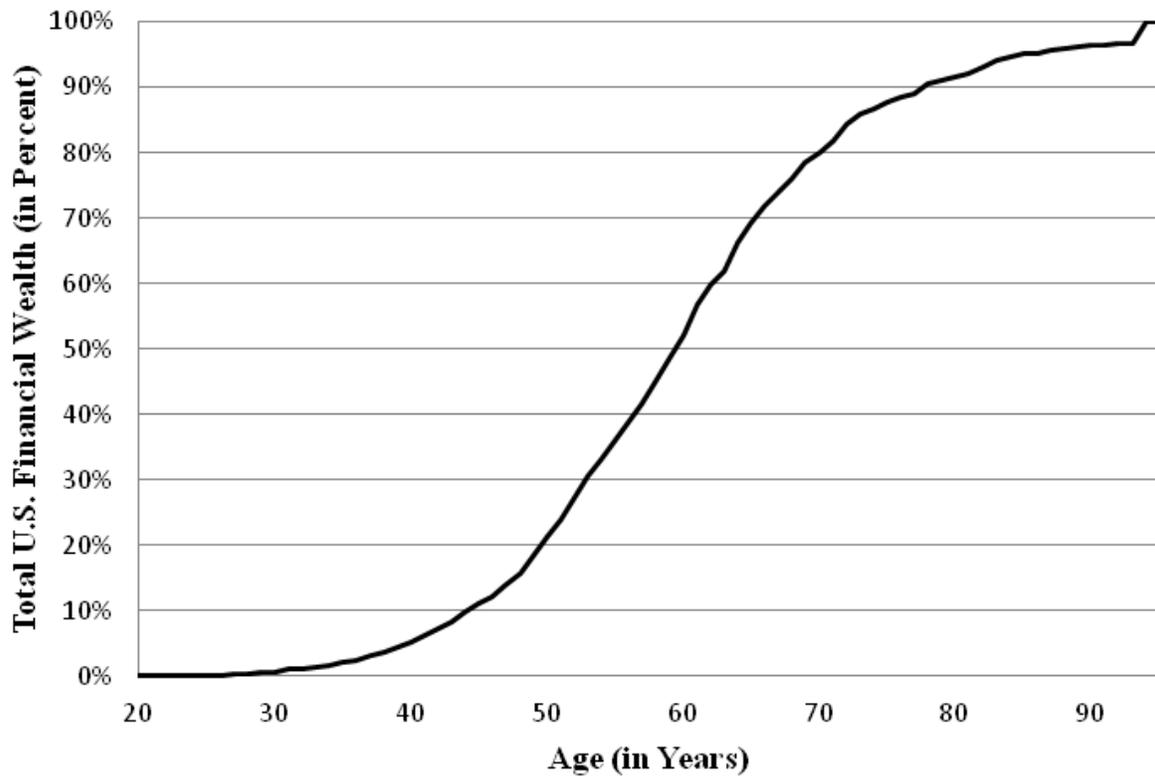***,**,* indicate significance at the 0.01, 0.05 and 0.10 levels, respectively

Fig. 1. Distribution of aggregate financial wealth owned by age using population-weighted data from the 2007 Survey of Consumer Finances.
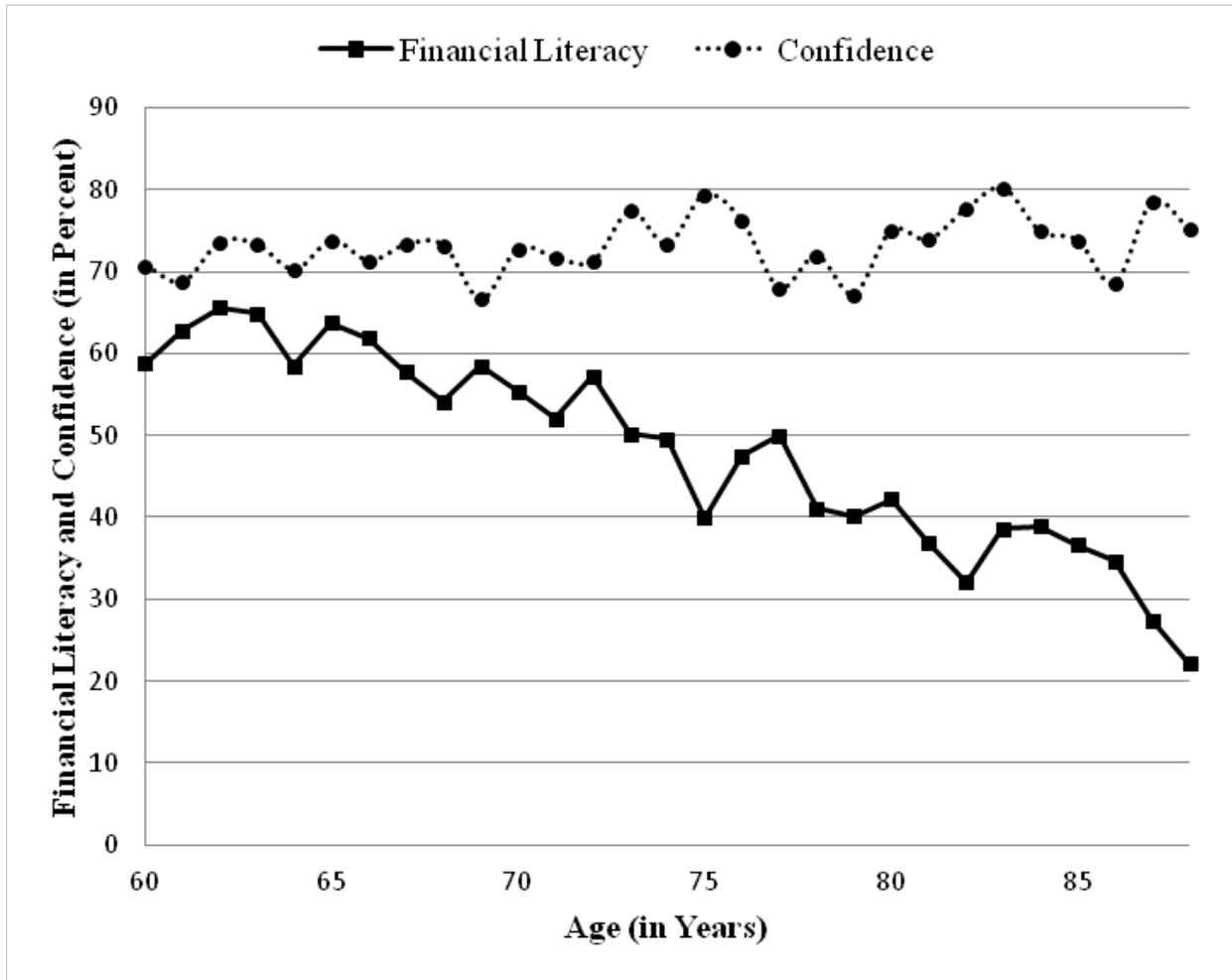
Fig. 2. Mean self-assessed financial literacy confidence and objective financial literacy score as age increases from 60 to 88.
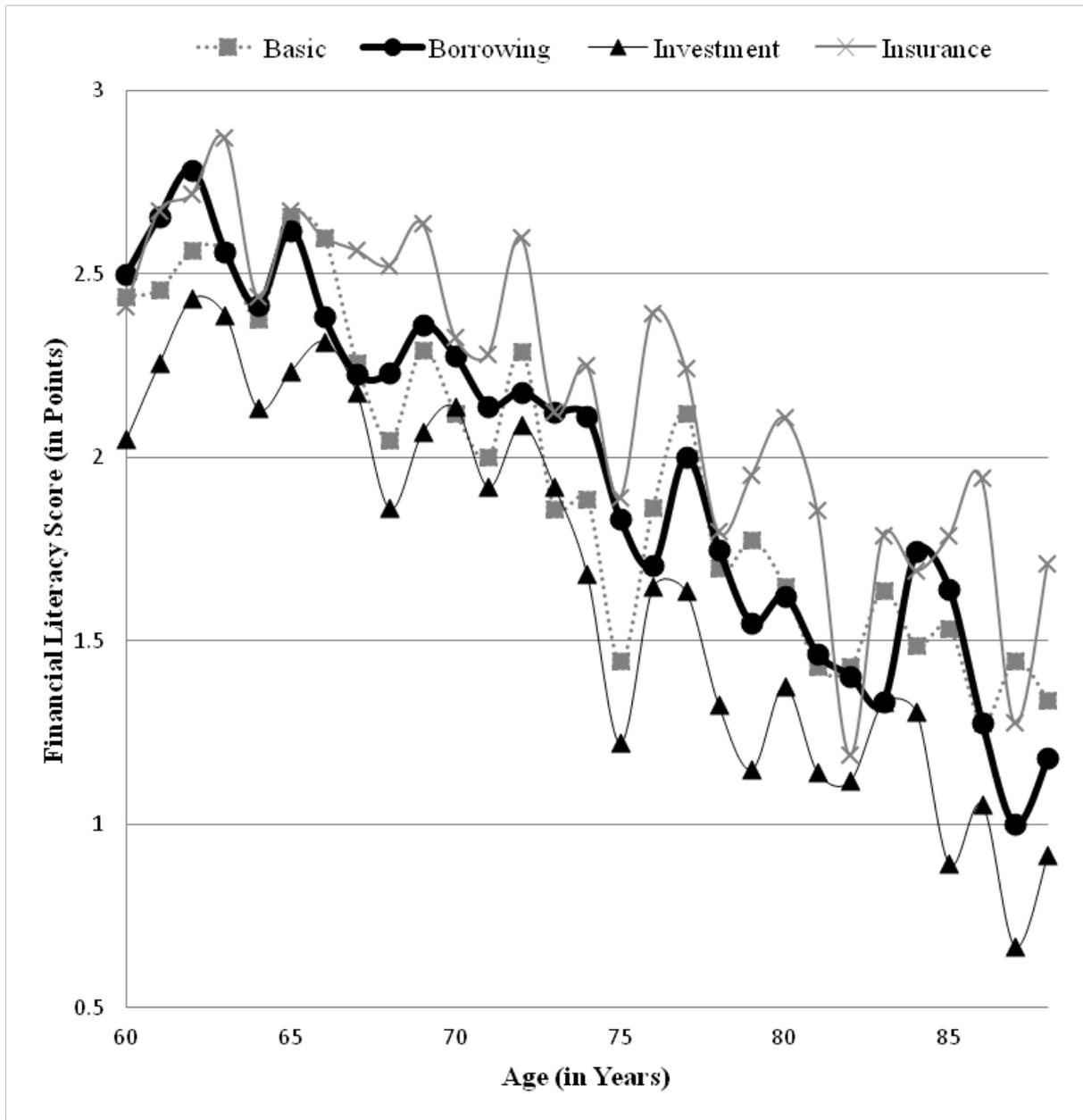
Fig. 3. Mean financial literacy scores in the content domains of basic knowledge, borrowing, investments, and insurance by age for respondents between 60 and 88. Within the financial literacy instrument there are four objective questions for each content domain. Assigning one point per correct question results in a maximum possible score of 4 for each content domain.