

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

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Studies by Lusardi and Mitchell (2006) and Banks and Oldfield (2007) confirm a link between numeracy and household wealth. Indeed, McArdle, Smith, and Willis (2009) find that measures of numeracy, based on simple questions testing a person's ability 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, provides 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 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. Cagan (1965) and Katona (1965) found that those with pensions saved almost the same amount outside of their pensions as those without a plan. As confirmed by Gustman and 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

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[†] To view additional materials, visit the article page at <http://dx.doi.org/10.1257/aer.102.3.309>.

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

The study is based on HRS data for members of couple households from the Early Boomer cohort, where at least one respondent was age 51 to 56 in 2004. Four sets of variables are used in the analysis.

Measures of Wealth.—The HRS asks about the major components of nonpension, 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 expected retirement age. Kandice Kapinos projected Social Security wealth for the HRS by applying the Social Security Administration's ANYPIA program to respondents' covered earnings. Own, spouse, and survivor benefits are included in the calculation.

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 Social Security 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). TICS ranges from 0 to 7. Word recall measures immediate and delayed recall of a list of words. The sum of correct answers 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

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 knowledge 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 estimated. We suspect that much of the causality runs from wealth to knowledge, not from knowledge to wealth. Two-thirds of the pension wealth held by members of the HRS cohort of Early Boomers is in defined benefit (DB) plans (Gustman, Steinmeier, and Tabatabai 2010a). 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 in 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. Moreover, at the time of hire, future DB benefits have limited value due to the back loading of defined benefit plans.¹

¹ Gustman and 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.

3. *Household wealth held outside of pensions and Social Security is not related to measures of knowledge of pensions and Social Security.*—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 might be related to knowledge of pensions. We find no evidence that pension knowledge is related to wealth outside of pensions. We tried various specifications, included measures of income in various forms, but could not detect a relation.

4. *Although wealth is significantly related to numeracy, 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 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, these respondents are within a few years of retirement. Along these lines, 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?²

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.

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² 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.

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