



Cognition and Wealth: The Importance of Probabilistic Thinking

Lee A. Lillard and
Robert J. Willis

IB 2001-007



Executive Summary

In recent years there has been an increase in private and company pension plans that allow workers to make contributions to their own retirement accounts and to make their own decisions about how much they contribute, into what type of account they contribute, and about when and how much is paid out to them. It has been argued that at least some portion of Social Security funds should be managed as voluntary private accounts of this sort. Whether this policy move would be harmful or beneficial depends in part on how well individuals and households would manage these accounts. Critics are concerned that many people, especially those with lower income to begin with, will not make investment decisions that will give them the greatest return on their money. This, they argue, will widen the already large inequalities in wealth among older Americans. Research that addresses this question is needed for informed retirement policy.

In this *Issue in Brief*, we summarize work that investigates one aspect of financial decision-making: the ability to make precise judgments, or guesses, about the likely occurrence of future events, or as we refer to it, probabilistic thinking. We use data from the Health and Retirement Study (HRS) to create a measure of this kind of thinking and then relate it to household choices about the riskiness of investments, and hence the rate of growth in the value of those assets. In short, we find that a large proportion of older Americans tend to make imprecise probability judgments and that this is related to holding a financial portfolio containing less risky assets with lower rates of return. This is important information for policymakers to consider when weighing the

costs and benefits of individual retirement accounts in the Social Security system.

The Data

The Health and Retirement Study (HRS) is a longitudinal, nationally representative study of older Americans. The survey began in 1992 with an initial cohort of 12,652 individuals from 7,607 households, with at least one household member born from 1931 to 1941. In this study, we use questions asked in the 1998 wave that surveyed over 22,000 Americans over the age of 50. We construct an index of probabilistic thinking using questions that ask the respondent about topics ranging from personal life expectancy and date of retirement to beliefs about the rate of inflation and future Social Security policy. For each question, the respondent is asked how likely they think various events might be. The respondent is told to give a number between 0 and 100 where “0” means “no chance at all” and “100” means the event is absolutely sure to happen. The HRS also contains extensive information about respondents’ financial assets, which we use in our analyses.

The Logic of our Argument

In general, the probability questions give good information. For example, answers to questions about life expectancy match life table probabilities surprisingly well. However, there are also a large proportion of respondents who typically answer ‘0’ or ‘50’ or ‘100.’ We call these focal answers and assume that they reflect

a large degree of uncertainty about the true probability of the occurrence of an event. By contrast when respondents say that an event has, for example, a 30 percent or a 70 percent chance of happening, we assume that reflects a greater certainty about the true probability. Thus, we propose that individuals who make more precise guesses are more confident about the accuracy of their guess.

An important aspect of our argument is that people don’t make these guesses in a vacuum but based on their own experience. Although we do not explore it fully in this paper, it may be that people can become more competent probabilistic thinkers through experience. The precision of a person’s beliefs may depend on his or her education, cognitive ability and experience in either making or observing decisions.

The confidence that is indicated by precise guesses, we propose, leads people to be willing to take greater risks, in this case, where financial matters are concerned. On the other hand, given a lot of uncertainty, people will tend to make a more conservative decision--one that they think will give them a more certain outcome. In our analyses, we examine the relationship between the precision of guesses (probabilistic thinking) and two financial outcomes: the fraction of risky assets (ones which tend to have a higher rate of growth) and the actual growth rate of those assets held by a household.

Summary of Major Findings

- Sixty percent of all answers to the probability questions were imprecise answers (respondents answered that an event had a 0, 50 or 100 percent chance of happening).
- Probabilistic thinking is strongly related to age and education such that older people and less educated people tend to be less competent probabilistic thinkers, that is, they are more likely to give imprecise answers (0, 50, or 100 percent) to the probability questions.
- Households with people who are very likely to give precise answers--are very good probabilistic thinkers--have a significantly larger proportion of risky assets in their financial portfolio. This effect takes into account the effect of education and age as well as other demographic and financial factors.
- When we examine the effect of probabilistic thinking on the growth rate of those assets, we find that households with people who are good probabilistic thinkers experienced a significant and very large rate of growth of assets from 1992 to 1998 compared to households where individuals tended to be less precise, or poorer probabilistic thinkers. In this model, the control for education has a large effect and cuts the relationship between probabilistic thinking and asset growth in half. Further investigation of this finding suggests that education is likely related to some other measure of cognitive ability that we were able to measure.

Conclusion

This study was motivated by the question of how well older Americans will be able to take advantage of individual private retirement investment accounts—programs that expand the scope of individual choice in decision-making. We have focused our attention on one aspect of financial decision-making — probabilistic thinking — that is important for financial decision-making. We believe that this paper provides clear evidence that there is a wide range of competence in probabilistic thinking in the older population and that more precise beliefs lead households to be willing to take more risks and to enjoy higher growth in wealth. An important caveat, however, is that this study is the first of its kind. Furthermore, we believe it is important for future work to explore the extent to which people can reduce uncertainty, become more confident and precise thinkers, through experience with financial management, and hence become better able to manage their finances in ways that will be most beneficial to them.

Robert J. Willis is Professor of Economics and is the Principal Investigator of the Health and Retirement Study (HRS) at the University of Michigan Institute for Social Research (ISR).

Lee A. Lillard was a Professor of Economics and the Director of the Michigan Retirement Research Center (MRRC) at the University of Michigan Institute for Social Research (ISR). Dr. Lillard Died on December 2, 2000.

We are grateful for research assistance by Gabor Kezdi, Jody Schimmel, and Helena Stolyarova. We are also grateful for comments on earlier versions of this paper by workshop participants at the University of Michigan, the University of Bergen, Northwestern University, and the TMR Conference-Paris, the University of Chicago and discussions with Gary Becker, Jim Heckman, Chuck Manski, Sol Polachek, Sherwin Rosen, Mark Rosenzweig, Matthew Shapiro, Jim Smith, and Yoram Weiss. This work was supported, in part, by a grant from the Social Security Administration through the Michigan Retirement Research Center (10-P-98358-5).

The opinions and conclusions are solely those of the authors and should not be construed as representing the opinions or policy of SSA or any agency of the Federal Government.

Michigan Retirement Research Center
Institute for Social Research
University of Michigan
426 Thompson Street, Room 3026
Ann Arbor, MI 48104-2321

Phone (734) 615-0422
Fax (734) 615-2180

<http://www.mrrc.isr.umich.edu>
mrrc@isr.umich.edu

Regents of the University of Michigan

David A. Brandon, Ann Arbor
Laurence B. Deitch, Bingham Farms
Daniel D. Horning, Grand Haven
Olivia P. Maynard, Goodrich
Rebecca McGowan, Ann Arbor

Andrea Fischer Newman, Ann Arbor
S. Martin Taylor, Grosse Pointe Farms
Katherine E. White, Ann Arbor
Mary Sue Coleman, ex officio

The Michigan Retirement Research Center is supported by a grant from the Social Security Administration (grant number 10-P-98358-5).