Who Values the Social Security Annuity?
New Evidence on the Annuity Puzzle

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Abstract: We examine individuals' self-reported willingness to exchange part of their Social Security inflation-indexed annuity benefit for an immediate lump-sum payment, using an experimental module in the 2004 Health and Retirement Study. Our first finding is that nearly three out of five respondents favor the lump-sum payment if it were approximately actuarially fair, a finding that casts doubt on several leading explanations for why more people do not annuitize. Second, there is some modest price sensitivity and evidence consistent with adverse selection; in particular, people in better health and having more optimistic longevity expectations are more likely to choose the annuity. Third, after controlling on education, more financially literate individuals prefer the annuity. Fourth, people anticipating future Social Security benefit reductions are more likely to choose the lump-sum, suggesting that political risk matters. Other factors such as sex, marital status, income, wealth, or the presence of children are not associated with respondents' relative preferences for the annuity versus the lump-sum.

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1. Introduction

Economic theory suggests that giving retirees the opportunity to convert their retirement savings into a life annuity paying benefits no matter how long they live will substantially boost utility, as these financial products protect individuals 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 life annuities in the US voluntary annuity market, a finding that is often called the "annuity puzzle."

Three prominent hypotheses for explaining the low level of voluntary annuitization are: (i) prices are too high due to adverse selection and/or administrative costs; (ii) most life annuities in the U.S. offer fixed nominal payouts and are thus unattractive in the presence of uncertain inflation; and (iii) individuals are already sufficiently annuitized through Social Security.[1] Numerous papers have examined these hypotheses by looking at market data or life-cycle simulation models, but careful empirical tests of these hypotheses have been hampered by a lack of data. Few buyers of voluntary annuities can be identified in nationally representative microeconomic datasets such as the Health and Retirement Study (HRS) or the Survey of Consumer Finances, since the non-group individual annuity market is far too small. In the group market, two papers have examined stated annuity preferences or choices within 401(k) plans (e.g., Brown 2001; Johnson et al. 2004), but it is difficult to extrapolate these findings because 401(k) participation is far from universal and only one in five 401(k) plans even offers participants an option to annuitize through the plan. There is a small literature examining

[1] Additional hypotheses are discussed in section 2.

decisions to delay claiming of Social Security benefits, which is somewhat akin to purchasing a larger annuity (e.g., Coile, Diamond, Gruber and Jousten 2002; Hurd 1990), but this decision is closer to a trade-off between a smaller immediate annuity and a larger deferred annuity.[2]

This paper uses a novel set of questions developed for an experimental module in the 2004 Health and Retirement Study (HRS) in which nearly 1,000 HRS survey participants were asked whether they would 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 nearly three out of five respondents indicate that they would prefer the lump-sum to the annuity when the lump-sum is computed at an approximately actuarially fair rate for the average individual. This finding casts doubt on three leading hypotheses regarding the annuity puzzle. First, the fact that a majority of individuals prefer the lump-sum even when the annuity is actuarially fairly priced suggests that the presence of high loads in the private market is not the primary cause of limited annuitization. Second, individuals prefer the lump-sum even though the Social Security annuity is annually indexed for inflation, suggesting that the lack of inflation-protection in the private annuity market is not the primary culprit. Third, because individuals are (hypothetically) giving up half of their Social Security in order to gain access to the lump-sum, leaving them with only $6,000 per year in annuity income, this suggests that high levels of pre-existing annuitization is not the primary driver of limited annuity demand.

While our finding suggests that pricing is not the primary cause of limited demand, we do find some price responsiveness. When the lump-sum generosity is reduced (increased) by 25 percent, we find that approximately 20 percent (10 percent) of individuals would switch to (from) the annuity. We also find that health and longevity expectations matter in a manner

[2] 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.

consistent with standard models of adverse selection: 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, we also find that individuals who believe it is likely that SS benefits will be reduced in the next ten years are also more likely to choose the lump-sum, suggesting that political risk may matter. There is little evidence that sex, marital status, income, wealth, or the presence of children 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. We then expand the analysis to a multivariate framework. A final section provides discussion, conclusions, and directions for future work.

2. Previous Literature

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, review 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 this 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 five percent of their wealth and the median percentage of annuitized wealth was zero. Other authors have also confirmed the small size of the private payout annuity market in the U.S.(Brown et al., 2001).

Several studies have sought to reconcile the theoretical predictions of strong annuity demand with the empirical evidence showing the opposite. As already noted, it is often found that adverse selection raises prices in annuity markets (Mitchell et al., 1999), although analysis of market prices has not been accompanied by reliable estimates of the price elasticity of demand. A lack of inflation protection in standard annuity contracts has also been highlighted as a shortcoming of available annuity products. Additionally, some authors have suggested that pre-existing annuities from Social Security crowd out private annuity purchases (Dushi and Webb 2004). In addition to these hypotheses, some have suggested that the discrepancy between theory and practice may arise from restrictive assumptions underlying the theoretical models such as separable utility and complete markets. Yet 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 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, *forthcoming*), and the potential arrival of information about future returns or mortality (Milevsky and Young, 2002).

The empirical literature has been hampered due to data shortcomings. Brown (2001) studied 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 were then asked whether they intend to take the payout as an annuity, and the author found 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 found 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 did not offer a representative picture of how the broader population might perceive the annuity/lump-sum choice. More recently, Dushi and Webb (2004a) used the HRS to study annuity decisions. As that analysis seeks to parameterize a life-cycle simulation model, they did not analyze the annuitization decision *per se*.

3. Data 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. 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 preeminent dataset used to study the financial decision-making of older Americans.

One advantage of using an experimental module in the HRS is that individuals are randomly assigned to the modules, so our sub sample should be representative of the HRS cohorts (age 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.

4. New Evidence on Annuity Choice

For the 2004 wave of the HRS, we included an experimental module 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.

The upper portion of Figure 1 summarizes the first key result: of the 990 respondents who answered this question, nearly three-fifths (59%) said they would opt for the lump-sum cash payment combined with a reduced annuity benefit.[3] This simple summary statistic casts doubt on three leading hypotheses regarding the annuity puzzle. First, the fact that a majority of individuals prefer the lump-sum even when the annuity is actuarially fairly priced suggests that the presence of high loads in the private market is not the primary explanation for limited annuitization. Second, individuals prefer the lump-sum even though the Social Security annuity is annually indexed for inflation, suggesting that the lack of inflation-protection in the private annuity market is not the primary culprit. Third, because individuals are (hypothetically) giving up half of their Social Security in order to gain access to the lump-sum, leaving them with only $6,000 per year in annuity income, this suggests that high levels of pre-existing annuitization is not the primary driver of limited annuity demand.

While our result suggests that pricing is not the major factor limiting annuity demand, conditional on other factors, consumers may still exhibit some degree of price responsiveness. To assess this, 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

[3] In our regression analysis below, we begin by restricting the sample to individuals age 50-64, and find that the distribution of responses is identical to that of Figure 1.

question, in which the value of the lump-sum was reduced by approximately 25 percent to $65,000 [$60,000].

By tracing through these answers, we can divide the sample into four groups rank-ordered by the value they place on the annuity from Social Security. 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.

Approximately 37 percent of respondents say they would always exchange the annuity for the lump-sum payment, even when the annuity is offered with a substantial subsidy (i.e., a reduction in the lump-sum alternative is equivalent to getting a much higher annuity payout per dollar of lump-sum). Only 30 percent always chose to take the annuity.

These figures indicate a modest price elasticity: approximately 22 percent of respondents 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.

5. Who Values the Annuity?

5.1 Univariate Analysis

Many other hypotheses about limits to annuity demand (e.g., bequest motives, preferences) require analysis of individual-level decisions. To provide an initial exploration of how individual characteristics correlated with annuity decisions, 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 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 most individuals in every demographic category prefer 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. 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 express a stronger preference for the lump-sum, but in fact 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 no 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 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 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 answer, respondents were asked follow-up questions using larger or smaller changes in income. Using these responses, 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." 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 two questions asked in the 2004 HRS to assess individual numerical capabilities:

> *"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 this question, or another question related to probabilities, correctly, then he was asked an additional question:

> *"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 "Lottery Split" "Interest" and we construct indicator variables such that the variable is set to 1 if the person answered correctly, and 0 otherwise.[4] 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.

As noted in Table 2, it 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, suggesting that "numeracy," a possible measure of financial sophistication, may make one more likely to choose the annuity.

To further assess respondent confidence in the Social Security annuity in general, we take advantage of a question asked in the 2006 wave of the HRS :

Thinking of the Social Security program in general and not just your own Social Security benefits: On a scale from 0-100 (where 0 means no chance and 100 means absolutely certain,) what is the percent chance that congress will change Social Security sometime in the next 10 years so that it becomes less generous than now.

In particular, this question provides some insight into the beliefs individuals hold about the potential future risk to their annuity payments attributable to changes in the political environment. A partial breakdown of the responses to the question is provided in the last row of Table 2. In particular, of those individuals who place at least a 50 percent probability on Social Security benefit cuts in the next 10 years, 37 percent always take the lump-sum option.

[4] Note that we give the respondent credit for the Interest question if they provide either the correct simple interest response or the correct compound interest response.

5.2 Multivariate Analysis

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). We 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 ordinal ranking, we estimate an ordered Logit model:

$$(1) \qquad P(Y_i = J | x_i) = \Lambda(x_i \boldsymbol{\beta}) \qquad J = \{1 \ldots 4\}.$$

Here J represents the four possible choice paths respondents can take. Table 3 presents ordered Logit coefficients. A positive coefficient implies an increase in the probability of the highest outcome (always electing the annuity), while a negative coefficient implies an increased probability of the lowest outcome (always choosing the lump-sum).[5] Because our sample size drops as we add in financial literacy and political risk questions, we first report, in column 1, the results without these variables. In the next three columns we add in the financial literacy variables both individually and in combination. The final column also controls for political risk.

Moving down the columns, we find that younger individuals (ages 50-54 and 55-59) are less likely to choose the annuity than are older individuals (age 60-64). Specifically, the marginal effect of being under age 60, relative to age 60-64, is roughly a 9-12 percentage point

[5] 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.

drop in the probability of always annuitizing, and a similar percentage point increase in the probability of always taking the lump-sum.

The relation between annuity choice and gender is insignificant, despite the fact that men and women have substantially different life expectancies. In contrast to theoretical work suggesting that married individuals ought to find annuities less valuable than single individuals (e.g., Kotlikoff and Spivak 1981), we find no evidence that marital status matters. In unreported results, we have confirmed that interactions of marital status and gender are also insignificant.

We do find some evidence that is consistent with adverse selection, namely that individuals who rate themselves as being in poor health are approximately 10-15 percentage points less likely to annuitize, a finding that is consistent with Brown's (2001) analysis of intended distributions from defined contribution plans. We also find in most of our specifications that individuals who rate their survival probabilities as being higher than what the Social Security life tables would suggest are more likely to choose the annuity.

Of the various controls for labor force attachment, the only control that is significant is an indicator variable for being unemployed. The marginal effect of being unemployed is quite large, i.e., a 15-22 percentage point reduction in the probability of always choosing the annuity over the lump-sum. This could reflect that unemployed individuals may have short-term liquidity needs that would render the receipt of a lump-sum payment particularly valuable.

All specifications in Table 3 also include controls for one's income quintile, net worth quintile, as well as indicator variables for whether one participates in a DB plan and/or a DC plan. Notably, none of these financial controls are statistically significant from zero.

In the next two rows, we include admittedly noisy proxies for risk aversion and time preference rates. First, we include an indicator variable for whether one is a in the least risk

averse category (meaning they were willing to accept all of the income bets that they were offered. This variable is consistently negative, meaning that being less risk averse makes one more likely to take the lump-sum option, but only in column 5 is the effect large and significant. In column 5, the marginal effect suggests that someone who exhibits little risk aversion is 19 percentage points more likely to always choose the lump-sum and 17 percentage points less likely to always annuitized than someone with higher risk aversion levels. With respect to time preference, we find that individuals who have low discount rates (i.e., patient individuals) are less likely to choose the annuity.

Consistent with other studies (e.g., Brown 2001, Johnson et al. 2004), we do not find any evidence that annuity decisions are affected by bequest motives, at least insofar as the having children or having written a will or trust is a good proxy for bequest motives. Persons with higher (16+ years) education are significantly less likely to choose the annuity, with a marginal effect ranging from 11-15 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 (column 2) or the interest question (column 3) are 6 percentage points more likely to choose the annuity, results that are significant at the 10 percent level. When both coefficients are entered simultaneously, the coefficients are 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 0.07.

In column 5 we add a variable for the subjective probability that Social Security benefits will be reduced in the next 10 years. We find a statistically significant negative coefficient, meaning that individuals who expect benefits to be reduced are more likely to prefer the lump-sum payment. For perspective, a 10 percentage point rise in the likelihood of benefits being

reduced translates to a 2 percentage point increase (decrease) in the probability of always taking the lump-sum (annuity). Thus, the difference between those who believe a benefit cut is certain (probability = 100) and those who believe it is impossible (probability = 0) is a 20 percentage point difference in the probability of always choosing the annuity.

6. Implications and Conclusions

Given the prior literature on annuities suggesting that there are important benefits from annuitization, the new evidence presented here is striking: most respondents indicate a preference for exchanging Social Security's lifelong annuity payment for a lump-sum combined with a reduced annuity benefit. This finding is robust across virtually every demographic subgroup in the sample. In other words, most individuals do not appear to value annuities as highly as standard economic models would suggest, a finding that also casts doubt on the ability of several leading hypotheses to explain this aversion to annuities.

We also find several variables are significantly and robustly correlated with older respondents' interest in annuities. Specifically, people in the early 60's prefer the annuity benefit more highly than do younger workers. 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. However, our findings also suggest that overall sensitivity of annuity demand to prices and mortality risk is rather small, and

that some factors – such as the fact that more highly educated individuals prefer the lump-sum – might even be suggestive of advantageous selection (given the positive correlation between mortality and income).

We also find many factors that have limited / 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. We do find that, conditional on education, more financially sophisticated individuals prefer to annuitize. We also find that individuals who place a higher probability on the outcome that future Social Security benefits will be cut are more likely to choose the lump-sum option, suggesting that individuals do discount future benefits for political risk.

From a methodological perspective, this paper offers a new way to overcome data limitations in the annuity market, and thus assess the determinants of consumer decision-making in the retirement payout marketplace.

Policymakers are routinely faced with making critical decisions regarding the design of public and private pension payouts, and our findings have several implications in this regard. For example, a key design issue in proposals to include personal accounts in Social Security is whether participants would be compelled to annuitize their account balances at retirement (Cogan and Mitchell, 2003). One key 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. Similar issues arise in developing the rules governing payouts from industry pension plans. One economic rationale for compulsory annuitization is that consumers ought to find annuities welfare-enhancing, and yet imperfections in the private market may limit

the availability of fairly priced, inflation-indexed annuities. Underlying this rationale is an assumption that consumers will, in fact, find annuities welfare-enhancing.

In contrast, our results imply that a majority of individuals not only value the Social Security annuity less than would be predicted by the life-cycle model, but, in fact, value the Social Security annuity at *less than its actuarial value.* As such, it raises the possibility that compulsory annuitization is not as welfare-enhancing as standard life cycle theory would suggest, or at least that it is not perceived as such. If true, then it suggests that one potentially feasible path to reducing the long-term liabilities facing the U.S. Social Security system would be to allow individuals to voluntarily convert part of their Social Security annuity to a lump-sum at less-than-actuarially favorable rates. Even in the presence of (mild) adverse selection, our results suggest that such a voluntary approach could reduce net liabilities of the Social Security system. Of course, another oft-cited rationale for Social Security is the paternalistic goal of protecting myopic individuals from a failure to rationally insure against longevity risk, and there is little doubt that such a voluntary lump-sum option would expose millions of individuals to additional longevity risk, perhaps even leading to higher rates of poverty at advanced ages. Designing optimal public policy to ensure retirement income security in the presence of heterogeneous attitudes about the value of annuitization is a fruitful area for future research.

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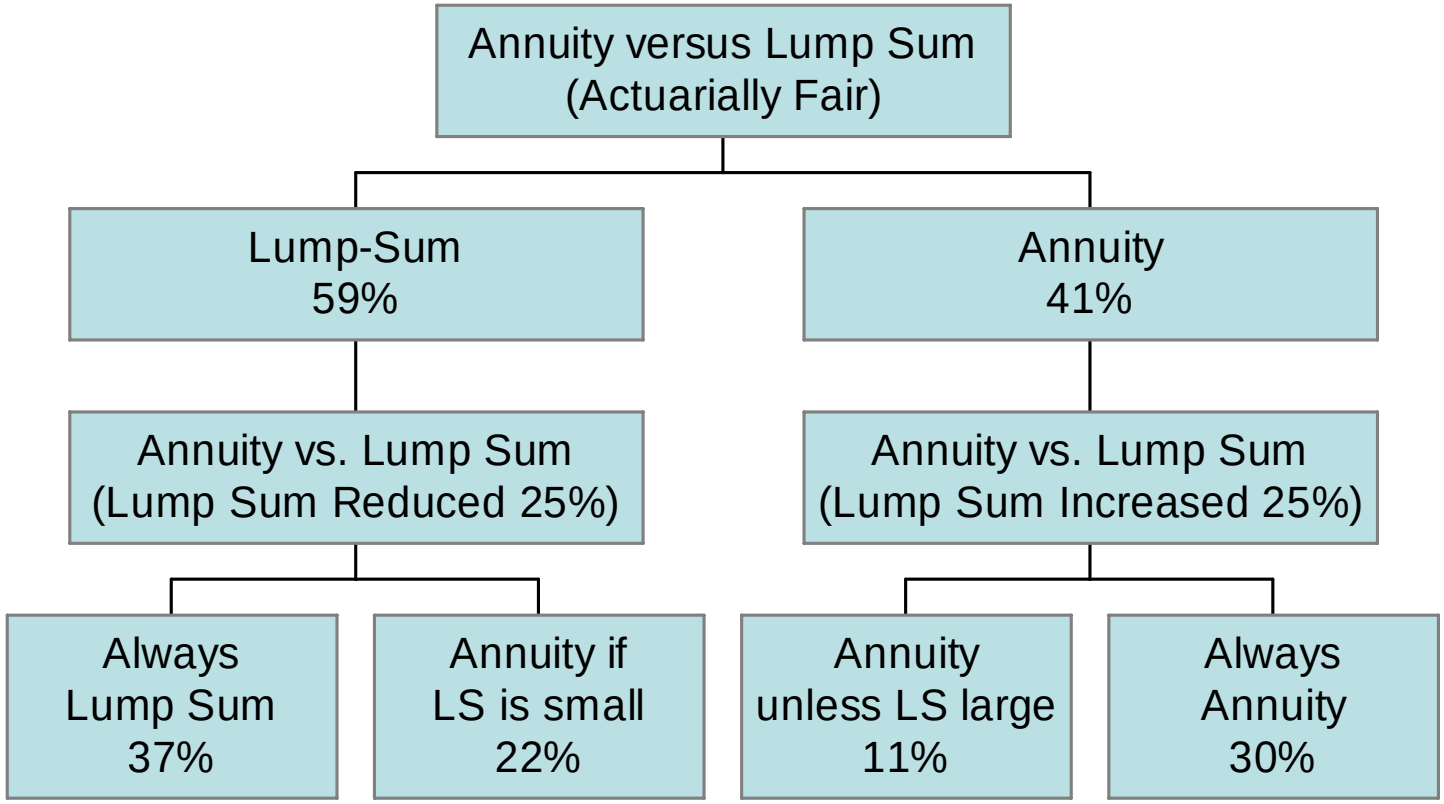
Figure 1: Expressed Preference for Social Security Annuity vs. Lump-sum



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
Demographics						
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
Health						
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
Optimistic Longevity	0.44	0	0.50	0.45	0	0.50
Wealth & Inc						
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
Bequests						
Children	2.99	3	1.99	2.44	3	1.67
Will/Trust	0.43	0	0.49	0.42	0	0.49
Work Status						
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
Other						
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.

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

	Take Lump-sum Intially		Take Annuity Initially		
	Always Take Lump-sum	Take Lump-sum 1st Take Annuity 2nd	Take Annuity 1st Take Lump-sum 2nd	Always Take Annuity	N
Age Group					
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
Sex					
Male	39.5	19.1	12.1	29.3	372
Female	36.2	22.2	10.9	30.7	514
Race					
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
Marriage Status					
Married	36.9	21.9	11.3	29.9	593
Unmarried	36.2	22.2	10.9	30.7	293
Education Group(years)					
< 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
Health					
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
Longevity					
Optimistic	33.5	26.7	11.5	28.3	382
Pessimistic	39.6	18.9	10.6	30.9	482
HH Income Quintile					
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
Wealth Quintile					
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

Table 2(cont.)

		Take Lump-sum Intially		Take Annuity Initially		
		Always Take Lump-sum	Take Lump-sum 1st Take Annuity 2nd	Take Annuity 1st Take Lump-sum 2nd	Always Take Annuity	N
Pension Type						
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
Children						
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
Will/Trust Ownership						
Yes		36.9	20.9	13.6	28.5	382
No		37.7	19.4	11.7	32.2	525
Work Status						
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
Risk						
Risk Lover		34.5	26.5	12.5	26.5	321
Risk Averse		36.5	20.3	10.9	32.3	493
Discount						
Patient		42.2	20.6	8.9	28.3	180
Impatient		35.5	22.5	11.8	30.2	702
Lottery Split						
Correct		34.8	23.0	11.2	31.0	355
Incorrect		41.9	21.6	9.4	27.1	263
Interest[a]						
Correct		34.2	23.7	11.0	31.1	354
Incorrect		40.5	22.0	10.5	27.0	200
Political Risk						
Pr(SS Ben Cut)≥0.5[b]		36.7	20.9	11.4	31.0	818

Notes: Authors' tabulations from 2004 HRS. Row percentages are in each cell. Income Quintiles: Q-1 $20,011, Q-2 $38,648, Q-3 $65,048, Q-4 $104,7824. 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. a: treats simple or compound interest answers as correct. B: SS benefit cut is respondents who state that benefits will be cut with probability of at least 0.5.

Table 3: Ordered Logit Model for Expressed Preference of Annuity versus Lump-sum

Variable	(1)	(2)	(3)	(4)	(5)
Demographics					
50-54	-0.175	-0.137	-0.244	-0.262	-0.345
	[0.180]	[0.193]	[0.211]	[0.211]	[0.225]
55-59	-0.336	-0.328	-0.493	-0.506	-0.502
	[0.169]**	[0.191]*	[0.208]**	[0.209]**	[0.219]**
Female	-0.047	-0.035	-0.142	-0.142	-0.221
	[0.144]	[0.157]	[0.174]	[0.175]	[0.187]
Unmarried	0.160	0.017	0.147	0.148	0.098
	[0.163]	[0.183]	[0.208]	[0.208]	[0.229]
Health					
Poor	-0.638	-0.630	-0.801	-0.827	-0.899
	[0.326]*	[0.368]*	[0.431]*	[0.432]*	[0.481]*
Fair	0.266	0.341	0.561	0.535	0.540
	[0.214]	[0.234]	[0.275]**	[0.276]*	[0.297]*
Very Good	0.176	0.137	0.285	0.279	0.211
	[0.172]	[0.191]	[0.208]	[0.208]	[0.219]
Excellent	-0.261	-0.299	-0.086	-0.110	-0.128
	[0.218]	[0.239]	[0.257]	[0.257]	[0.275]
Opt. Longevity	0.211	0.280	0.228	0.236	0.067
	[0.169]	[0.185]*	[0.208]*	[0.208]*	[0.186]
Employment					
Unemployed	-0.891	-1.004	-1.439	-1.474	-1.720
	[0.547]	[0.555]*	[0.724]**	[0.732]**	[0.885]**
Disabled	0.272	0.249	0.586	0.591	0.619
	[0.265]	[0.299]	[0.365]	[0.371]	[0.395]
Retired	-0.115	-0.078	-0.243	-0.252	-0.419
	[0.217]	[0.254]	[0.279]	[0.279]	[0.291]
Homemaker	-0.063	-0.151	-0.029	-0.037	-0.200
	[0.285]	[0.335]	[0.378]	[0.378]	[0.403]
Other Status	-0.111	0.090	-0.108	-0.138	-0.049
	[0.569]	[0.590]	[0.634]	[0.632]	[0.770]
Preferences					
Low Risk Aversion	-0.079	-0.129	-0.113	-0.120	-0.841
	[0.137]	[0.152]	[0.170]	[0.170]	[0.498]*
Patient	-0.265	-0.333	-0.364	-0.383	-0.309
	[0.168]	[0.183]*	[0.205]	[0.206]*	[0.219]

Table 3(cont.):

Variable	(1)	(2)	(3)	(4)	(5)
Bequests					
Children	0.002	0.016	0.015	0.014	0.017
	[0.036]	[0.040]	[0.046]	[0.046]	[0.052]
Will/Trust	-0.078	-0.052	0.041	0.044	0.009
	[0.151]	[0.171]	[0.184]	[0.185]	[0.193]
Education					
< 12 yrs	0.261	0.117	0.267	0.305	0.178
	[0.218]	[0.244]	[0.296]	[0.297]	[0.323]
> 12 & < 16 yrs	-0.082	-0.102	-0.249	-0.262	-0.226
	[0.177]	[0.196]	[0.216]	[0.217]	[0.227]
16 yrs	-0.052	-0.047	-0.036	-0.089	-0.159
	[0.228]	[0.249]	[0.261]	[0.264]	[0.281]
> 16 yrs	-0.621	-0.875	-0.932	-0.974	-0.878
	[0.245]**	[0.281]***	[0.289]***	[0.292]***	[0.306]***
Financial Literacy					
Lottery Split		0.326		0.265	0.140
		[0.173]*		[0.190]	[0.201]
Interest			0.329	0.301	0.203
			[0.181]*	[0.182]*	[0.193]
SS Political Risk					
Chance SS Less Generous in 10 yrs					-0.008
					[0.004]*
SS Less Generous x Low Risk Aversion					0.011
					[0.007]
Observations	790	663	556	556	499
Log Likelihood	-1017.91	-848.65	-702.91	-701.91	-626.75
Other Controls	Y	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. Asterisks indicate statistical significance: * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Omitted categories are 60-64 year olds, and Good Health. Additional controls in all columns include net worth quintiles, income quintiles, and indicator variables for race and ethnicity, none of which were statistically significant. The Wald statistic in column (4) test for joint significance of the two financial literacy questions.