

MRRC

# RESEARCHER

*Robert J. Willis discusses his MRRC-supported research*

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**Q:** Talk about what motivates your MRRC-supported research.

**A:** Over the years, various colleagues and I have been supported by the MRRC and NIA to pursue a line of inquiry in the area of cognitive economics, or the role of cognition in economic decision-making. It is important to understand this link for several reasons. First, with increasing longevity, the elderly are a fast growing segment of the population. Older Americans face increasingly complex financial decisions. For example, there is increased scope for choice due to the decline of defined benefit pensions and the growth of 401(k) plans. Portfolio decisions concerning savings and wealth management, decisions about when and/or whether to annuitize, choices about health care and medical insurance plans as well as understanding rules around Medicare benefits are all cognitively demanding. Furthermore, the cognitive abilities of older Americans are highly heterogeneous and changing as they age. Decisions faced by older individuals balancing risks and benefits of alternative financial and health care choices are genuinely difficult.

The field of cognitive economics seeks to develop innovations in economic theory and measurement to address questions like: What are the limitations in knowledge, memory, reasoning, calculation? What is the role of emotion, social context, conscious vs. unconscious judgments and decisions? What is the role of health as determinant, outcome and context for economic activity, decisions and well being? What is the connection between economic welfare and measures of well being? Some of my work for MRRC begins to address some of these issues. In particular, I have focused on subjective expected probability beliefs, which are available in the Health and Retirement Study (HRS).

**Q:** How do you measure subjective beliefs?

**A:** The probability questions use a format pioneered by Tom Juster and Chuck Manski. An example question asks, "Using a number from 0 to 100, what do you think are the chances that you will live to be at least X?" where X = 80 for persons 50 to 70 and increases to 85, 90, 95, 100 for each five year increase in age. On average, researchers using these questions have found that they make sense. For example, survival probabilities conform to life tables and are predictive of actual mortality. However, we also find that individual probabilities are very noisy with heaping on the focal values of "0", "50-50" and "100."

**Q:** How do subjective expected probabilities relate to financial decisions?

**A:** Subjective Expected Utility (SEU) theory assumes that individuals decide on a given course of action by choosing that action which yields the highest expected utility. The SEU model presumes that individuals competently perform some extremely demanding tasks before making any given decision.

The SEU model assumes that the individual has a coherent set of beliefs about the probabilities that each state will occur. There is a distinction between “risk” and “uncertainty” where risk refers to a situation in which a specific probability can be attached to a given outcome while uncertainty refers to a situation in which a probability cannot be specified.

What Ellsberg identified in the famous “Ellsberg Paradox” and subsequent experimental research has verified, is that most people prefer a known risk to an uncertain one of equal expected value. This is known as uncertainty aversion.

In an early MRRC paper, Lee Lillard and I devised a model which assumes that most individuals form their preferences among uncertain prospects in a context of real world choices. Examples include the returns from investments in human or physical capital, the choice of a marriage partner, or the returns from a stock held over time. We show that uncertainty aversion is simply a consequence of risk aversion.

Lee and I began to look at the pattern of responses to the probability questions in the HRS as indicators of the degree to which they indicate people’s capacity to think clearly about subjective probability beliefs. We explored the idea that focal answers of “0”, “50” and “100” were perhaps indicators of less coherent or well-formed beliefs than non-focal (or “exact”) answers. We treated the probability questions like a psychological battery and constructed an empirical propensity to give non-focal answers.

We hypothesized that people who give more focal answers are more uncertain about the true value of probabilities. If the uncertainty is about a repeated risk, such as the return to a stock portfolio held over time, we show that people who have more imprecise probability beliefs (i.e. are more uncertain about the “true” probability) will behave more risk aversely. We found that people who had a higher propensity to give exact answers tended to have higher wealth, had riskier portfolios, and achieved higher rates of return, controlling for conventional economic and demographic variables.

**Q:** How does this affect portfolio choice?

**A:** In another MRRC paper, Gabor Kezdi and I continue this line of investigation in order to attempt to explain why some people hold stocks and others do not. In addition to the measures of precision from Lillard and Willis, we construct a measure of optimism using questions on expectations about weather. We find that stock ownership and the probability of becoming a stockholder are strongly positively correlated with the index of optimism and the propensity to make precise (non-focal) probability expectations. The optimism index may reflect cognitive bias as well as optimistic beliefs that are justified by the individual’s private information. Nonetheless, we find strong evidence that people who give more optimistic answers to probability questions in general are healthier, wealthier, and more educated.

**Q:** What about subjective survival probabilities?

**A:** Adeline Delavande and I have begun examining the relationship between how long people expect to live and their probability of claiming Social Security benefits early, at age 62. We find that subjective survival probabilities capture meaningful behavioral responses to incentives for early Social Security claiming when they are purged of measurement error using risk factors as instruments. Among people who are still working at age 62, those who expect to live longer are likely to delay claiming of Social Security benefits to a degree that is both statistically and economically significant. For example, an increase of 5 percentage points in the subjective probability of survival to age 75 of each person leads to a 1.9 percentage point decline in the proportion who claim before age 64, from 29.6 percent to 27.7 percent.

**Q:** Where are you headed with this research?

**A:** Delavande and I are interested in deepening our understanding of how people make complicated financial decisions such as when to claim Social Security benefits by blending findings from the literature pointing out behavioral mistakes, and our own findings on the role of survival expectations. We are especially interested in understanding financial decision-making in the context of scarce cognitive resources. We think that even thinking about decisions such as whether to delay Social Security claiming or not is costly when cognitive resources are scarce.

If you think of an individual who is fairly uncertain about his life expectancy, when reaching age 62, he is faced with the following decision: either claim early because this sounds beneficial when he computes his average life expectancy, or invest cognitive resources to find out more information about his mortality risks. Many people who claim early may just do so because they are fairly uncertain about their life expectancy, and think it will be costly and maybe useless to devote cognitive resources to evaluate whether delaying would be better for them.



Robert J. Willis is Professor of Economics and Research Professor in the Survey Research Center and the Population Studies Center of the Institute for Social Research. He is the Principal Investigator for the Health and Retirement Study, a longitudinal survey of over 22,000 persons over age fifty in the United States, which is supported by the National Institute on Aging. Professor Willis received his Ph.D. from the University of Washington in 1974. He joined the University of

Michigan in 1995 and holds joint appointments with the Survey Research Center and the Population Studies Center at the ISR. Before coming to Michigan, Professor Willis held appointments at the University of Chicago, SUNY at Stony Brook, and Stanford University. He has served on a number of advisory boards including, currently, the Census Advisory Board, and the Board of Visitors of the Rockefeller Center for the Social Sciences at Dartmouth College.

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