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Who Values the Annuity from Social Security? New Evidence from the Health and Retirement Study

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Abstract: We examine individuals' self-reported willingness to exchange part of the inflation-indexed annuity they could get from Social Security for an immediate lump sum payment. Drawing on an experimental survey module fielded on respondents to the 2004 wave of the Health and Retirement Study (HRS), we find that approximately 58 percent of the respondents indicate they would prefer a lump sum payment if it is approximately "actuarially fair" (based on population mortality), while more than a third of respondents would prefer the lump sum even when the amount is nearly 25 percent below its actuarially fair level. Several factors are associated with preferences favoring annuities; for instance, those aged 60-64 are more likely to say they prefer the Social Security annuity than are younger respondents. Individuals in better health are substantially more likely to prefer the annuity, as are those indicating they believe they are more likely than average to live to age 75. The more highly educated tend to say they will elect a lump sum over an annuity, although, conditional on education, more financially sophisticated individuals value the annuity more highly. Jobless persons prefer the lump sum. Surprisingly, we find no evidence that sex, marital status, income, wealth, the presence of children, or risk preferences are associated with respondents' relative preferences for the annuity versus the lump sum.

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Who Values the Annuity from Social Security? New Evidence from the Health and Retirement Study

Jeffrey R. Brown, Marcus Casey, and Olivia S. Mitchell

Economic theory suggests that giving retirees the opportunity to convert their retirement saving into a life annuity paying benefits no matter how long they live will substantially boost utility, as these financial products protect people from running out of money in old age (e.g., Yaari 1965; Mitchell et al., 1999; Davidoff et al., 2005). An implication of the theory is that most risk-averse individuals would be expected to hold a substantial portion of their portfolios in annuitized assets. Yet few retirees to date have purchased *payout* life annuities in the US voluntary annuity market, a finding that has been called the “annuity puzzle.”

A prominent hypothesis explaining low levels of voluntary annuitization is that people may already be over-annuitized, as a result of having much of their retirement wealth held in the form of Social Security benefits. Because these Social Security benefits are payable until death, they represent a key source of lifelong or annuitized income for a substantial segment of US retirees. To date, empirical efforts to test whether retirees are overannuitized have been hampered by a lack of data. For instance, one cannot readily observe peoples’ preferences regarding Social Security annuitization, because retirees currently cannot opt for their benefits as a lump sum.¹ Similarly, choice is limited in private sector retirement plans: for example, only about one in five 401(k) plans offers participants an option to annuitize through the plans. And few buyers of voluntary annuities can be identified in nationally representative microeconomic

¹ There is a small literature noting that a decision to delay claiming of Social Security benefits is akin to purchasing a larger annuity (e.g., Coile, Diamond, Gruber and Jouten (2002); Hurd (1990)), but this decision is somewhat different in that it is really a trade-off between a smaller immediate annuity and a larger deferred annuity. Bernheim (1991) argued that the purchase of life insurance by the elderly was an indication that they were over-annuitized by Social Security, but subsequent research by Brown (2002) indicates that most life insurance holdings of the elderly are the result of factors other than over-annuitization.

datasets such as the Health and Retirement Study (HRS) or the Survey of Consumer Finances, since the non-group individual annuity market is rather small.

This paper provides the first empirical evidence on who values the annuity aspect of Social Security benefits, using a novel set of questions developed for an experimental module in the 2004 Health and Retirement Study (HRS) designed to provide new insights into this question. Specifically, we ask nearly 1,000 HRS survey participants whether they might be willing to give up half of their Social Security monthly payments for the rest of their lives, in exchange for a lump sum payment today. To briefly preview our findings, we find that well over half the older participants we survey indicate they would prefer the lump sum to the annuity when the lump sum is computed as an approximately actuarially fair trade for the average individual. Further, over one third of the individuals would still prefer the lump sum to the annuity even if the lump sum generosity level were reduced by almost 25 percent. Multivariate analysis indicates that, holding other things constant, younger individuals prefer the lump sum, whereas individuals in their 60s prefer the annuity. Health and longevity expectations also matter in sensible ways: people who report being in poor health are substantially more likely to want the lump sum, while those with optimistic longevity expectations are more likely to choose the annuity. Better educated people are more likely to want the lump sum over the annuity, although conditional on education, more financially sophisticated individuals value the annuity more highly. Interestingly, there is little evidence that sex, marital status, income, wealth, the presence of children, or risk preferences are correlated with this choice.

In what follows, we first offer a brief review of the literature on annuities, along with a description of the data we use, the main questions from the experimental module, and summary statistics. Subsequently, we provide preliminary cross-tabs of respondent characteristics and the

annuity vs. lump sum choice. Next, we expand the analysis to a multivariate framework where we estimate two models, one for the binary decision of electing the annuity versus the lump sum, and the other evaluating an ordered ranking of respondent choices. A final section provides discussion, conclusions, and directions for future work.

Prior Studies

The value of life-contingent annuities to risk-averse individuals facing uncertainty over their date of death was first established in the seminal theoretical work of Yaari (1965). He showed that, under certain conditions, it was optimal for individuals to fully annuitize their wealth in the face of length-of-life uncertainty. That paper spawned a considerable literature arguing for the importance of life annuities in financial planning (Gentry and Rothschild, 2006, have a review of this literature). More recent work by Davidoff, Brown, and Diamond (2005) relaxes several of the restrictive assumptions underlying earlier work and finds that the full annuitization result is even more general, though the full annuitization result breaks down if markets are sufficiently incomplete so as to impose a substantial mismatch between the individual's optimal consumption path and the income stream available from annuities. Even then, however, they demonstrate that annuities will comprise a very large share of the retirement portfolio. Recent research by Horneff, Maurer, Mitchell and Dus (2007) confirms this analysis in a simulation context using real-world annuity and capital market parameters.

Despite the strong rationale for annuities in theory, in practice we see relatively low levels of annuitization during the retirement decumulation period. Poterba et al. (2003) found that on average, men age 63-67 annuitized only 5 percent of their wealth, and the median

percentage of annuitized wealth was zero. Various other studies have confirmed the small size of the private payout annuity market in the U.S. (see Brown et al., 2001).

Various studies have sought to reconcile the theoretical predictions of strong annuity demand with the empirical evidence showing the opposite. Some authors suggest that the discrepancy may arise from restrictive assumptions underlying the theoretical models, such as separable utility and complete markets. Nevertheless, while restrictive assumptions may explain why *full* annuitization is not seen, they cannot explain why the demand for *partial* annuitization is so modest (Davidoff et al., 2005). Other rationales include higher than actuarially fair pricing of annuities (Mitchell et al., 1999), the existence of bequest motives (Bernheim 1987, 1991; Brown 2001), the opportunity for risk-sharing within families (Kotlikoff and Spivak, 1981; Brown and Poterba, 2001; Dushi and Webb, 2004a); the demand for liquidity due to medical expenditure shocks (Turra and Mitchell, 2005), and the potential arrival of information about future returns or mortality (Milevsky and Young, 2002). Various papers have also suggested that pre-existing annuities from Social Security (Mitchell et al., 1999) have crowded out private annuity purchases. While one can combine many of these explanations to produce very low predicted levels of annuitization in a theoretical model (e.g., Dushi and Webb, 2004b), such an approach tends to then lead to new puzzles, such as why surviving spouses do not annuitize upon the death of their spouse (Davidoff et al., 2005). Overall, it is fair to say that neither the theoretical nor the simulation literatures to date have successfully explained low levels of annuitization demand.

As noted earlier, the empirical literature has been limited due to data shortcomings. Brown (2001) studies individuals who report that they participate in a defined contribution plan which offers an option to withdraw the money gradually or as an annuity. These participants are

then asked whether they intend to take the payout as an annuity, and the author finds that those predicted by a life-cycle model to value the annuity more highly, were significantly more likely to state an intention to annuitize. Conditional on that measure, he also finds that persons in poor health are less likely to annuitize, as are people with short/myopic planning horizons. Since that study included only participants in defined contribution plans, it does not offer a representative picture of how the broader population might perceive the annuity/lump sum choice. A paper by Dushi and Webb (2004a) uses the HRS to study annuity decisions. However, their analysis seeks to parameterize a life-cycle simulation model, so they do not analyze the annuitization decision *per se*.

In summary, existing theoretical and simulation studies have not been particularly successful in explaining actual annuitization behavior. That fact, and the limited empirical work heretofore, confirms that there is still substantial scope for increasing our understanding of annuity decisionmaking.

HRS Data Description and Summary Statistics

In this section, we summarize the experimental module fielded as part of the 2004 wave of the HRS, and we offer some initial descriptive statistics.

Experimental Module. The HRS is a nationally representative longitudinal study of older individuals (and their spouses) originally fielded in 1992, with follow-up surveys every two years. It asks detailed questions on assets, employment history, health status, daily activities, and expectations of the respondents. The HRS has become the primary data set used to study the financial decision-making of older Americans.

For the 2004 wave of the HRS, we included an experimental module which was conducted on 1,039 HRS participants. Included in this module was the following question posed to non-married individuals:

Imagine you are 65 years old, and you are receiving \$1000 per month in Social Security benefits. Suppose you were given the choice to lower that benefit by half, to \$500 per month. This one-half benefit reduction will continue as long as you live. In return, you would be given a one-time, lump sum payment of \$87,000. Would you take the \$1000 monthly benefit for life or the lower monthly benefit with the lump sum payment?

For married households, the dollar amount of the lump sum was \$80,000, reflecting the actuarial adjustment when switching from an individual to a joint-and-survivor annuity that Social Security provides to married couples. The \$87,000 lump sum for non-married individuals, and the \$80,000 value for married individuals, are approximately actuarially fair for an age-65 individual (the assumed age in the question), given average unisex population mortality rates from the Social Security Administration, and an real interest rate of 3 percent.

As indicated in the upper portion of figure 1, of the 990 respondents who answered this question, approximately two-fifths (41%) of them indicated that they would prefer to keep the full Social Security annuity, while nearly three-fifths (59%) said they would opt for the lump sum cash payment, combined with a reduced annuity benefit. Those who indicated that they wished to receive the full annuity benefit were then asked a follow-up question, in which the value of the lump sum offer was increased by approximately 25 percent, to \$109,000 [\$100,000] for non-married [married] individuals. Respondents who first chose the original lump sum cash payment were also asked a follow-up question, in which the value of the lump sum was reduced by approximately 25 percent to \$65,000 [\$60,000].

Figure 1 here

By tracing through these answers, we can divide the sample into four groups ranked by the value they place on the annuity from Social Security.² These groups are those who indicate that they:

- (1) Always prefer the lump sum;
- (2) Prefer the lump sum at \$87,000, but preferred the annuity over the \$65,000 lump sum;
- (3) Prefer the annuity at \$87,000 but preferred the lump sum at \$109,000;
- (4) Always prefer the full Social Security annuity.

It is readily apparent from Figure 1 that most respondents value on the lump sum payment. Approximately 37 percent of respondents choose to always exchange the annuity for the lump sum payment; some 30 percent always chose to take the annuity. Almost one quarter of the respondents, 22 percent, preferred to exchange the annuity for the lump sum initially but changed their minds when the lump sum was lowered by a quarter, while 11 percent took the lump sum only when it was boosted by 25 percent.

In view of the theoretical prediction that most households should value the longevity insurance provided by the Social Security annuity, it worth noting that a clear majority of our sample indicated that they would prefer the lump sum payment if the annuity were “priced” at an actuarially fair level for the average individual in the population. While there is a meaningful response to the change in prices -- a 25 percent cut in the lump sum value raises the fraction annuitizing by 22 percentage points -- it is nonetheless the case that a majority prefers the lump sum even when the annuity is attractively priced (actuarially fair for average population mortality rates) and is indexed to inflation. This finding refutes annuity market observers who suggest that annuities would be more popular if they were priced more fairly or who argue that demand is depressed because few payout products are fully inflation-indexed.

² Because we are primarily interested in the behavior of individuals nearing retirement age, we restrict the analysis below to persons age 50+, which eliminates 97 respondents younger than age 50 (e.g., spouses of older workers).

Summary Statistics. One advantage of using an experimental module in the HRS is that individuals are randomly assigned to the modules, so our subsample should be representative of the HRS age cohorts (persons over the age of 50). Summary statistics reported in Table 1 suggest that this randomization was successful at providing an analysis sample quite similar to the HRS as a whole. Specifically, Table 1 compares the mean, median, and standard deviations of key variables from our analysis sample to the HRS sample. Our respondents average 57.8 years, in line with the HRS average of 57.5 years. Nearly 3 out of 5 respondents are women. The average respondent has just under 13 years of education, and approximately two-thirds are married. Blacks and Hispanics comprise 16 percent and 9 percent of the sample respectively. The characteristics of our module sample are also comparable to the full HRS along other dimensions, including self-reported health status, wealth, income and prevalence of DB and DC pension plan participation.

Table 1 here

Comparing Annuity vs. Lump sum Choice by Demographic Characteristics. In Table 2, we present cross-tabulations of the annuity versus lump sum choice results, arrayed by interesting demographic characteristics. Moving from left (“Always Take Lump Sum”) to right (“Always Take Annuity”) corresponds to placing a higher value on the annuity. The final column simply reports the number of respondents for whom we have data on the variable in question.

Table 2 here

The first striking finding is that the preference for a lump sum over the Social Security annuity is quite widespread. For every category reported, at least 30 percent of the respondents always would prefer the lump sum, even when it is “priced” at 25 percent less than the actuarially fair level. Adding together the first two columns, which together show the fraction

that would take the lump sum if the annuity were actuarially fair, we see that a majority of individuals in every demographic category prefers the lump sum.

Several other patterns also emerge from these tabulations. For example, it appears that respondents age 60-64 are less likely to prefer the lump sum and more likely to want to annuitize, compared to the younger respondents. It is unclear why this relation may hold, given that all respondents are asked the question “as if” they were already age 65. It is possible that this is picking up differences in proximity to retirement (e.g., individuals who are closer to retirement may have spent more time planning, and thus have a greater appreciation for the importance of longevity insurance), but other plausible explanations are possible.

Another interesting finding is that men and women indicate remarkably similar tastes for the lump sum, though this is inconsistent with expectations since women live much longer than men, yet the lump sum offered in the survey was identical for both men and women. Accordingly, all else equal, one would expect that men would have express a stronger preference for the lump sum. The fact is that there is no evidence of a sex differential in Table 2 (and the finding remains true when the sample is restricted to single individuals). Similarly, there are not clear patterns of choice across racial/ethnic groups, despite known mortality differences across these groups as well.

Theory indicates that marital status ought to be an important control, as under plausible parameterizations, married couples should value an annuity less than single individuals due to their ability to pool risks within the household (Brown and Poterba, 2000). Nevertheless the simple cross tabulations indicate no difference in the propensity to choose the annuity, for married versus unmarried individuals. More striking are the substantial differences in preferences across education group. For example, nearly half of those individuals with 16+ years

of education always prefer the lump sum, while those with less schooling always prefer the lump sum at ranges between 33-38 percent. Health status would also be expected to have a significant impact on retirees' demand for annuities; that is, those in better health would be predicted to be more likely to annuitize because they anticipate living longer and possibly facing future financial risk. In our data, the clearest evidence along these lines is that persons reporting themselves as having poor health substantially prefer the lump sum and are much less likely to elect the annuity.

With respect to income and wealth, households at both the bottom and top quintiles of both distributions appear more likely to prefer the lump sum payment, leading to a shallow U-shaped pattern in the likelihood of choosing the lump sum over the annuity. We also ask whether peoples' valuations of the Social Security annuity depend on whether they have a company pension and what type of plan it is. The expected correlation could go two ways, however. Some lacking a pension may feel that Social Security represents a substantial share of their retirement resources, so they would need the regular annuity to maintain living standards. Others lacking a pension, however, have all their wealth annuitized under Social Security, so they might strongly value more liquidity with the lump sum. In our data, persons having either a defined benefit (DB) or a defined contribution (DC) plan, or both, appear slightly more likely to locate in one of the "extreme" outcomes (i.e., either always take the lump sum or always take the annuity).

There has been considerable interest in the literature on the role of bequest motives in the annuitization decision; however, empirical results to this date have generally suggested negligible effects at best (e.g., Bernheim, 1987; Brown, 2001). In principle, people with bequest motives would be less interested in annuitizing their wealth and would be more likely to opt for

the lump sum. We proxy for a bequest motive with a control indicating whether the respondent has a will or trust, a variable that has been shown by (Kopczuk and Slemrod, 2000) to be a good proxy for a bequest motive. The effect proves weak in our data, however: those without a will or trust are a bit more likely to always take the annuity, but they are also slightly more likely to always take the lump sum.

Employment status (unemployed, retired, disabled, etc) may influence preferences for several reasons, including potentially influencing whether the person is liquidity constrained, differences in the extent to which they have planned for retirement, and so on. The cross-tabs suggest that being unemployed is very strongly correlated with preferring the lump sum, potentially suggesting that unemployed individuals are liquidity constrained.

Because an annuity is a form of insurance, risk preferences are a natural factor to consider when evaluating a person's willingness to annuitize. To investigate tastes for risk, we use a series of questions in the HRS that assess risk attitudes. These questions are particularly useful in our context because several studies have found them to be predictors of individual proclivity to engage in risky behavior (Barsky et al., 1997; Lusardi, 1998). The survey interviewer provides a scenario and asks the respondent to choose between two possible jobs:

“The first would guarantee your current total family income for life. The second is possibly better paying, but the income is also less certain. There is a 50-50 chance the second job would double your total lifetime income and a 50-50 chance that it would cut it by a third. Which job would you take -- the first job or the second job?”

Depending on the respondent's answer, another question is asked that makes the downside of the second job larger or smaller. Using these and responses to another question about job risk, we can divide respondents into six groups, ordered by their willingness to take gambles presented to them. For example, a person in the highest risk aversion category would be one who chose the

first job (guaranteed income) on each question asked, whereas a person in the lowest risk aversion category would have taken the second job (risky income) each time he was faced with the decision. We combine groups to form two sets, one of “risk lovers” and the other “risk averse” individuals. The data in Table 2 show that risk averse individuals are more likely to always choose the annuity (32 percent versus only 27 percent of the risk lovers), which makes sense. Yet the risk averse group is also, paradoxically, more likely to always elect the lump sum. In this sense, risk averse individuals are likely to choose one of the extreme outcomes rather than something in the middle.

Discount rates are also an important factor, as respondents with a high discount rate might be expected to strongly prefer the lump sum to a stream of future income. To measure discount rates, we make use of another question asked in our HRS experimental module engineered to elicit time preference. The question is as follows:

“Suppose that you won a prize that is worth \$1000 if you take it today. Or you could wait one year to claim the prize and be guaranteed to receive \$1100. Would you claim the \$1000 dollars today, or would you wait one year for \$1100?”

Depending on the answer provided, the value of waiting is increased to \$1200 or decreased to \$1050. Using the answers to these questions, we were able to construct four groups which are rank-ordered by their revealed rate of time preference. Thus Group 1 constitutes the most patient (i.e., those who delayed taking the prize both times), whereas Group 4 always chose to take the prize now. Over 67 percent of the sample fell into Group 4. We cluster those in Groups 1 and 2 and label them “patient.” Unexpectedly, Table 2 suggests that more patient individuals are more likely to always take the lump sum.

Because Social Security pays a benefit for life, a respondent’s assessment of his life expectancy could also influence the desirability of annuitization. Accordingly we make use of

information about respondents' survival probabilities, particularly the HRS question which asks respondents "What is the probability (percent chance) of living to 75 or more?" We then compare each individual's response to what would be predicted from the 2004 Social Security Administration (SSA) actuarial life tables by birth cohort. Respondents are then labeled as "optimistic" or "pessimistic," depending on whether their subjective probability of survival is greater than (less than) the objective SSA measure. Consistent with expectations, we find that individuals who are more pessimistic about their longevity are more likely to always take the lump sum.

Earlier, we noted that more highly educated individuals are more likely to take the lump sum. However, being highly educated does not necessarily mean that one is financially sophisticated, and the reverse is also true. To more fully explore how financial literacy might relate to the annuitization decision, we utilize responses from three questions asked in the 2004 HRS to assess individual numerical capabilities:

- a) *"If the chance of getting a disease is 10 percent, how many people out of 1,000 would be expected to get the disease?"*
- b) *"If 5 people all have the winning numbers in the lottery and the prize is two million dollars, how much will each of them get?"*

If the respondent answered either the question (a) or (b) correctly, then he was asked an additional and slightly more challenging question:

- c) *"Let's say you have \$200 in a savings account. The account earns 10 percent interest per year. How much would you have in the account at the end of two years?"*

We label these questions, respectively, the Percent Calculation, Lottery Split, and Interest questions, and we construct indicator variables such that the variable is set to 1 if the person answered correctly, and 0 otherwise.³ Results appear in Table 3.

³ Note that we give the respondent credit for the Interest question, irrespective of whether he used simple or compound interest.

Table 3 here

As noted in Table 3, most people were able to answer the Percent Calculation question correctly but less than half were able to correctly answer the Lottery Split question. 60 percent of respondents answered the Interest question correctly. These controls for financial literacy are also used by Lusardi and Mitchell (2007) who find them to have some predictive power in explaining wealth differentials among the HRS Early Baby Boomers cohort.

Table 4 provides a breakdown of choice behavior by the measures of financial literacy. The response patterns resemble those seen in Table 2 in that there is an overall preference for the lump sum. However, it also appears that individuals who are able to answer the lottery split and interest question correctly are more likely to choose the annuity than the lump sum. Conversely, those who get the questions incorrect are more likely to always take the lump sum. In this sense, financial literacy is somewhat correlated with valuing the annuity more highly.

Table 4 here

Multivariate Models

As some of the variables explored above may be correlated with one another, a multivariate specification can be helpful in isolating which covariates have a significant relation with the outcome of interest. We turn to this next.

Binary Choice. We begin our multivariate analysis using a simple bivariate model.

Specifically, we use the first “branch” of the decision by defining $Y_i = 1$ if the individual indicates that he would prefer the annuity, and $Y_i = 0$ if he would prefer the lump sum when it is initially offered at approximately an actuarially fair rate. Below we use an ordered Logit model that permits us to use the richer information about the subsequent annuity choices.

Estimated marginal effects evaluated at the mean are reported in Table 5, taken from a Probit specification. The difference across the four columns results from including the different financial literacy questions (different numbers of respondents replied to the different financial literacy questions). In column 1 the literacy questions are omitted, so the full sample is included in the estimation. Column 2 reports results including the indicator for whether the individual answered the Lottery Split question correctly, with a resultant sample size of 668. Column 3 uses the Interest question, while column 4 includes both the Lottery Split and the Interest Question, with a corresponding sample size of 561 observations. As the initial Percent Calculation proxy for financial literacy proves to have no explanatory power, we have not reported results for that variable here.

Table 5 here

Looking down the columns, it is striking that respondents age 50-54 and age 55-59 are markedly less likely to opt for the annuity initially, compared to the reference group in the age 60-64 bracket. Accordingly, younger persons are 9-13 percentage points less likely to choose the annuity and more likely to choose the lump sum option. Surprisingly, we find no significant relation between annuity choice and sex, marital status, or the presence of children. There are no significant differences in the propensity to annuitize for those in fair through excellent health groups, but there is a very strong negative effect of poor health on the likelihood of annuitizing. Specifically, individuals in poor health are 18-23 percentage points less likely to choose the annuity than are persons who report themselves in good health. This is consistent with the view that people indicating they are in poor health may anticipate shorter remaining lifespans, in which case they would receive less lifetime income from an annuity. This is consistent with Brown (2001) who found that those in poor health were less likely to annuitize their 401(k) plan

balances. Having controlled on health, we find no additional significant impact of having a more optimistic longevity expectation than average has any additional explanatory power.

Unemployed individuals are substantially less likely to choose the annuity, and this difference is large and significant in columns 3 and 4. Indeed, the magnitude of the unemployment effect in columns 3 and 4 is approximately the same as for poor health, i.e., a 23-percentage point reduction in the probability of choosing the annuity over the lump sum. Attitudes towards risk, the degree of patience, subjective probabilities of survival, income, wealth, and participation in a pension plan are not significantly correlated in this multivariate analysis with the decision to opt for the annuity. Persons with higher (16+ years) education are significantly less likely to choose the annuity, with a point estimate ranging from 11-16 percentage points. Conditional on education, however, there is some evidence that more financially sophisticated individuals are more likely to choose the annuity. Specifically, individuals who are able to answer the lottery split question correctly are 8 percentage points more likely to choose the annuity, a result that is statistically significant at the 10 percent level. We also find a positive, though insignificant, effect of correctly answering the lottery question on the likelihood of choosing the annuity. When both coefficients are entered simultaneously, the coefficients remain comparable, but due to the drop in sample size, the lottery split question is no longer significant. A test of joint significance of these two variables has a p-value of 0.13.

Ordered Logit Results. The marginal Probit effects are easy to interpret, but a binary model does not make full use of all available information about annuity preferences. Recall that by tracing out the series of questions, it is possible to allocate individuals into four outcome categories, ranging from those that always take the annuity (even when the lump sum payment is 25 percent higher than the actuarially fair amount), to those who always take the lump sum (even

when the lump sum payment is 25 percent lower than the actuarially fair amount). To better use this additional information, we now define the dependent variable Y_i as follows:

- $Y_i = 4$ if the individual always chooses the annuity
- $Y_i = 3$ if the individual chooses the annuity only if it is at least actuarially fair
- $Y_i = 2$ if the individual chooses the annuity only if it is better than actuarially fair
- $Y_i = 1$ if the individual always chooses the lump sum.

Because these choices have a clear ranking, it is appropriate to estimate an ordered response model of the following form using ordered Logit:

$$(2) \quad P(Y_i = J | x_i, z_i) = \Lambda(x_i\beta + z_i\gamma) \quad J = \{1, \dots, 4\}.$$

Here J represents the four possible choice paths respondents can take. Note that the estimates from these models do not generally have a causal interpretation; rather, they represent reduced form conditional correlations of respondent choices and their various characteristics.

Table 6 presents ordered Logit coefficients, which loosely can be interpreted in the following manner: a positive sign on the coefficient of x_i implies an increase in the probability of the highest outcome, in this case, the probability of always electing the annuity.⁴ The first column of the table reports results from a canonical specification, while the other columns add the financial literacy variables. As in the case of the linear probability models above, we see that younger individuals (age 50-59) are significantly less likely to always choose the annuity relative to the oldest age group. There is no statistically significant effect of any of the proxies for tastes for bequests -- having children or having a will turns out to be unrelated to the demand for annuities. Having additional education is strongly associated with a stronger preference for the lump sum; for instance, respondents having at least a college degree are 16 percentage points less

⁴ As discussed in Wooldridge (2002), the direction of the effect of a variable x_i on the probabilities of the endpoint outcomes is given by the sign on the estimated coefficient. However, in interpreting the intermediate outcomes, there may be some ambiguity. A full set of marginal effects is available upon request.

likely than those with only a high-school degree, to prefer the annuity versus the lump sum.⁵ Consistent with our Probit results, individuals who report themselves as having poor health are significantly less likely to prefer the annuity and more likely to take the lump sum payment. Similarly, we find that those who are consistently more optimistic about living to age 75 than might be gleaned from standard mortality tables, are more likely to choose the annuity option. This relation is significant at the 10 percent level in columns 2, 3 and 4.

Table 6 here

Now that other factors are controlled, we confirm that those experiencing unemployment are less likely to choose the annuity, and they are conversely more interested in a lump sum. Other work status factors are not statistically significant. In contrast with the Probit results, now we find that individuals who are more patient are less likely to annuitize and more likely to take the lump sum, which is counter to our intuition. We continue to find a robust inverse relation between education and a preference for annuitization. And conditional on education, the more financially sophisticated, measured by both the Lottery Split and Interest questions, are significantly more likely to annuitize. Columns 2 and 3 show that each of these measures of financial sophistication is individually significant, and a Wald test for joint significance in column 4 indicates that the two financial literacy proxies are jointly significant with a p-value of 0.07.

Discussion and Conclusions

Prior literature on annuities suggests that there are important benefits from annuitization, while empirical evidence suggests that voluntary annuitization of retirement wealth is rather rare.

⁵ The marginal effects are evaluated in Stata via the user contributed program mfx2.

Our analysis relies on a new module for the HRS, which we structured to illustrate how people might evaluate a life annuity from Social Security relative to a lump sum payment.

Our evidence is striking: a majority of respondents indicates it would be willing to exchange Social Security's lifelong annuity payment, for a lump sum combined with either an actuarially fair or a reduced annuity benefit. This finding is robust across virtually every demographic subgroup in the sample. In other words, the results are suggestive of Social Security over-annuitization -- a crowd-out effect -- for a large number of older Americans.

Several variables are significantly and robustly correlated with older respondents' interest in annuities. Specifically, people in the early 60's prefer the annuity benefit, whereas younger workers do not. Those in poor health or with worse-than-average survival expectations are significantly more likely to prefer the lump sum. The latter finding underscores the potential for adverse selection in annuity markets: to the extent that individuals have private information about their health status or longevity expectations that lead shorter-lived individuals to avoid annuitization, this will tend to raise average annuity prices. Yet it is interesting that this form of selection does not occur from longer-lived individuals being more likely to buy, but rather from those persons in poorest health opting out of the market. Many factors have no influence over the annuity vs lump sum choice, despite the prominent role played by some of these variables in theoretical models. These include such as risk aversion, sex, marital status, income, wealth, having a pension plan, or having children. Another finding that is particularly interesting, and which should be the subject of further research, is more educated people say they prefer the lump sum, but more financially sophisticated individuals prefer to annuitize. This finding has interesting implications: for example, if more financially sophisticated individuals also tended to

be longer-lived on average, then financial sophistication could turn out to be a basis for advantageous selection.

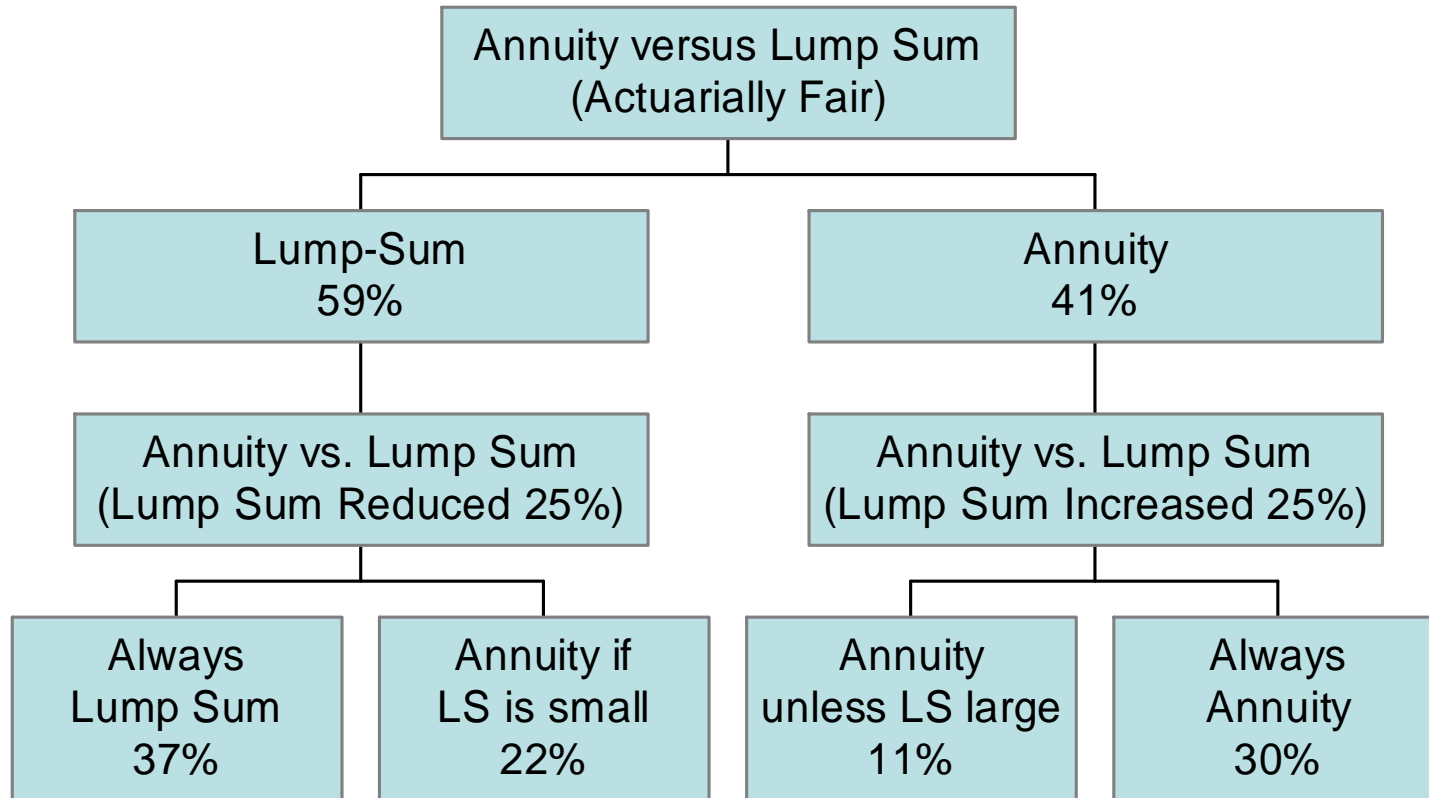
Our contribution in this paper is to offer a new way to examine consumer decision-making in the retirement payout marketplace. A factor in assessing the desirability of compulsory annuitization is the extent to which individuals might adversely select into the annuity market, thus affecting market prices. Prior studies have lacked information on these issues, despite the fact that policymakers are routinely faced with making critical decisions regarding the design of public and private pension payouts. For example, a key design issue in proposals to include personal accounts in Social Security was whether participants would be compelled to annuitize their account balances at retirement (Cogan and Mitchell, 2003). Similar issues arise in developing the rules governing payouts from industry pension plans. Future research can explore further whether adverse versus advantageous selection dominates in individual annuity markets, and whether older Americans' sense of over-annuitization has any measurable impact on their retirement portfolio saving and investment composition.

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Figure 1. Expressed Preference for Social Security Annuity vs. Lump Sum



Notes: Tabulations from 2004 HRS. Sample restricted to those between the ages 50-64 and participated in the experimental module. Answers included only if respondent gave meaningful response across both branches of primary question.

Table 1: Summary Statistics, HRS Module Sample vs Entire HRS Sample in 2004

	Sample			HRS		
	Mean	Median	sd	Mean	Median	sd
<u>Demographics</u>						
Age	57.8	58	4.5	57.5	57	4.43
Female	0.58	1	0.49	0.59	1	0.49
Education	12.8	12	2.95	12.9	13	3.1
Married	0.66	1	0.47	0.69	1	0.46
Black	0.16	0	0.37	0.16	0	0.37
Hispanic	0.09	0	0.28	0.11	0	0.31
Other	0.06	0	0.24	0.07	0	0.26
<u>Health</u>						
Excellent	0.16	0	0.36	0.15	0	0.36
Very Good	0.30	0	0.46	0.29	0	0.45
Good	0.29	0	0.46	0.29	0	0.46
Fair	0.18	0	0.38	0.17	0	0.38
Poor	0.07	0	0.26	0.08	0	0.27
Op.Longevity	0.44	0	0.50	0.45	0	0.50
<u>Wealth & Inc</u>						
Wealth	\$385,477	\$168,300	\$803,604	\$424,575	\$157,312	\$1,648,987
Income	\$76092	\$50,320	\$115,045	\$75,431	\$51,000	\$107,671
DB	0.53	1	0.49	0.52	1	0.50
DC	0.57	1	0.49	0.57	1	0.50
<u>Bequests</u>						
Children	2.99	3	1.99	2.44	3	1.67
Will/Trust	0.43	0	0.49	0.42	0	0.49
<u>Work Status</u>						
Working	0.60	1	0.49	0.59	1	0.49
Unemployed	0.03	0	0.15	0.04	0	0.19
Disabled	0.13	0	0.34	0.13	0	0.33
Retired	0.14	0	0.35	0.15	0	0.36
Homemaker	0.09	0	0.28	0.08	0	0.28
Other	0.01	0	0.12	0.01	0	0.12
<u>Other</u>						
Patient	0.20	0	0.40	-	-	-
Risk Lover	0.39	0	0.49	0.27	0	0.44

Notes: Tabulations from 2004 HRS Experimental Module V and overall sample. Restricted to respondents aged 50-64. DC/DB refers to reported ownership of at least one defined contribution or defined benefit pension. Work status is based on initial report at interview. See text for description of Patient, Risk Lover, and Longevity variables. Question used to create the Patient variable not available in core HRS. N ~ 942 and 8011 for the analysis sample and HRS, respectively.

Table 2: Expressed Preference for Annuity vs. Lump Sum by Demographic Characteristics

	<u>Take Lump Sum Initially</u>		<u>Take Annuity Initially</u>		N
	Always Take Lump Sum	Take Lump Sum 1 st Take Annuity 2 nd	Take Annuity 1 st Take Lump Sum 2 nd	Always Take Annuity	
<u>Age Group</u>					
50-54	38.5	23.0	8.7	30.3	265
55-59	40.7	24.2	9.7	25.4	248
60-64	32.7	22.0	11.2	30.1	373
<u>Sex</u>					
Male	39.5	19.1	12.1	29.3	372
Female	36.2	22.2	10.9	30.7	514
<u>Race</u>					
White	35.6	22.4	11.7	29.9	648
Black	39.4	20.4	11.3	28.9	142
Hispanic	38.4	18.3	5.6	36.6	71
Other	37.3	23.5	9.8	29.4	51
<u>Marriage Status</u>					
Married	36.9	21.9	11.3	29.9	593
Unmarried	36.2	22.2	10.9	30.7	293
<u>Education Group (years)</u>					
< 12	33.6	18.1	10.3	38.1	155
12	34.3	22.8	13.5	29.5	312
> 12 & <16	38.1	21.4	9.8	30.7	215
16	32.7	30.7	7.9	28.7	101
> 16	49.5	18.5	11.7	20.4	103
<u>Health</u>					
Excellent	40.1	25.7	11.8	22.1	146
Very Good	34.9	21.2	12.6	31.2	281
Good	36.7	22.1	11.8	29.3	277
Fair	30.9	20.4	9.9	38.8	167
Poor	47.7	21.5	4.6	26.2	69
<u>Longevity</u>					
Optimistic	33.5	26.7	11.5	28.3	382
Pessimistic	39.6	18.9	10.6	30.9	482
<u>HH Income Quintile</u>					
Quint 1	41.7	14.9	11.3	32.1	168
Quint 2	33.9	23.3	11.7	31.1	180
Quint 3	33.2	23.8	11.6	31.5	181
Quint 4	35.8	25.1	12.3	26.8	179
Top Quint	39.3	22.5	8.9	29.2	178

Table 2(cont.)

		<u>Take Lump Sum Initially</u>		<u>Take Annuity Initially</u>		
		Always Take Lump Sum	Take Lump Sum 1 st Take Annuity 2 nd	Take Annuity 1 st Take Lump Sum 2 nd	Always Take Annuity	N
<u>Wealth Quintile</u>						
Quint 1		41.4	16.7	9.2	32.8	174
Quint 2		36.4	22.2	13.1	28.4	176
Quint 3		34.3	24.3	9.4	32.0	181
Quint 4		32.2	25.9	12.9	28.8	177
Top Quint		39.3	20.8	11.2	28.7	178
<u>Pension Type</u>						
DB	Yes	34.7	24.5	12.9	27.9	481
	No	39.0	19.0	9.1	32.8	405
DC	Yes	36.3	25.1	10.9	27.7	510
	No	37.2	17.8	11.4	33.5	376
Both	Yes	35.2	25.8	11.9	27.2	361
	No	37.7	19.4	11.7	32.2	525
<u>Children</u>						
0		36.2	26.1	4.4	33.3	69
1-2		38.4	22.7	10.5	28.4	352
3-4		35.6	19.4	15.2	29.8	315
> 4		35.3	24.0	7.3	33.3	150
<u>Will/Trust Ownership</u>						
	Yes	36.9	20.9	13.6	28.5	382
	No	37.7	19.4	11.7	32.2	525
<u>Work Status</u>						
	Working	36.5	23.1	10.8	29.6	537
	Unemployed	71.4	4.8	4.8	19.1	21
	Disabled	33.3	22.8	11.4	32.5	114
	Homemaker	33.3	18.1	16.7	31.9	72
	Other	38.5	30.8	7.7	23.1	13
<u>Risk</u>						
	Risk Lover	34.5	26.5	12.5	26.5	321
	Risk Averse	36.5	20.3	10.9	32.3	493
<u>Discount</u>						
	Patient	42.2	20.6	8.9	28.3	180
	Impatient	35.5	22.5	11.8	30.2	702

Notes: Authors' tabulations from 2004 HRS. Row percentages are in each cell. Income Quintiles: Q-1 \$20,011, Q-2 \$38648, Q-3 \$65048, Q-4 \$1047824. Wealth Quintiles: Q1-\$25,500, Q2-\$109,900, Q3-\$245,000, Q4-\$562,600 DC/DB refers to defined contribution and defined benefit pension plans, respectively. See text for definitions.

Table 3. Financial Literacy Questions in the 2004 HRS

Question Type	Correct	Incorrect	Dk/Rf	n
Percent Calculation	0.76	0.22	0.02	758
Lottery Split	0.47	0.35	0.18	758
Interest ^{a,b}	0.60	0.34	0.06	611

Notes: Authors' tabulations from 2004 HRS. ^a Only the respondents who answered correctly at least one of the first two questions were asked the interest question. ^b This variable treats either simple or compound interest answer as correct for the question. Dk/Rf indicates respondent did not know or refused to answer the question.

Table 4: Expressed Preference for Annuity vs. Lump Sum Annuity by Financial Literacy

	<u>Take Lump Sum Initially</u>		<u>Take Annuity Initially</u>		N
	Always Take Lump Sum	Take Lump Sum 1 st Take Annuity 2 nd	Take Annuity 1 st Take Lump Sum 2 nd	Always Take Annuity	
<u>Percentage Calculation</u>					
Correct	36.6	22.4	10.1	30.9	554
Incorrect	37.3	20.3	13.3	29.1	158
DK/RF	0	25.0	12.5	62.5	8
<u>Lottery Split</u>					
Correct	34.8	23.0	11.2	31.0	355
Incorrect	41.9	21.6	9.4	27.1	263
DK/RF	29.4	19.8	12.7	38.1	140
<u>Interest^{a,b}</u>					
Correct	34.2	23.7	11.0	31.1	354
Incorrect	40.5	22.0	10.5	27.0	200
DK/RF	38.7	12.9	0.0	48.9	31

Notes: Authors' tabulations from 2004 HRS. Row percentages in each cell. ^a Only the respondents who answered correctly at least one of the first two questions were asked the interest question. ^b This variable treats either simple or compound interest answer as correct for the question.

Table 5: Probit Model for Initial Response: Prefer the Social Security Annuity

Variable	(1)	(2)	(3)	(4)
<u>Demographics</u>				
50-54	-0.073 [0.047]	-0.053 [0.051]	-0.077 [0.055]	-0.081 [0.055]
55-59	-0.108 [0.044]**	-0.088 [0.050]*	-0.130 [0.053]**	-0.132 [0.053]**
Female	-0.050 [0.039]	-0.054 [0.043]	-0.063 [0.047]	-0.065 [0.047]
Unmarried	0.002 [0.044]	-0.037 [0.050]	-0.012 [0.056]	-0.014 [0.056]
<u>Health</u>				
Poor	-0.179 [0.073]**	-0.207 [0.080]***	-0.220 [0.088]**	-0.224 [0.087]**
Fair	0.058 [0.058]	0.069 [0.064]	0.113 [0.075]	0.104 [0.075]
Very Good	0.062 [0.047]	0.049 [0.052]	0.073 [0.056]	0.071 [0.056]
Excellent	-0.044 [0.058]	-0.067 [0.063]	-0.020 [0.069]	-0.024 [0.069]
Op. Longevity	0.015 [0.039]	0.013 [0.043]	-0.006 [0.047]	-0.007 [0.047]
<u>Employment</u>				
Unemployed	-0.113 [0.118]	-0.137 [0.116]	-0.222 [0.120]*	-0.228 [0.118]*
Disabled	0.043 [0.072]	0.035 [0.082]	0.084 [0.101]	0.082 [0.101]
Retired	-0.057 [0.056]	-0.061 [0.066]	-0.095 [0.071]	-0.101 [0.071]
Homemaker	-0.014 [0.075]	-0.069 [0.083]	-0.049 [0.095]	-0.052 [0.094]
Other Status	-0.049 [0.152]	-0.006 [0.168]	-0.076 [0.169]	-0.083 [0.169]
Risk Lover	-0.042 [0.037]	-0.056 [0.041]	-0.053 [0.046]	-0.055 [0.046]
Patient	-0.065 [0.044]	-0.075 [0.048]	-0.067 [0.053]	-0.069 [0.053]
<u>Wealth</u>				
1 st Wealth quintile	-0.019 [0.065]	-0.044 [0.070]	-0.054 [0.078]	-0.057 [0.078]
2 nd Wealth quintile	-0.018 [0.058]	-0.007 [0.065]	0.005 [0.071]	-0.001 [0.071]
4 th Wealth quintile	-0.007 [0.056]	-0.008 [0.061]	0.028 [0.065]	0.015 [0.066]
Top Wealth quintile	0.032 [0.060]	0.004 [0.066]	0.025 [0.070]	0.014 [0.070]
1 st Income quintile	0.027 [0.068]	0.075 [0.077]	0.036 [0.089]	0.037 [0.089]
2 nd Income quintile	-0.033 [0.058]	-0.029 [0.065]	-0.012 [0.071]	-0.010 [0.072]
4 th Income quintile	-0.031 [0.055]	-0.026 [0.061]	-0.029 [0.065]	-0.030 [0.065]

Table 5(cont.):

Variable	(1)	(2)	(3)	(4)
Top Income quintile	-0.005 [0.061]	-0.009 [0.068]	-0.005 [0.072]	-0.011 [0.072]
DB Pension	-0.002 [0.041]	0.000 [0.045]	0.036 [0.049]	0.034 [0.050]
DC Pension	-0.041 [0.041]	-0.054 [0.046]	-0.079 [0.050]	-0.078 [0.050]
<u>Bequests</u>				
Children	-0.002 [0.009]	0.003 [0.011]	0.002 [0.012]	0.002 [0.012]
Will/Trust	0.007 [0.041]	0.023 [0.046]	0.049 [0.050]	0.050 [0.050]
<u>Education</u>				
< 12 yrs	0.053 [0.059]	-0.001 [0.065]	0.051 [0.079]	0.058 [0.080]
> 12 & < 16 yrs	-0.023 [0.047]	-0.027 [0.053]	-0.062 [0.057]	-0.065 [0.057]
16 yrs	-0.052 [0.061]	-0.051 [0.067]	-0.043 [0.070]	-0.054 [0.070]
> 16 yrs	-0.111 [0.061]*	-0.161 [0.065]**	-0.160 [0.066]**	-0.169 [0.066]**
<u>Financial Literacy</u>				
Lottery Split		0.083 [0.047]*		0.076 [0.051]
Interest			0.065 [0.048]	0.057 [0.049]
Observations	797	668	561	561
Log Lik	-520.73	-431.66	-357.43	-356.31
Other Controls	Y	Y	Y	Y
Wald Stat				4.04
p-value				0.13

Notes: Probit model of initial response indicating the respondent would prefer the Social Security annuity versus the lump sum; marginal effects are evaluated at mean of variables. Omitted categories are 60-64 year olds, Good Health, and 3rd quintiles of household wealth and income. * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Regressions also control for race/ethnicity. Wald statistic is for the joint significance of financial literacy questions in regression (4).

Table 6: Ordered Logit Model for Expressed Preference of Annuity versus Lump Sum

Variable	(1)	(2)	(3)	(4)
<u>Demographics</u>				
50-54	-0.175 [0.180]	-0.137 [0.193]	-0.244 [0.211]	-0.262 [0.211]
55-59	-0.336 [0.169]**	-0.328 [0.191]*	-0.493 [0.208]**	-0.506 [0.209]**
Female	-0.047 [0.144]	-0.035 [0.157]	-0.142 [0.174]	-0.142 [0.175]
Unmarried	0.160 [0.163]	0.017 [0.183]	0.147 [0.208]	0.148 [0.208]
<u>Health</u>				
Poor	-0.638 [0.326]*	-0.630 [0.368]*	-0.801 [0.431]*	-0.827 [0.432]*
Fair	0.266 [0.214]	0.341 [0.234]	0.561 [0.275]**	0.535 [0.276]*
Very Good	0.176 [0.172]	0.137 [0.191]	0.285 [0.208]	0.279 [0.208]
Excellent	-0.261 [0.218]	-0.299 [0.239]	-0.086 [0.257]	-0.110 [0.257]
Opt. Longevity	0.211 [0.169]	0.280 [0.185]*	0.228 [0.208]*	0.236 [0.208]*
<u>Employment</u>				
Unemployed	-0.891 [0.547]	-1.004 [0.555]*	-1.439 [0.724]**	-1.474 [0.732]**
Disabled	0.272 [0.265]	0.249 [0.299]	0.586 [0.365]	0.591 [0.371]
Retired	-0.115 [0.217]	-0.078 [0.254]	-0.243 [0.279]	-0.252 [0.279]
Homemaker	-0.063 [0.285]	-0.151 [0.335]	-0.029 [0.378]	-0.037 [0.378]
Other Status	-0.111 [0.569]	0.090 [0.590]	-0.108 [0.634]	-0.138 [0.632]
Risk Lover	-0.079 [0.137]	-0.129 [0.152]	-0.113 [0.170]	-0.120 [0.170]
Patient	-0.265 [0.168]	-0.333 [0.183]*	-0.364 [0.205]	-0.383 [0.206]*
<u>Wealth and Income</u>				
1 st Wealth quintile	-0.174 [0.243]	-0.260 [0.262]	-0.285 [0.298]	-0.300 [0.300]
2 nd Wealth quintile	-0.185 [0.215]	-0.070 [0.238]	-0.045 [0.261]	-0.060 [0.262]
4 th Wealth quintile	-0.006 [0.205]	-0.005 [0.225]	0.113 [0.238]	0.067 [0.241]
Top Wealth quintile	0.125 [0.221]	0.049 [0.244]	0.154 [0.260]	0.122 [0.261]
1 st Income quintile	-0.118 [0.258]	0.055 [0.286]	-0.129 [0.330]	-0.130 [0.331]
2 nd Income quintile	-0.120 [0.215]	-0.067 [0.241]	-0.075 [0.266]	-0.081 [0.268]
4 th Income quintile	-0.095 [0.204]	-0.098 [0.225]	-0.109 [0.240]	-0.109 [0.240]

Table 6 (cont.):

Variable	(1)	(2)	(3)	(4)
Top Income quintile	0.001 [0.225]	-0.002 [0.251]	0.001 [0.269]	-0.012 [0.269]
DB Pension	0.020 [0.152]	0.055 [0.166]	0.175 [0.184]	0.167 [0.185]
DC Pension	-0.062 [0.154]	-0.119 [0.168]	-0.198 [0.186]	-0.199 [0.186]
<u>Bequests</u>				
Children	0.002 [0.036]	0.016 [0.040]	0.015 [0.046]	0.014 [0.046]
Will/Trust	-0.078 [0.151]	-0.052 [0.171]	0.041 [0.184]	0.044 [0.185]
<u>Education</u>				
< 12 yrs	0.261 [0.218]	0.117 [0.244]	0.267 [0.296]	0.305 [0.297]
> 12 & < 16 yrs	-0.082 [0.177]	-0.102 [0.196]	-0.249 [0.216]	-0.262 [0.217]
16 yrs	-0.052 [0.228]	-0.047 [0.249]	-0.036 [0.261]	-0.089 [0.264]
> 16 yrs	-0.621 [0.245]**	-0.875 [0.281]***	-0.932 [0.289]***	-0.974 [0.292]***
<u>Financial Literacy</u>				
Lottery Split		0.326 [0.173]*		0.265 [0.190]
Interest			0.329 [0.181]*	0.301 [0.182]*
Observations	790	663	556	556
Log Lik	-1017.91	-848.65	-702.91	-701.91
Other Controls	Y	Y	Y	Y
Wald Stat				5.22
p-value				0.07

Notes: Coefficients from ordered Logit model of Expressed Preference of annuity versus lump sum. Definition for dependent variable: $Y_i = 4$ if the individual always chooses the annuity; $= 3$ if the individual chooses the annuity only if it is at least actuarially fair; $= 2$ if the individual chooses the annuity only if it is better than actuarially fair; and $= 1$ if the individual always chooses the lump sum. * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Omitted categories are 60-64 year olds, Good Health, and 3rd quintiles of household wealth and income. Regression models also control for race/ethnicity. Wald statistic is for the joint significance of financial literacy questions in regression (4).