Financial Knowledge and Financial Literacy at the Household Level*

*ALAN L. GUSTMAN (corresponding author)
Department of Economics, Dartmouth College, Hanover, NH 03755
Office Phone: 603/646-2641
Cell Phone: 603/359-2645 (In March, at Rand)
Fax: 603/646-2122
E-Mail: Alan.L.Gustman@dartmouth.edu

THOMAS L. STEINMEIER
Department of Economics
Texas Tech University
Lubbock, TX 79409
Phone: 806/742-2203
Fax: 806/742-1137
E-Mail: Thomas.Steinmeier@TTU.edu

NAHID TABATABAI
Department of Economics, Dartmouth College, Hanover, NH 03755
Phone: 603/646-3703
Fax: 603/646-2122
E-Mail: Nahid.Tabatabai@dartmouth.edu

Session Title: The Effects of Financial Education and Financial Literacy
Session Chair: B. Douglas Bernheim
Discussants: Justine Hastings, William Walstad, Urvi Neelakantan, Annamaria Lusardi

Abstract

There is evidence of a relation between numeracy and wealth held outside of pensions and Social Security. With pensions and Social Security accounting for half of wealth at retirement, and evidence that those with pensions save more in other forms, one would expect to find knowledge of pensions and Social Security influencing retirement saving. Yet we find no evidence that knowledge of pensions and Social Security is related to nonpension, non-Social Security wealth, to numeracy, or that it plays an intermediate role in the numeracy-wealth relation. Our findings raise questions about policies that would enhance numeracy to increase retirement saving.

Financial Knowledge and Financial Literacy at the Household Level[1]

Studies by Annamaria Lusardi and Olivia S. Mitchell (2006) and James Banks and Zoe Oldfield (2007) confirm a link between numeracy and household wealth. Indeed, John J. McArdle, James P. Smith and Robert Willis (2010) find that measures of numeracy, based on simple questions testing the ability of a person to calculate fractions, percentages and compounding, seem to dominate more elaborate measures of cognition in explaining the wealth of those approaching retirement age. Although there is strong evidence that numeracy affects wealth, there is much less understanding of what lies behind the numeracy-wealth relation.

Our aim is to determine whether financial knowledge, particularly knowledge of pensions and Social Security, plays an intermediary role in linking numeracy to wealth. Specifically, we explore linkages between numeracy and knowledge of pensions and Social Security, and from there to wealth held outside of pensions and Social Security. The idea is that if numeracy, or other forms of cognitive ability, provide a basis for greater financial knowledge, which in turn leads to a greater appreciation of the need for retirement saving, or to more effective saving for retirement, one might also expect greater numeracy to be accompanied by

[1] This research was supported by a grant from the U.S. Social Security Administration (SSA) through the Michigan Retirement Research Center (MRRC). It draws on results in our book (Gustman, Steinmeier and Tabatabai, 2010a), supported by The National Institute on Aging (NIA) through grant No. R01 AG024337. The findings and conclusions expressed are solely those of the authors and do not represent the views of SSA, NIA, or the MRRC. James Smith and Jonathan Zinman provided helpful comments. Gustman, Steinmeier and Tabatabai (2010b), a working paper with the same title as this article, reports the complete results described here.

greater knowledge of the primary instruments used in saving for retirement, pensions and Social Security, which account for half of wealth at retirement.

There are a number of reasons for suspecting that numeracy, or other dimensions of cognition, might be related to knowledge of pensions and Social Security, and knowledge of pensions and Social Security, in turn, linked to wealth, and in particular to wealth held outside of pensions and Social Security. Phillip Cagan (1965) and George Katona (1965) found that those with pensions saved almost the same amount outside of their pensions as those without a plan. As confirmed by Alan L. Gustman and Thomas L. Steinmeier (1999), income constant, higher pension wealth is associated with higher total wealth. Cagan and Katona suggest the reason is that pensions increase knowledge of the need for retirement saving. Even if causality does not run directly from numeracy through knowledge of pensions and Social Security to wealth, one would expect at least an indirect association. That is, holding income constant, more numerate individuals accumulate greater wealth because they recognize the need for retirement saving, and at the same time accrue greater knowledge of financial instruments. An indirect linkage might also arise if numeracy leads to increased planning activities, which increase knowledge of pensions and Social Security while also affecting wealth (Lusardi and Mitchell, 2007).

The Health and Retirement Study (HRS) measures wealth held in the form of pensions and Social Security, other forms of wealth, income, cognition and numeracy, and provides data that can be used to measure knowledge of pensions and Social Security. With these data we first relate numeracy and other measures of cognitive ability to knowledge of pensions and Social Security. We then relate measures of knowledge of pensions and Social Security to wealth accumulated in the form of pensions. In addition, we relate wealth held outside of pensions and Social Security, as well as total wealth including pensions and Social Security, to measures of

numeracy. We follow that with an examination of the sensitivity of the numeracy-wealth relation to the presence of measures of pension and Social Security knowledge.

Perhaps surprisingly, when explaining the link between numeracy or other cognitive measures and wealth, the empirical estimates do not support an intermediary role for financial knowledge, and in particular knowledge of pensions and Social Security. Rather than increasing our understanding of the mechanism by which numeracy and other dimensions of cognition affect wealth, our findings provide little evidence that more numerate individuals have a better understanding of their pensions or Social Security. Nor is the relation between numeracy and wealth affected by knowledge of pensions and Social Security. Moreover, substitution of pensions for other forms of wealth does not vary with knowledge of pensions.

I. The Data and variables used in the analysis. The HRS data we use are restricted to members of couple households with at least one individual age 51 to 56 in 2004, the so called Early Boomer cohort of the HRS. There are four sets of variables in the analysis.

Measures of wealth: The HRS asks about the major components of non-pension, non-Social Security wealth. These include housing, other real estate, stocks and other financial assets, business wealth and other forms of wealth. Pension wealth is based on reported balances in defined contribution (DC) plans, or for defined benefit (DB) pensions, on expected benefits at the reported expected retirement age. Social Security wealth is projected by Kandice Kapinos of the HRS by applying the Social Security Administration's ANYPIA program to each respondent's record of covered earnings. Own, spouse and survivor benefits are included in the calculation of Social Security wealth.

Measures of knowledge of pensions and Social Security: We create a number of measures of pension knowledge. One set of measures indicates that the respondent answered Don't Know

(DK) to a question about plan type, ages of eligibility, or benefit amount for a pension on the respondent's current job. The respondent may have answered DK to an initial question, or in some specifications to follow-up bracket questions. We also compare respondent reports with the corresponding values obtained when detailed employer-provided plan descriptions are applied to the individual's date of birth, tenure at the firm, past earnings and intended age of retirement.

Specifically, measures of knowledge of plan type include: Respondent (R) answers (DK) when asked about plan type; R and firm agree on: all plan types; plan is Defined Benefit (DB); plan is Defined Contribution (DC); R and firm disagree in specified ways. Similarly, measures of knowledge of retirement age for pensions include: R says DK for Early Retirement (ER) age for DB; ER age for DC; Normal Retirement (NR) age for DB, R and Firm agree on ER age; agree on NR age. The measures of plan value include: R says DK for DB value at normal retirement age; or at expected retirement age. R and Firm agree on expected DB benefits; R says DK to DC balances; R says DK to SS benefits at ER age; at NR age.

Measures of numeracy and cognition: Numeracy ranges from 0 to 3 and is measured by the sum of the number of correct answers to three questions --Take 10 percent of a thousand. Calculate one fifth of two million. What is ten percent interest compounded over two years? Cognition is evaluated by TICS (Telephone Interview of Intact Cognitive Status) questions and by measures of word recall. The TICS questions are: Serially subtract 7 from 100. Count backward (from 20 to 1). The range for TICS is from 0 to 7. Word Recall measures, as the name indicates, recall of a list of words. In one set of questions, recall is measured immediately. in another, recall is delayed. The sum of correct answers to immediate and delayed word recall ranges between 0 and 10.

Other covariates are included in the multivariate analyses as appropriate. They include indicators of respondents' union and public employment status, a series of dummy variables for respondent's education, dummy variables indicating whether the respondent is female, nonwhite, Hispanic, age and age squared for respondent and spouse, spouse's school years, Social Security wealth based on covered lifetime earnings, household income, and whether the respondent is the financially knowledgeable respondent in the household.

II. Findings:[2]

1. Numeracy, or other measures of cognition, are not significant determinants of knowledge of pensions and Social Security. If the numeracy-wealth relation exists because numeracy increases a person's ability to appreciate the importance of saving for retirement, then given the large share of pensions and Social Security in total wealth, pension knowledge should be directly related to numeracy. A similar argument can be made for the relation of other measures of cognition to knowledge of pensions and Social Security. Yet when we test for a relation between numeracy and knowledge of pensions and Social Security, running separate probits for each of 18 measures of knowledge of pensions and Social Security, not one coefficient of the variable measuring numeracy has the correct sign and is significant at conventional levels. These results are not sensitive to inclusion of pension wealth as a covariate.

2. Pension and Social Security knowledge are related to pension wealth. The coefficient of pension wealth is significantly related to measures of pension and Social Security knowledge in one third of the probits. We suspect that much of the causality runs from wealth to knowledge,

[2] An Appendix, available on the AEA website, contains tables reporting the detailed empirical results. Alan L. Gustman, Thomas L. Steinmeier and Nahid Tabatabai (2010b), in a working paper of the same name as this article, discuss these results in more detail.

not from knowledge to wealth. Two thirds of pension wealth held by members of the HRS cohort of Early Boomers is in defined benefit (DB) plans. Once enrolled, except for not quitting, or working more hours, there is little a DB plan holder can do to affect the ultimate amount of DB wealth at early or normal retirement age. Nor is there strong evidence that selection into jobs early on a person's career is driven by the availability or value of pensions. At least in the private sector, at the time employment was secured by members of the Early Boomer cohort, jobs offering pensions also offered premium wages and future DB benefits have limited value at the time of hire.[3]

3. Household wealth held outside of pensions and Social Security is not related to measures of knowledge of pensions and Social Security. One would expect that if pensions lead to greater understanding of the mechanics of saving and a greater appreciation of the need for retirement saving, wealth held outside of pensions should be related to knowledge of pensions. We find no evidence that pension knowledge is related to wealth, either total wealth or wealth held outside of pensions. We tried various specifications, included measures of income in various forms, but could not detect a relation.

4. Wealth is significantly related to numeracy and that relation is not sensitive to whether measures of knowledge of pensions and Social Security are included. If knowledge of pensions and Social Security are intermediate variables through which cognition, or numeracy, influence wealth accumulation, the relation between cognition and wealth should vary when measures of pension knowledge are included in the regression of wealth on cognition. There is no evidence

[3] Alan L. Gustman and Thomas L. Steinmeier (1993) analyze the low rate of DB pension accrual early in the career, and the roles of pension accrual and wage premia as determinants of job mobility of pension covered workers in cohorts comparable to the Early Boomers.

that including measures of pension or Social Security knowledge affects the estimated relation of wealth to numeracy or other measures of cognition.

5. The relation between wealth held outside of pensions and pension wealth is not affected when pension knowledge is included as an independent variable. If the relation between pension wealth and wealth held outside of pensions and Social Security reflects learning about the need to save for retirement, one would expect to find that when measures of pension knowledge are entered into a regression of wealth held outside of pensions on pension wealth, there should be an effect on the estimated coefficient of the pension wealth measure. There is none. Pension wealth has the same relation to total wealth, or to wealth outside of pensions and Social Security, whether or not pension knowledge is included as an independent variable.

III. Conclusions:

There is convincing evidence that numeracy is related to wealth held outside of pensions and Social Security. Our findings, however, raise questions about what underlies this relationship. Why is knowledge of pensions and Social Security irrelevant when explaining the numeracy-wealth relation? Shouldn't greater numeracy that leads to greater wealth have created greater financial acumen, which is accompanied by greater understanding of one's pensions and Social Security? Why isn't knowledge of pensions and Social Security affected by numeracy or other measures of cognition? Why does numeracy play an important role in influencing saving, even holding income constant, while knowledge of pensions plays none? What might account for the lack of a relationship between measures of knowledge of pensions and Social Security and retirement wealth? Why isn't the relation of numeracy to wealth related to the respondents' knowledge of their pensions and Social Security?

To be sure, a substantial number of those with pensions are disengaged from the management of their plan. Many are not aware of the details of their pensions, and in some cases there is good reason why they do not pay attention. For some their plans are not sufficiently valuable to pay much attention. For others, their retirement is assured due to a generous pension that does not require monitoring. Moreover, many with a DB plan have no incentive to understand their pension since they can do little to influence its value.

Nevertheless, there would be a payoff to learning what their plans are worth so they can determine how much wealth to accumulate outside of their pension. Moreover, many with large balances in defined contribution plans never rebalance their portfolios. Others rebalance infrequently, even during a recession. Their plans would benefit from more attention.

Yet we have shown that knowledge of pensions is greater for those with greater pension wealth. Why is it that given the importance of pensions and Social Security in total wealth, knowledge of pensions plays no role in shaping wealth held outside of pensions, or in the numeracy-wealth relation? More numerate individuals may be paying more attention to, and be engaged in transactions involving wealth outside of their pensions. But does it seem reasonable that this attention to other wealth is the same for those with and without pensions?

Is there an omitted variable problem here? Can the strong relation of numeracy to wealth held in other forms than pensions and Social Security, along with little effect of pension and Social Security knowledge on that relation, reflect other factors than the effects of numeracy on the need to accumulate wealth? Are there unmeasured correlates of numeracy associated with income and time preference that are being ignored? Gustman and Steinmeier (1999) could find no evidence that measures of time preference available in the HRS were driving the relation

between pensions and other forms of wealth. Are there other omitted factors accounting for the apparent relation between numeracy and wealth?

Our failure to link numeracy, or other measures of cognition, on the one hand, with knowledge of pensions and Social Security on the other, and the absence of a role for knowledge of pensions and Social Security in shaping the relation between numeracy and wealth, leaves open the question of what underlies the numeracy-wealth relation. Are we sure that the numeracy-wealth relation is causal, rather than reflecting unmeasured characteristics of the individual that in turn affect earnings and wealth?[4]

Even if the numeracy-wealth relation is causal, is it subject to effective policy manipulation? It remains unclear how best to use the apparently robust numeracy-wealth relation when designing policies that are aimed at increasing retirement saving. Specifically, will policies that act only on numeracy increase retirement wealth? Given a lack of understanding of the mechanism linking numeracy to wealth, one must certainly proceed with caution when designing policies meant to exploit that relation.

References

Banks, James and Zoe Oldfield. 2007. "Understanding Pensions: Cognitive Function, Numerical Ability and Retirement Saving". *Fiscal Studies* 28(2):143-170.

[4] Another puzzle is worth mentioning in this context. In exploring measures of pension knowledge similar to those reported here, Gustman and Steinmeier (2001) found that HRS respondents who overestimated the values of their pensions and Social Security in 1992 did not save more or delay retirement in future years. Nor did those who underestimated their plan values reduce saving or accelerate their retirement.

Cagan, Phillip. 1965. *The Effect of Pension Plans on Aggregate Savings*. New York: National Bureau of Economic Research.

Gustman, Alan L. and Thomas L. Steinmeier. 1993. "Pension Portability and Labor Mobility: Evidence from the Survey of Income and Program Participation". *Journal of Public Economics* 50: 299-323.

_____. 1999. "Effects of Pensions on Savings: Analysis with Data from the Health and Retirement Study". *Carnegie-Rochester Conference Series on Public Policy 50*: 271-324.

_____. 2001. "Imperfect Knowledge of Retirement and Saving". Michigan Retirement Research Center, Working Paper UM00-08.

Gustman, Alan L., Thomas L. Steinmeier and Nahid Tabatabai. 2010a. *Pensions in the Health and Retirement Study*. Harvard University Press.

_____. 2010b. "Financial Knowledge and Financial Literacy at the Household Level". NBER Working Paper 16500. http://www.nber.org/papers/w16500

Katona, George. 1965. *Private Pensions and Individual Savings*. Ann Arbor: Survey Research Center, Institute for Social Research, University of Michigan.

Lusardi, Annamaria and Olivia S. Mitchell. 2006. “Financial Literacy and Planning: Implications for Retirement Wellbeing,” MRRC Working Paper No. 2006-144.

_____. 2007. “Baby Boomer Retirement Security: The Role of Planning, Financial Literacy, and Housing Wealth,” *Journal of Monetary Economics* 54: 205-224.

McArdle, John J., James P. Smith and Robert Willis. 2010. "Financial Decision Making and Cognition in a Family Context." *Economic Journal*, 120: F363-F380.

Appendix: Tables Reporting Empirical Results

These tables are from our longer working paper of the same title, "Financial Knowledge and Financial Literacy at the Household Level". NBER Working Paper 16500. The tables are discussed in detail in that paper. http://www.nber.org/papers/w16500

Table 1: Marginal Effects of Cognition Measures on Pension Knowledge: Ages 51-56 in 2004

Dependent Variables	Pension/ DB/DC Wealth	TICS (absolute z)	Word Recall (absolute z)	Numeracy (absolute z)	# of Obs. Pseudo R2
A. Indicators of Plan Type					
DK plan type	0.032 (1.44)	-0.002 (0.34)	-0.002 (0.37)	0.026 (2.31)	651 0.2455
R & firm agree on all plan types (wider restriction)	0.164 (2.92)	0.005 (0.55)	0.024 (2.82)	-0.039 (2.07)	626 0.1621
R & firm agree plan is DB	-0.025 (0.29)	-0.015 (1.07)	-0.004 (0.27)	0.010 (0.33)	431 0.1365
R & firm agree plan is DC	-0.057 (0.48)	-0.013 (0.57)	0.013 (0.80)	-0.005 (0.16)	404 0.3418
R reports DB & firm reports DC plan	-0.022 (1.36)	0.004 (1.08)	-0.006 (2.15)	0.006 (0.94)	527 0.2644
R reports DC & firm reports DB plan	-0.133 (2.96)	-0.003 (0.55)	-0.002 (0.40)	0.013 (1.15)	505 0.2144
B. Indicators of Retirement Age					
DK- ER age for DB	-0.062 (1.16)	-0.004 (0.57)	0.003 (0.46)	-0.010 (0.65)	725 0.1758
DK- NR age for DB	-0.003 (0.10)	0.003 (0.65)	0.007 (1.54)	0.005 (0.52)	725 0.2320
DK- ER age for DC	-0.197 (2.20)	-0.008 (0.91)	0.001 (0.13)	-0.011 (0.63)	1013 0.1262
R and Firm agree	0.448	0.015	-0.010	0.071	361

Dependent Variables	Pension/ DB/DC Wealth	TICS (absolute z)	Word Recall (absolute z)	Numeracy (absolute z)	# of Obs. Pseudo R2
on ER age	(2.99)	(0.63)	(0.43)	(1.42)	0.1046
R and Firm agree on NR age	0.177 (1.22)	0.023 (0.97)	-0.025 (1.09)	-0.032 (0.66)	350 0.0886
C. Indicators of Plan Value					
DK- NR benefits for DB	-0.284 (1.82)	0.016 (0.74)	0.032 (1.57)	-0.018 (0.41)	729 0.5286
DK- XP benefits for DB*	-0.330 (1.44)	0.036 (1.14)	0.014 (0.42)	-0.033 (0.43)	725 0.8618
R and Firm agree on expected DB benefits	0.201 (4.31)	-0.001 (0.10)	-0.010 (1.03)	-0.017 (0.76)	350 0.3854
DK- DC balances	0.075 (0.77)	-0.003 (0.12)	-0.023 (1.15)	-0.008 (0.20)	1076 0.8087
DK after brackets in DC balances	0.017 (1.41)	-0.000 (0.16)	-0.001 0.24)	0.007 (1.25)	1062 0.3965
DK- SS benefits at ER age	0.068 (1.09)	-0.002 (0.29)	0.008 (0.94)	0.019 (1.07)	2392 0.0958
DK- SS benefits at NR age	-0.009 (0.15)	-0.002 (0.26)	0.004 (0.49)	0.032 (1.80)	2415 0.0893

Other covariates include indicators of respondent's union and public employment status, measures of TICS, Recall and Numeracy for the respondent's spouse, a series of dummy variables for respondent's education, dummy variables indicating whether the respondent is female, nonwhite, Hispanic, age and age squared for respondent and spouse, spouse's school years, whether respondent is financially knowledgeable R, dummy variables indicating Social Security Wealth on an if claim now basis (<50,000; 50,000 to100,000 omitted; 100,000 to 150,000; 150,000 to 200,000; >200,000) [these measures are due to Kandice Kapinos of the Health and Retirement Study], dummy variables for missing values including those who were proxies, whether the respondent answered dk to questions about cognition variables, and a dummy if pension wealth is imputed. Current pension, DB, and DC wealth are in millions of dollars. DB wealth includes a calculation of the present value of the respondent's expected DB benefits for his/her most important DB plan. DC wealth includes the sum of all DC accounts from R's current job.

*Nine cases who reported they have a DB plan from their current job, but that they were receiving benefits currently, are excluded.

z-statistics are reported in parentheses.

Table 2: Marginal Effects of Pension and Social Security Knowledge on Household Wealth:

Ages 51-56 in 2004. (Note: Measures of cognition are not included in these regressions.)

	Dependent Variable: HH Total Wealth (thousands of dollars)		Dependent Variable: Ratio of HH Total Wealth to HH Income		Dependent Variable: HH Total Wealth Excluding Pension & SS Wealth (thousands of dollars)	
Independent Pension Knowledge Variables	Coefficient for Pension/SS Knowledge Variable	Coefficient for Pension Wealth Variable	Coefficient for Pension/SS Knowledge Variable	Coefficient for (Pension Wealth/HH Income) Variable	Coefficient for Pension/SS Knowledge Variable	Coefficient for Pension Wealth Variable
A. Indicators of Plan Type						
DK plan type	-127.30 (2.22)	1.120 (30.30)	0.33 (0.59)	0.979 (34.56)	-24.88 (0.74)	0.226 (10.36)
R & firm agree on all plan types (wider restriction)	21.7 (0.49)	1.100 (20.65)	-0.57 (1.29)	0.996 (16.45)	14.97 (0.63)	0.180 (6.29)
R & firm agree plan is DB	93.51 (1.79)	0.985 (9.96)	0.33 (0.65)	0.881 (10.04)	25.95 (1.04)	0.139 (2.95)
B. Indicators of Retirement Age						
DK- ER age for DB	73.66 (1.45)	0.839 (11.03)	0.06 (0.13)	0.747 (15.95)	67.62 (2.53)	0.116 (2.91)
DK- NR age for DB	67.07 (1.15)	0.835 (11.02)	0.42 (0.76)	0.749 (16.03)	48.57 (1.60)	0.105 (2.66)
C. Indicators of Plan Value						
DK- NR benefits for DB	49.89 (1.21)	0.850 (11.10)	0.54 (1.40)	0.752 (16.13)	46.67 (2.14)	0.118 (2.93)
DK- XP benefits for DB*	-2.72 (0.05)	0.837 (10.96)	-0.06 (0.11)	0.748 (15.99)	26.74 (0.92)	0.103 (2.60)
R and Firm agree on expected DB benefits	73.86 (1.17)	0.912 (7.79)	-0.43 (0.78)	0.826 (8.90)	-15.99 (0.51)	0.170 (2.95)
DK- DC balances	-55.13 (1.31)	1.411 (26.13)	0.13 (0.32)	1.24 (37.51)	-26.92 (1.04)	0.355 (10.77)
DK- SS benefits at ER age	14.60 (0.67)	1.092 (25.02)	0.11 (0.52)	1.05 (22.92)	11.01 (0.85)	0.248 (9.54)

Estimated with robust regression. Covariates not listed in the table include an indicator if respondent is female, race, age and age squared for respondent and spouse, a series of dummy

variables for respondent's education, spouse's school years, whether respondent is financially knowledgeable R, if a union member or public employee, dummy variables indicating Social Security Wealth on an if claim now basis (<50,000; 50,000 to100,000 omitted; 100,000 to 150,000; 150,000 to 200,000; >200,000), dummy variables for missing values; , and a dummy if pension wealth is imputed.

Table 3: Marginal Effects of Measures of Cognition and Current Pension on Household Wealth: Ages 51-56 in 2004 (Wealth is measured in thousands of dollars.)

	Wealth Excluding Pensions and Social Security		Wealth Including Pensions and Social Security	
Independent Variables	Rs with Pension	Rs with matched pension	Rs with Pension	Rs with matched pension
	(1)	(2)	(3)	(4)
Financial R				
TICS	-6.17 (1.49)	-4.90 (0.80)	-2.94 (0.43)	7.33 (0.67)
Word Recall	-9.45 (2.42)	1.76 (0.30)	-6.80 (1.05)	-0.91 (0.09)
Numeracy	26.54 (3.23)	26.28 (2.08)	31.69 (2.32)	12.13 (0.54)
Non-Financial R				
TICS	-4.04 (0.99)	-3.65 (0.58)	3.07 (0.45)	-12.21 (1.09)
Word Recall	11.45 (2.86)	9.88 (1.66)	17.67 (2.66)	31.78 (3.02)
Numeracy	15.56 (1.69)	27.15 (1.97)	21.76 (1.42)	19.41 (0.80)
Covered Worker				
Current Pension Wealth	0.139 (6.92)	0.126 (4.53)	0.942 (28.20)	0.949 (19.39)

Estimated with robust regression. Covariates not listed in the table include indices for female, financial R, Hispanic, non-white, household total income and its square, respondent's and his/her spouse's age and their squares, respondent's and his/her spouse's education.
t-statistics are reported in parentheses.

Table 4: Marginal Effects of Measures of Financial Knowledge and Cognition on Household Wealth Excluding Pensions and Social Security: Ages 51-56 in 2004 (Wealth is measured in thousands of dollars.)

	(1)	(2)	(3)	(4)	(5)	(6)
Financial R						
TICS	-4.73 (0.77)	-8.18 (1.40)	-9.22 (1.57)	-9.36 (1.13)	-4.47 (0.81)	-7.89 (1.66)
Word Recall	0.41 (0.07)	-5.59 (1.01)	-5.05 (0.91)	10.26 (1.23)	-11.93 (2.34)	-9.79 (2.21)
Numeracy	26.37 (2.11)	29.91 (2.54)	31.64 (2.68)	19.55 (1.09)	33.50 (3.21)	30.94 (3.34)
Non-Financial R						
TICS	-3.51 (0.56)	-6.41 (1.15)	-7.15 (1.27)	-0.37 (0.04)	-6.54 (1.19)	-4.49 (0.98)
Word Recall	9.23 (1.56)	14.16 (2.55)	14.78 (2.65)	9.37 (1.12)	10.16 (1.92)	11.06 (2.53)
Numeracy	29.07 (2.11)	7.91 (0.62)	8.68 (0.68)	36.34 (1.95)	22.06 (1.85)	16.69 (1.65)
Covered Worker						
Current pension/DB/DC wealth	0.120 (4.34)	0.049 (1.37)	0.045 (1.26)	0.107 (1.92)	0.251 (7.96)	0.156 (6.39)
DK-Plan Type	-20.88 (0.40)	-	-	-	-	-
R and Firm Agree on All Plan Types (Wider Restriction)	10.52 (0.40)	-	-	-	-	-
R and Firm Agree Plan is DB	10.07 (0.42)	-	-	-	-	-
DK-ER Age for DB	-	36.80 (1.52)	-	-	-	-
DK- expected DB benefit	-	-	62.66 (1.46)	-	-	-
R & firm agree on expected DB benefits	-	-	-	-28.80 (0.95)	-	-
DK-DC Balances	-	-	-	-	-64.44 (1.79)	-
DK-ER Age for DC Plan	-	-	-	-	-21.42 (1.14)	-
DK- SS Ben at ER age	-	-	-	-	-	7.64 (0.50)
DK- SS Ben at NR age	-	-	-	-	-	-3.39 (0.21)

Estimated with robust regression. The dependent variable is household wealth excluding Social Security and pension benefits. Covariates not listed in the table include indices for female, financial R, Hispanic, non-white, household total income and its square, respondent's and his/her spouse's age and their squares, and respondent's and his/her spouse's education.
t-statistics are reported in parentheses.

Table 5: Marginal Effects of Measures of Financial Knowledge and Cognition on Total Household Wealth: Ages 51-56 in 2004 (Wealth is measured in thousands of dollars.)

Financial R	(1)	(2)	(3)	(4)	(5)	(6)
TICS	7.05 (0.65)	-14.16 (1.28)	-14.86 (1.34)	-11.97 (0.78)	4.14 (0.47)	-2.70 (0.35)
Word Recall	-2.88 (0.28)	-10.31 (0.98)	-9.83 (0.94)	-11.03 (0.72)	-7.53 (0.91)	-7.15 (1.00)
Numeracy	9.20 (0.42)	55.78 (2.50)	57.15 (2.56)	27.84 (0.85)	43.32 (2.57)	40.30 (2.68)
Non-Financial R						
TICS	-8.98 (0.81)	4.04 (0.38)	3.57 (0.34)	4.51 (0.29)	5.03 (0.57)	2.75 (0.37)
Word Recall	31.31 (3.00)	29.37 (2.79)	29.42 (2.80)	27.52 (1.80)	16.78 (1.97)	18.36 (2.59)
Numeracy	22.18 (0.91)	0.64 (0.03)	-0.16 (0.01)	40.39 (1.18)	42.52 (2.21)	26.62 (1.63)
Covered Worker						
Current pension/DB/DC wealth	0.942 (19.29)	0.689 (10.14)	0.691 (10.18)	0.755 (7.38)	1.262 (24.79)	0.901 (22.74)
DK-Plan Type	-59.33 (0.64)	-	-	-	-	-
R and Firm Agree on All Plan Types (Wider Restriction)	-8.53 (0.18)	-	-	-	-	-
R and Firm Agree Plan is DB	68.80 (1.62)	-	-	-	-	-
DK-ER Age for DB	-	19.34 (0.42)	-	-	-	-
DK- Expected DB Benefit	-	-	58.43 (0.72)	-	-	-
R & Firm Agree on Expected DB Benefits	-	-	-	5.90 (0.11)	-	-
DK-DC Balances	-	-	-	-	-67.13 (1.15)	-
DK-ER Age for DC Plan	-	-	-	-	-80.39 (2.66)	-
DK- SS Ben at ER age	-	-	-	-	-	16.73 (0.67)
DK- SS Ben at NR age	-	-	-	-	-	-7.40 (0.28)

Estimated with robust regression. The dependent variable is household wealth including Social Security and pension benefits. Covariates not listed in the table include indices for female,

financial R, Hispanic, non-white, household total income and its square, respondent's and his/her spouse's age and their squares, and respondent's and his/her spouse's education.
t-statistics are reported in parentheses.

Table A1: Selected Measures of Cognition, Demographic Status, Income and Wealth, for Members of Two Person Households, Health and Retirement Study, Respondents Aged 51-56 in 2004 (Means and Standard Deviations in Various Subsamples)

Independent Variables	All Rs (51-56)	Rs with Pension	Rs with Matched Pension	Rs with Any DB	Rs with Any DC	Rs Expecting SS Benefits At ER age	Rs Expecting SS Benefits At NR age
Financial R							
TICS	5.37 (1.68)*	5.55 (1.61)	5.47 (1.66)	5.53 (1.61)	5.62 (1.57)	5.52 (1.61)	5.51 (1.61)
Word Recall	5.46 (1.46)	5.66 (1.35)	5.74 (1.34)	5.69 (1.33)	5.70 (1.34)	5.57 (1.42)	5.56 (1.42)
Numeracy	1.43 (0.96)	1.58 (0.94)	1.62 (0.95)	1.63 (0.91)	1.61 (0.93)	1.53 (0.94)	1.53 (0.94)
Non-Financial R							
TICS	4.81 (1.82)	5.07 (1.72)	5.10 (1.70)	5.06 (1.71)	5.15 (1.71)	5.07 (1.75)	5.06 (1.75)
Word Recall	5.40 (1.45)	5.57 (1.34)	5.66 (1.37)	5.61 (1.40)	5.61 (1.38)	5.50 (1.48)	5.50 (1.48)
Numeracy	1.06 (0.93)	1.19 (0.93)	1.21 (0.93)	1.20 (0.93)	1.23 (0.94)	1.20 (0.91)	1.20 (0.91)
All							
Female	0.50 (0.50)	0.47 (0.50)	0.56 (0.50)	0.47 (0.50)	0.46 (0.50)	0.54 (0.50)	0.54 (0.50)
Hispanic	0.14 (0.35)	0.09 (0.28)	0.09 (0.29)	0.08 (0.28)	0.08 (0.27)	0.12 (0.33)	0.12 (0.32)
Non-white	0.15 (0.36)	0.15 (0.36)	0.15 (0.36)	0.17 (0.37)	0.14 (0.35)	0.14 (0.35)	0.14 (0.35)
R's age	53.60 (5.23)	53.10 (4.19)	53.04 (4.14)	53.20 (4.08)	52.95 (4.23)	52.89 (3.98)	52.97 (4.08)
Spouse's age	53.60 (5.23)	53.35 (5.0)	53.66 (4.78)	53.37 (5.10)	53.14 (5.05)	53.54 (5.34)	53.54 (5.32)
R's # of school years	13.20 (3.10)	14.11 (2.39)	14.57 (2.32)	14.30 (2.37)	14.13 (2.36)	13.54 (2.79)	13.54 (2.79)
R's spouse's # of school years	13.20 (3.10)	13.86 (2.47)	14.12 (2.38)	13.91 (2.43)	13.91 (2.42)	13.48 (2.82)	13.48 (2.82)
HH total income**	103.2 (134.6)	125.3 (148.6)	124.9 (133.7)	132.1 (169.1)	122.0 (118.6)	112.2 (146.4)	112.1 (146.1)
HH Wealth excluding pension and SS wealth**	432.3 (1,052)	466.8 (1,074)	448.0 (832)	436.8 (832)	475.0 (1,110)	479.1 (1,111)	458.1 (1,109)
HH Wealth including pension	839.6 (1,165)	975.3 (1,205)	1002.7 (982)	1001.7 (966)	986.3 (1,246)	879.1 (1,221)	879.7 (1,218)

Independent Variables	All Rs (51-56)	Rs with Pension	Rs with Matched Pension	Rs with Any DB	Rs with Any DC	Rs Expecting SS Benefits At ER age	Rs Expecting SS Benefits At NR age
and SS wealth**							
N	3418	1520	639	743	1078	2398	2415

* Standard deviations are in parenthesis

* * In 1000 dollars

Table A2: Descriptive Data Regarding Pension Coverage and Pension Knowledge, Couple Households, Health and Retirement Study, Early Boomer Cohort, in 2004

	All			Financial R			Non-Financial R		
	All	Males	Females	All	Males	Females	All	Males	Females
Part A: Indicators of Employment, Coverage, Plan Type, Matched Employer and Social Security Data									
Total	3418	1708	1710	1709	1041	668	1709	667	1042
Number Employed	2510	1325	1185	1297	824	473	1213	501	712
% Employed	73	78	69	76	79	71	71	75	68
Number Reporting Current Pension	1520	801	719	818	524	294	702	277	425
Percent Reporting Current Pension	61	60	61	63	64	62	58	55	60
Number Reporting Matched Employer Pension	639	280	359	340	197	143	299	83	216
Percent Reporting Matched Employer Pension	42	35	50	42	38	49	43	30	51
Percent (of R with current pension) Reporting DB/comb	49	50	48	52	52	51	46	45	46
Percent (of R with current pension) Reporting DC/comb	71	73	68	73	75	70	68	70	67
Number with Matched Social Security Data	2068	1029	1039	1068	664	404	1000	365	635
Percent with Matched Social Security Data	61	60	61	62	64	60	59	55	61
Number Expecting Social Security benefit	2647	1292	1355	1313	780	533	1334	512	822

Percent Expecting Social Security benefit	77	76	79	77	75	80	78	77	79
Part B: Indicators of Pension Knowledge									
Percent (of R with current pension) Reporting DK Plan Type	3	2	3	2	2	2	4	3	4
Number Firm and Respondent Report of Plan Type Agree ((broader restriction)	565	248	318	298	172	126	267	76	191
Percent (of R with matched pension) Firm and Respondent Report of Plan Type Agree (broader restriction)	90	89	89	88	87	88	89	92	88
Number Firm and Respondent Report of Plan Type Agree (narrower restriction)	170	68	102	79	47	32	91	21	70
Percent (with matched pension) Firm and Respondent Report of Plan Type Agree (narrower restriction)	27	24	28	23	24	22	30	25	32
Percent (with matched pension) Reporting DB only with Matched DB only	10	11	10	9	11	8	11	11	11
Percent (with matched pension) Reporting DC only with Matched DC only	16	16	16	15	15	15	17	18	17
Percent with DB/comb	9	7	12	7	7	7	12	9	15

Reporting DK on Early Retirement Age									
Percent with Matched DB/comb Agreeing on Early Retirement Age (On Diagonal)	41	45	37	40	46	32	41	43	41
Percent with DB/comb Reporting DK on Normal Retirement Age	7	5	10	5	4	7	9	5	11
Percent with Matched DB/Comb Agreeing on Normal Retirement Age (On Diagonal)	34	37	32	36	41	28	33	28	35
Percent (of R with DB/comb) with DB Reporting DK on Expected Retirement Age	5	4	7	3	3	4	8	6	9
Percent (of R with DB/comb) Reporting DK on Normal Retirement Benefits*	42	34	52	38	30	52	48	42	51
Percent with DB/Comb Reporting DK on Expected Retirement Benefits**	40	31	51	37	28	52	45	37	50
Percent with Matched DB Agreeing on Benefits at Expected Retirement Age (On Diagonal)	18	20	16	21	23	19	13	13	13
Percent (of R with DC/comb) Reporting DK on Early Retirement Age	13	10	18	10	7	16	18	15	20

Percent (of R with DC/comb) Answering DK on Account Balance	34	30	39	31	28	35	38	32	41
Percent (of R with DC/comb) Answering DK after Brackets on Account Balance	11	10	12	11	11	12	11	9	12
Part C: Indicators of Social Security Knowledge									
Percent (R expecting SS benefits) Reporting DK on Early Retirement Benefit	37	28	45	32	26	42	42	32	48
Percent (R expecting SS benefits) Reporting DK on Normal Retirement Benefit	32	23	40	28	21	38	36	26	42

*Includes only those who provided a normal retirement age

**Includes under dk those who could not provide an expected retirement age.

***Rs expecting benefits based on own work and/or spouse's work are included.

Table A3: Variables Used in the Analysis

Variable name	Definition
Knowledge Variables	
DK- Plan type	R doesn't know plan type
R and firm agree on all plan types (broad restriction)	If self-rep=DB/comb& firm-rep=DB/comb or If self-rep =DC/comb & firm-rep =DC/comb
Firm and R agree plan is DB	Firm reports DB only, self-report DB only
Firm and R agree plan is DC	Firm reports DC only, self-report DC only
Firm reports DC & self-rep DB	Firm reports DC/comb, self-report DB/comb
Firm reports DB & self-rep DC	Firm reports DB/comb, self-report DC/comb
DK-ER age for DB	R reports dk on the early retirement age for the most important DB/comb plan
DK-NR age for DB	R reports dk on the normal retirement age for the most important DB/comb plan
DK-ER age for DC	R reports dk on the early retirement age for the most important DC plan
DK-DC balances	R reports dk on account balances for the most important DC plan
DK after brackets in DC	R reports DK after bracket questions for DC account balances
R & Firm agree on NR age	Firm-rep of normal retirement age agrees with self-report within ranges of 2 years for the most important DB/comb plan
DK-XP benefits for DB	R reports dk on the benefits at expected age of retirement for the most important DB/comb plan
R & Firm agree on expected DB benefits	Firm-rep of benefits at expected age of retirement agrees with self-rep for the most important DB/comb plan
DK-SS benefits at ER age	R reports dk on social security benefits at early retirement age
DK-SS benefits at NR age	R reports dk on social security benefits at normal retirement age
Current pension wealth	Sum of DB wealth and DC balances
Current DB wealth	Self-rep expected DB benefits from current job
Current DC wealth	DC balances from current job
Cognition Variables	
TICS	Sum of series 7 and backward counting - Sum of correct answers, average for the missing
Word recall	Average of immediate +delayed recall- Missing values replaced with the average
Numeracy	Sum of dummies for 10% chance, winning lott, and interest on savings calculations- Each dummy if correct=1, else=0

Variable name	Definition
sTICS	Spouse's tics
sWord recall	Spouse's Word recall
sTotal numeracy	Spouse's total numeracy
Ddel	Dummy var for delayed recall
Dimm	Dummy var for immediate recall
dbwc20	Dummy var for backward counting
dser7	Dummy var for series 7
Mischnc	Dummy var for missing chance of getting disease
Miswnn	Dummy for missing Winning lottery
Misntrst	Dummy for missing interest on savings
Other Covariates	
Public	Dummy for if public employee
Mispubl	Dummy for missing public employee variable
Dunion	Dummy for union employee
Misunion	Dummy for missing union employee
Dontwrk	Dummy for not working Rs
Rage	R's age
Sage	Spouse's age
Rage squar	R's age square
Sage square	Spouse's age square
Total income	Total household income -- used in wealth equations
Total income square	Total household income square -- used in wealth equations
Female	Dummy for gender
Hispanic	Dummy var for hispanic
Nonwhite	Dummy var for non-white
Finr	Financial respondent
Rschlyrs	R's number of years of education -- used in wealth equations
Sschlyrs	spouse's number of years of education -- used in both wealth & knowledge equations
Dropout	If did not finish high school -- used in knowledge equations
Somecol	R has some college education -- used in knowledge equations
Colgrad	R has a college degree -- used in knowledge equations
Postgrad	R has more than a college degree -- used in knowledge equations
Snopen	Dummy for spouse with no pension
Snomatchspd	Dummy for spouse with no matched spd
sswca50	SS wealth if claim now le 50k -- used in knowledge equations
sswca100	SS wealth if claim now <= 100k > 50k -- used in knowledge equations
sswca150	SS wealth if claim now <= 150k > 100k -- used in knowledge equations
sswca200	SS wealth if claim now <= 200k > 1500k -- used in knowledge

Variable name	Definition
	equations
sswca201	SS wealth if claim now > 200k -- used in knowledge equations
dmsswca	Dummy var for missing ss wealth at claim now age -- used in knowledge equations