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# WHAT IS THE AGE OF REASON?

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## Introduction

Most U.S. households have accumulated significant assets by retirement, but these assets are often accompanied by significant liabilities. Including net home equity, households with a head age 65-74 had a median net worth of $239,400 in 2007, according to the *Survey of Consumer Finances* (SCF).[1] At the same time, the SCF reports that 48 percent had debt secured by a residential property, 26 percent had installment loans, and 37 percent carried credit card balances from month to month. Overall, about two-thirds of these households had at least one form of debt. This *brief* raises the question of whether older households have the ability to manage their increasingly large and complex balance sheets.

The first section of this *brief* documents the decline in cognitive function that occurs as individuals age. The second section describes new evidence from 10 different financial transactions indicating that middle-age adults make fewer financial mistakes than younger or older adults. The third section explores possible policy responses to help older individuals more effectively manage their finances. The final section concludes that the best way forward is not yet clear, stressing that further research is needed on several key questions.

## Cognitive Decline Among Older Adults

A tendency for cognitive ability to decline with age is evident from both cross-sectional surveys (which look at a population sample at a given point in time) and from longitudinal surveys (which follow a sample over time). This section summarizes findings from both types of surveys.

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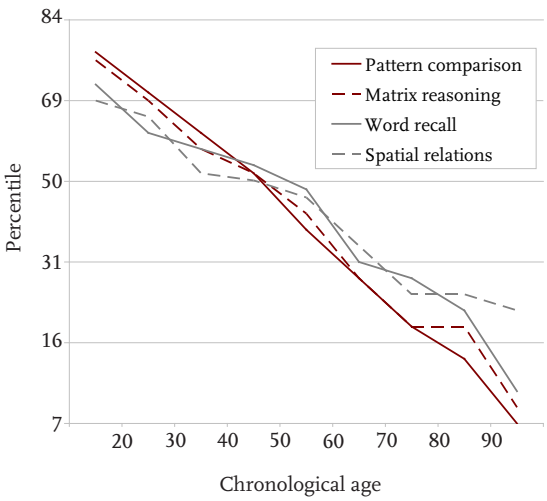
## *Cross-sectional Evidence*

Fluid intelligence (i.e., performance on novel tasks) can be measured along many dimensions, including working memory, reasoning, spatial visualization, and cognitive processing speed. Fluid intelligence shows a clear age pattern in cross-sectional data sets, with the results suggesting a decline of about 1 percentile per year after age 20 (see Figure 1).[2]

Figure 1. Trends in Cognitive Ability by Age

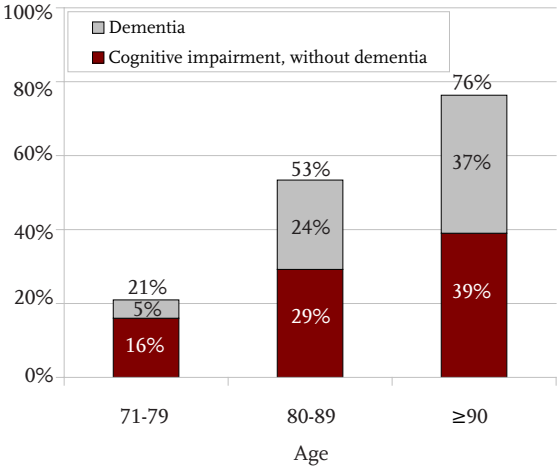



*Sources:* Salthouse (2005); and Salthouse 2010 (forthcoming).

One important pathway that influences performance in older adults is neurological problems. The prevalence of both dementia and cognitive impairment without dementia rises rapidly with age.[3] For example, Figure 2 shows that dementia in the United States increases from an estimated 5 percent of the population at ages 71-79 to 37 percent at ages 90 and above. Similarly, the estimate for a less severe form of cognitive impairment that does not involve dementia rises from 16 percent at ages 71-79 to 39 percent at ages 90 and above. All told, about half of adults in their 80s suffer from either dementia or cognitive impairment without dementia.

Age-driven declines in fluid intelligence, however, are partly offset by age-related increases in crystallized intelligence – sometimes called experience or knowledge. Most day-to-day tasks, such as buying the right amount of milk at the grocery store, rely on both fluid and crystallized intelligence.

Figure 2. Rates of Dementia and Cognitive Impairment Without Dementia in the United States, 2002




Notes: Cognitive impairment without dementia is defined here as a Dementia Severity Rating Scale score of 6 to 11.
*Sources:* Plassman et al. (2007); and Plassman et al. (2008).

For most tasks, we hypothesize that net performance is hump-shaped with respect to age, with a rise in crystallized intelligence partly offsetting a decline in fluid intelligence. In other words, cognitive performance improves from youth to middle age, at which point it peaks before beginning a steady decline. Consequently, middle-age adults may be at a decision-making sweet spot.

## *Longitudinal Evidence*

The cross-sectional evidence on age-based patterns in cognitive function is confounded by two effects, which may work in opposite directions: 1) cohort effects; and 2) selection effects. First, in any cross-section of subjects, the older subjects not only are older, but also were born in different cohorts than the younger subjects. And these various cohorts may have different characteristics; for example, people born in 1920 may generally have lower levels of cognitive function than those born in 1950 or 1970 due to fewer educational advantages. Second, selection effects result from differences that may occur in the type of people in each cohort who respond to the survey. For example, older adults have relatively more health problems (both physical and cognitive), and the less healthy are likely to drop out of surveys.

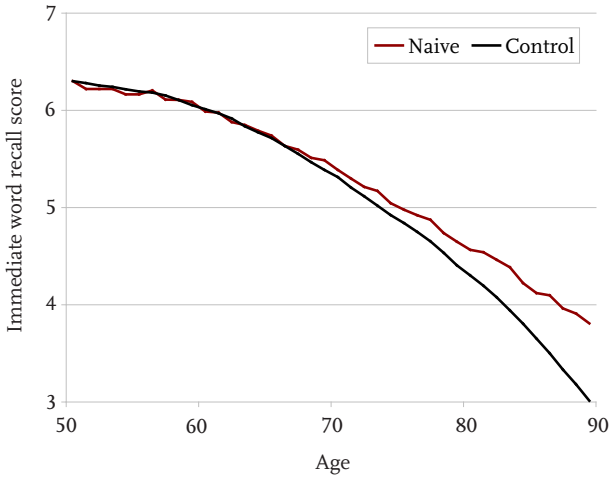
Such a pattern would work in the opposite direction from the cohort effect by raising the cognitive function level of the respondents in older age groups.

In light of these problems, it is useful to analyze data that follow individuals longitudinally. The *Health and Retirement Study* (HRS) is an excellent source for such analysis of cognitive variables.[4] Since it began in 1992, the HRS has surveyed every two years a nationally representative sample of more than 22,000 Americans over the age of 50.[5]

Our study examined several HRS questions involving tasks measuring cognitive function. For example, we studied an immediate word recall task in which the interviewer reads a list of 10 simple nouns, and the respondent is immediately asked to recall as many of them as possible, in any order. At age 51, the average performance is 6.2 words out of 10. By age 90, the average (controlled) performance is 3.0 words out of 10.

We analyzed the responses to the HRS questions using two parallel tracks. First, we undertook a "naive" analysis that simply plots mean performance by age, ignoring the potential role of cohort and selection effects. Second, we conducted a "controlled" analysis that traces out the performance trajectory using *only* intra-individual differences. Figure 3 shows the results for the word recall task; results for other questions showed a similar pattern.

Figure 3. Results of Immediate Word Recall Task in the HRS, 1992-2006




*Source:* Authors' calculations from University of Michigan, *Health and Retirement Study (HRS)*, 1992-2006.

The HRS results paint a clear picture of declining cognitive function with age. They also suggest that selection effects may be more important than cohort effects. Since older cohorts tend to have fewer educational advantages, cohort effects are predicted to cause the naive profiles to fall more steeply than the control profiles. Selection effects, in contrast, should cause the naive profiles to fall less sharply than the control profiles, since the individuals with the poorest cognitive function tend to exit the sample. Selection bias seems to be more important in the HRS data, since our controlled profiles are consistently steeper than our naive profiles.

# Financial Performance and Age: The Inverse U-Shape

This section summarizes evidence from our full study showing that the prices people pay in different credit transactions vary by age, exhibiting an inverse U-shaped curve pattern. The main example highlighted below covers credit card balance transfer offers. Other transactions we examined include home equity loans and lines of credit, car loans, mortgages, and several other types of credit card transactions. In each case, we conducted a regression analysis that identifies age effects and controls for observable factors that might explain the patterns by age.[6] The results consistently confirmed an inverse U-shaped pattern.

## *"Eureka" Moments: Optimizing the Use of Credit Card Balance Transfers*

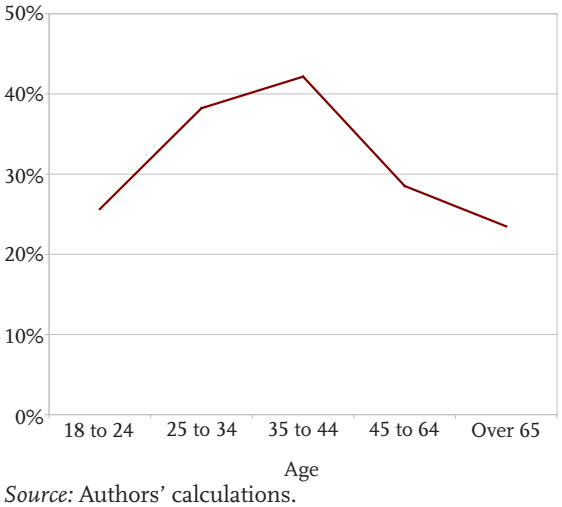
Credit card holders frequently receive offers to transfer account balances from an existing card to a new card charging a substantially lower annual percentage rate (APR) for an initial period, from six months to a year or more (a "teaser" rate). The catch is that all payments on the new card are applied first to the transferred balance and are applied to new purchases (which are subject to a higher APR) only after the transferred balance has been paid off.

The optimal strategy for the cardholder during the teaser-rate period, then, is to make all new purchases on the *old* credit card and none on the new card until all the transferred balances have been paid off. In our analysis, we categorize cardholders by the speed with which they converge on this optimal strategy.[7]

Some (about one-third) identify this optimal strategy immediately, before making any purchases with the new card. Others (slightly more than one-third) never identify the optimal strategy during the teaser-rate period. The remaining third discover it after one or more billing cycles as they observe their surprisingly high interest charges. These borrowers make purchases for one or more months and then have a "eureka" moment, after which they implement the optimal strategy.[8]

Figure 4 plots the frequency of "immediate eureka moments" for each of five age groups. The pattern shows a pronounced inverted U-shape, with adults age 35-44 most likely to adopt the optimal strategy immediately. Conversely, the corresponding data for the "no eureka" group have the opposite pattern, indicating that the greatest frequency of confusion occurs among younger adults and older adults.[9]

Figure 4. Percent of Borrowers Who Immediately Experience a "Eureka" Moment, by Age




*Source:* Authors' calculations.

## *Other Financial Choices*

The other financial transactions we examined show a similar inverted U-shaped pattern with performance peaking in middle age.[10] For example, with respect to home equity loans and lines of credit, younger and older consumers have a greater tendency to misestimate the value of their home, which results in a less favorable interest rate on their loans. With other transactions involving credit cards, car loans, and mortgages, the results suggest that fees and interest rates paid are lowest for customers in their late 40s or early 50s. Overall, the difference in interest rate outcomes between those at the peak performance age and older ages ranged from about 10 to 50 basis points.

For each transaction studied, we then estimated the point in the life span at which financial mistakes are minimized. The mean age is 53.3 years, and the standard deviation calculated by treating each study as a single data point is 4.3 years.

One possible explanation for the inverse U-shaped pattern of performance is a combination of two age-based effects discussed above: diminishing returns to experience (crystallized intelligence) and the age-based decline in fluid intelligence. Relatively young borrowers tend to have low levels of crystallized intelligence but a high degree of fluid intelligence, whereas older borrowers tend to have high levels of crystallized intelligence but relatively lower fluid intelligence.[11]

# Possible Policy Responses

Given that older Americans are less effective at handling financial decisions, a range of policy responses are discussed below, in order from least to most paternalistic. Each approach has pros and cons. Recognizing that strong regulatory interventions have the potential to generate large social benefits but also large social costs, even the least intrusive approaches should be subjected to a careful cost-benefit analysis.[12]

## *Disclosure*

Legislation to strengthen disclosure requirements has recently been introduced in many different domains, including mutual fund fees, 401(k) fees, and mortgage origination fees. However, we are skeptical that improved disclosure will be effective in improving financial choices. Even for cognitively healthy populations, additional disclosure and consumer education make surprisingly little difference in financial choices. For example, in one recent study, employees with low saving rates were randomly assigned to a treatment in which they were paid $50 to read a short explanation of their 401(k) plan, including a calculation of how much money they would personally gain by taking full advantage of the employer match. Relative to a control group, this group did not significantly increase its average 401(k) saving rate.[13]

### *Financial "Driving Licenses"*

Another set of proposals would require that individuals pass a "license" test before being allowed to make nontrivial financial decisions, such as opting out of "safe harbor" investment products.[14] Such proposals would need to overcome several logistical problems. Can a test be devised that reliably separates qualified from unqualified investors, without generating too many false negatives or false positives? Can it be administered at a reasonable social cost? Who would be required to take the test? Would such a test be politically feasible if it primarily targeted older adults? What would be the impact on older individuals themselves?

### *Mandatory Advance Directives*

One direct way to address the impact of cognitive decline on financial decision making would be to require older adults to put in place a financial advance directive before reaching a certain age so that the management of their assets could be transferred to a third party in the event of their incapacity. Entirely new legal protections might also be created. For example, a fiduciary could be appointed to approve all "significant financial transactions" involving the principal's funds after the principal reaches a designated age. As an alternative to a fiduciary-based model, the principal could place his assets in a safe harbor (which would contain certain restrictions on the types of asset holdings allowed and on draw-down rates).

Mandating advance directives would pose several problems. First, it might be perceived by some older adults as an unfair restriction targeted against them. Second, the imposition of a fiduciary would create transaction costs. Third, any attempt to define a safe harbor would be politically contentious, doubtless giving rise to a great deal of lobbying. An independent agency would probably be needed to partly insulate the safe harbor regulations from political pressure.[15]

### *Regulatory Approval*

Instead of primarily targeting individual investors, regulations could instead target the financial products themselves. One such regime would mimic the regulatory model currently used for nutritional supplements: new financial products would be allowed in the market without specific formal approval in advance but would be monitored for adverse effects. An alternative approach would require that new financial products obtain explicit regulatory approval before being marketed.

Either approach would be socially costly, particularly the explicit approval approach. Introducing a regulatory regime would delay the release of new products, increase costs for financial services firms, and discourage innovation. But this approach could also prevent the marketing of socially undesirable products. The net social benefit is not easy to evaluate.

## Conclusion

Older adults experience substantial declines in cognitive function over time. And evidence indicates that, after peaking in middle age, the ability to make effective financial decisions declines. In response to this problem, several policy approaches are possible and government intervention is probably desirable, although the ideal form of intervention remains unclear. Economic behavior among older adults is still poorly understood. Moreover, even if older adults are making substantial financial mistakes, it is not clear what a well-intentioned policymaker should do.

Before the best solutions can be identified, more research – including field experiments – is needed. Researchers and policymakers should consider several questions as they wrestle with the issue. These questions include the magnitude and prevalence of losses due to poor financial decision making; which demographic characteristics predict poor decision making; the extent to which people anticipate or recognize their own cognitive decline; the efficacy of financial education; the efficacy of third parties such as advisors or family members; and the market response to the current situation.

# Endnotes

1 This figure excludes defined benefit pension wealth.

2 Cattell (1987); Salthouse (2005); and Salthouse (2010 forthcoming).

3 Plassman et al. (2007); Plassman et al. (2008); Ferri et al. (2005); and Fratiglioni, De Ronchi, and Agüero-Torres (1999).

4 Ofstedal, Fisher, and Herzog (2005); and McArdle, Smith, and Willis (2010 forthcoming).

5 See Ofstedal, Fisher, and Herzog (2005) for a complete description of the cognitive scales in the HRS.

6 Our analysis is part of a recent literature that studies the effects of aging and cognitive function on the use of financial instruments (see, for example, Willis, 2007; and McArdle, Smith, and Willis 2010 forthcoming), which in turn is part of a broader literature on household finance (Campbell, 2006). See Agarwal et al. (2009) for more details on the literature.

7 We use a proprietary panel data set with data from several large financial institutions, later acquired by a single financial institution that made balance transfer offers nationally. The offers were not made conditional on closing the old credit card account. The data set contains information on 14,798 individuals who accepted such balance transfer offers over the period January 2000 through December 2002.

8 We thank Robert Barro of Harvard University for drawing our attention to this type of potentially tricky financial product. We also note that changes in regulation proposed in May 2008 by the Federal Reserve, the National Credit Union Administration, and the Office of Thrift Supervision would forbid banks from applying payments solely to transferred balances.

9 We also check for the possibilities that the relatively old and the relatively young might have lower levels of debt or less access to credit than the middle-aged. We find that neither credit card debt nor the number of open credit cards varies in economically or statistically significant ways with age.

10 Our analyses of these other transactions rely on data from various proprietary data sets from financial institutions. These data sets are described in Agarwal et al. (2009).

11 Alternatively, the inverse U-shaped pattern could also be influenced by cohort or selection efforts. In fact, we find no evidence for either cohort or selection effects that could explain our results, but our data do not allow us to definitively rule them out.

12 For a more expansive discussion of possible policy responses, see Agarwal et al. (2009).

13 See Choi, Laibson, and Madrian (2008). Examples of other studies that show a similar lack of effectiveness from providing more information can be found in Choi, Laibson, and Madrian (2005); Madrian and Shea (2001); and Beshears et al. (2009).

14 Alesina and Lusardi (2006).

15 The financial reform legislation currently under consideration includes a new consumer financial protection bureau within the Federal Reserve.

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The Center for Retirement Research at Boston College was established in 1998 through a grant from the Social Security Administration. The Center's mission is to produce first-class research and forge a strong link between the academic community and decision makers in the public and private sectors around an issue of critical importance to the nation's future. To achieve this mission, the Center sponsors a wide variety of research projects, transmits new findings to a broad audience, trains new scholars, and broadens access to valuable data sources. Since its inception, the Center has established a reputation as an authoritative source of information on all major aspects of the retirement income debate.

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