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ABSTRACT

Life annuities can be a valuable component of the decumulation stage of wealth during retirement. While economists argue that most retirees should annuitize, actual demand in the marketplace is low. We analyze data from two studies to determine how measurable individual differences among consumers affect their interest in annuities. We find that a relatively high percentage of respondents dislike all annuities. Demographic factors are not predictive of which individuals dislike annuities, and individual factors predicted by economic models to be important (such as beneficiaries) have small or even opposite effects. The strongest individual differences we measured that predicts liking of annuities is the respondent's perception of product fairness. We discuss implications of our findings for financial planners hoping to help their customers with these decumulation challenges.

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A data appendix is available at http://www.nber.org/data-appendix/w25067

THE DECUMULATION CHALLENGE

Since the rise of defined contribution (DC) plans in the late 1970s and early 1980s, financial advisors, policy makers, and academic researchers have dedicated substantial effort into helping Americans save more for their retirement. While these efforts have been successful at increasing savings rates in the productive "accumulation stage" of life, less effort has been put toward the problem of how individuals should optimally "decumulate" their assets during retirement.

The size of the decumulation challenge is large and growing. Approximately $9.2 trillion of retirement assets are held in DC plans or IRAs (Benartzi et al 2011). Each day, around 10,000 individuals enter retirement and face the problem of how to draw down those assets optimally during their remaining lifetime. If the money is spent too quickly, the retiree may run out and be destitute, but if spent too slowly, he or she may underconsume and die with unused assets. The financial and psychological dimensions of this decumulation problem are complex involving multiple uncertainties and value tradeoffs. First, solving the decumulation decision problem requires an estimate of the individual's life expectancy, a judgment that is highly uncertain and subject to bias (Payne et al 2013). Second, individual differences in family composition, outside income (such as Social Security), and uncertainites about future health status can all affect income requirements during retirement. Third, there is a clear tradeoff to be made between more retirement income sooner versus more income later. Finally, and most importantly for this paper, psychological differences in individual-level perceived fairness, feelings of ownership, loss aversion (not just risk aversion), as well as life expectations and patience, can strongly influence how the individual thinks about the tradeoffs within decumulation options (Shu & Payne 2016, Shu & Shu 2018, Shu 2018).

ANNUITIES AS A DECUMULATION TOOL

A retiree with retirement savings has several options available for generating consumable income during retirement.[1] One decumulation option is to self-manage the money (whether done alone or with the advice of a financial planner). Here, economists' and financial planners' advice for optimal drawdown is to spend no more than 4% or 5% per year, to avoid running out within thirty years (Bengen 1994). Another option, and one highly recommended by economics experts, is to convert some portion of accumulated retirement assets into a life annuity.

A life annuity allows a retiree to exchange a lump sum for a guaranteed stream of lifetime payments, thus effectively converting assets into an income stream more similar to a defined benefit (pension) plan. The primary advantages of a life annuity are the implied insurance against outliving one's assets as well as a higher percentage annual return than is normally feasible with self-managed accounts (for example, Brown 2007 models various assumptions and shows that a self-managed "amoritization" strategy at market rates leads to 25% lower income in retirement than a life annuity purchased with equivalent wealth). Thus, people who expect to live longer should find life annuitization particularly attractive, as should individuals who are highly risk averse and want to avoid uncertainty in future income (Poterba and Wise 1996, Milevsky 1998). The higher return associated with a life annuity is a result of survivorship benefits, based on pooling of assets from all contributors being used to support income to annuity holders who continue to live. Perceived disadvantages of life annuities are that the assets are transferred to the issuing company and therefore not available either for transfer to beneficiaries (i.e., bequests) or for use in case of emergencies (liquidity). To address some of these disadvantages, companies offering life annuities have introduced options such as period-certain guarantees, deferred start dates, annual income increases to compensate for inflation, and joint annuities (e.g., for married

[1] Decumulating private retirement savings is not the only source of income because most Americans receive Social Security benefits. Among retirees in the bottom half of the income distribution, Social Security benefits are in fact the majority of their retirement income (Poterba, 2014).

couples). Offering annuities with consumer-oriented options, such as period-certain guarantees, carries financial tradeoffs; the issue for the offering company is whether consumers are willing to accept higher prices in exchange for these benefits.

RESEARCH ON ANNUITY CHOICE

The economics literature has long argued that annuities are the most compelling marketplace solution to the decumulation problem (for a review, see Benartzi et al. 2011). Yaari (1965) was one of the first to show that rational retirees with no bequest motive should use all of their retirement assets to buy annuities. Life annuities eliminate "longevity risk"—the risk of outliving one's assets—while also offering a mortality premium on returns, due to the fact that some people in the annuity pool will die early. More recently, Davidoff, Brown, and Diamond (2005) provided a simple analysis of the attractiveness of annuitization.[2] However, retirees' purchase of annuities remains below their theoretical potential, leading to a so-called annuity puzzle (Davidoff, Brown, and Diamond 2005; Brown 2007). A recent *New York Times* article (Lieber, 1/29/2010) cites a 2009 study by Hewitt Associates reporting that just 1% of employees actually buy annuities as payout options. Inkmann, Lopes, and Michaelides (2011), using U.K. data, report that only about 6% of households participate in the voluntary annuity market. Brown (2007) provides a summary of the "economic" answers to the question of why a person might not buy some amount of a life annuity in today's marketplace, including price premiums due to adverse selection by individuals with longer life expectancies, but also argues that annuities are a rational choice for many consumers.

Possible reasons for limited market demand for annuities include rational heterogeneous preferences at the consumer level. Davidoff et al (2005), Babbel and Merrill (2006), Brown (2007), and Benartzi et al (2011) all provide comprehensive reviews of how individual

[2] They compare a one-year certificate of deposit to a security that "pays a higher interest rate at the end of the year conditional on living, but pays nothing if you die before year-end," and they conclude that "if you attach no value to wealth after death, then the second, annuitized, alternative is a dominant asset" (p. 1573).

preferences may affect annuity demand. For example, the guaranteed monthly income provided through Social Security could lead to less demand for additional annuitization among people with limited retirement savings. However, this does not account for the lack of interest among individuals higher up the wealth distribution. Similarly, an individual's bequest motive might account for less than full annuitization, so that some funds are set aside for beneficiaries, but bequest motives cannot explain the pattern of nearly no annuitization even among people without heirs. Concerns about liquidity to insure against expenditure shocks such as medical expenses could also reduce demand for full annuitization, although demand for bundled contracts of annuity and long-term care that can address these concerns is relatively small. Risks of inflation might also be expected to worry consumers, but evidence from Social Security claims suggests that many consumers have a preference for lump-sum payments rather than inflation-protected payoffs over time that are similar to annuities. Finally, consumers may worry about default risk by the annuity issuer, but reasonable levels of perceived default risk do not account for the relative lack of even partial annuitization.

Thus, although rational economic explanations of the lack of annuitization are important factors in the annuity puzzle, they do not fully explain the problem, and more psychological factors need to be considered (Brown 2007). For instance, some studies have looked at the general framing of the annuity decision. Hu & Scott (2007) argue that people adopt a narrow framing of the problem as a gamble, rather than as an insurance decision, due to the complexity of the annuity purchase task. Loss aversion from cumulative prospect theory (Tversky & Kahneman, 1992) is also widely invoked as a reason why annuities are generally less attractive than standard utility theory would predict, especially when considering the loss of the annuity purchase price due to early death. The risk of losing the full value of the annuity due to an unexpected early death is highlighted by not just loss aversion, but also the tendency to overweight small probabilities. Brown, Kling, Mullainathan, & Wrobel (2008) offer a preliminary test of the effects of framing the problem in terms of an investment (using words

such as invest and earnings) or in terms of consumption (using words such as spend and payment) and find that consumers like economically equivalent annuities more in the consumption frame. Agnew, Anderson, Gerlach, & Szykman, (2008) also find framing effects, mediated by gender, in a "Retirement Game" in which subjects choose between annuities and self-managed market investments. In our prior work, we have found that information displays that help individuals "do the math" on the cumulative value of annuity payouts can affect both overall interest in annuities and demand for particular annuity attributes (Shu, Zeithammer, and Payne 2016; see also Kunreuther, Pauly, and McMorrow 2013). These behavioral explanations of the annuity puzzle provide important insights to aspects of the annuity decision, but much more remains to be investigated and tested.

In this paper, we go beyond testing for some of the general judgmental biases and framing effects described above, and conduct an analysis of how measurable individual differences among consumers affect their interest in annuities. In addition to the differences in loss aversion described above, we consider a variety of other individual psychological differences that could affect demand. Schreiber and Weber (2016) show that individual differences in discount factors affect annuity choice. Other aspects of intertemporal choice, such as differential discounting of gains and losses, predictions of resource slack, myopia and hyperopia, construal, procrastination, and/or intertemporal consumption, may also relate to consumers' preference for annuities (e.g., Soman 1998, Zauberman and Lynch 2005, Shu 2008). Consumer uncertainty exists for both judgments of future health and economic outcomes (e.g., inflation) and judgments of life expectancy, so capturing individual variation in life expectations is a key input. Building on research on how trust, branding, company ratings, and perceived fairness all affect consumer choices, we measure perceived fairness of annuities as a product (Kahneman, Knetsch, and Thaler 1986; Seligman and Schwartz 1997, Roth 2007). Individuals' financial knowledge and literacy, numeracy, and overall cognitive ability also offer important predictions for how consumers who differ in individual ability may react to annuity offerings, so

we also include a measure of numeracy (Fernandes, Lynch, and Netemeyer 2014, Peters et al. 2006, Frederick 2005). We measure all of these psychological differences, along with a variety of demographic and financial variables, and analyze how they correlate with individual-level demand for annuities in a hypothetical decumulation scenario among consumers nearing retirement.

OUR STUDIES OF CONSUMER PREFERENCES FOR ANNUITIES

To explore how consumers think about the decumulation problem, and especially how their value differences and belief differences may drive the annuity puzzle, the rest of this paper analyzes data regarding survey results on consumers' preferences for annuities. The data reported here was collected as part of a larger study measuring how consumers value particular attributes of annuities relative to their actuarial value; those results suggested that individual differences were also important to annuity choice (Shu, Zeithammer, and Payne 2016). While our previous work focused on the value of the individual annuity attributes among consumers who say they would purchase at least some of the annuities our survey offered, this paper contrasts consumers who are willing to consider at least some types of annuities to those who avoid them entirely in our surveys.

Study Implementation: subject recruitment and detailed survey procedure

We completed two separate studies, with different participants per study, to explore the question of who chooses annuities. Study 1 focuses only on how a wide variety of demographics and psychographics affects annuity choice; we also include measures to capture differences in bequest motives, family status, risk aversion, and understanding of annuities. In Study 2, we include a test of an intervention that provides respondents with calculations for the cumulative value of each annuity, in the hopes of increasing overall demand for annuities (as recommended in Kunreuther, Pauly, and McMorrow 2013). Both studies were constructed as choice-based

conjoint analyses (Lenk et al 1996), in which study participants make a series of twenty choices, with each choice including three described annuities and an outside choice of self-management. Because the studies are similar in design we report them side by side in the remainder of the paper.

Participants. We recruited participants through a commercial online panel from Qualtrics. Qualtrics does hundreds of academic research projects and also serves clients such as the US Army and government agencies. Panel members opt-in to Qualtrics through various websites and are offered the opportunity to participate in surveys; Qualtrics does not actively solicit for its panel. For both studies, participation was limited to individuals between the ages of 40 and 65 because this target group is the most appropriate for annuity purchases. We placed no limit on household income or current retirement savings, but we collected data on these characteristics so that we could perform an analysis of how financial status affects preferences. We also included several demographic questions including age, gender, race, and marital status. To assess financial literacy, we included eight numeracy and cognitive reflection (CRT) questions. Finally, we also collected key individual difference measures suggested in the literature to affect liking for annuities, including bequest motives, life expectations, loss aversion, risk aversion, and annuity perceptions such as attitude, desire for control, and perceived fairness.

To reduce the number of respondents who either do not understand the instructions or do not pay attention to the task, we included an attention filter at the start of the survey and excluded participants who did not pass the filter. For Study 1, our final sample consists of 404 respondents. Of the 404, we have eliminated 41 who took less than 15 minutes to complete the questionnaire—a time we consider unreasonably fast. This elimination results in 363 useable respondents. Study 2 included two conditions: with and without an "enriched" information display of cumulative payouts per annuity. This sample consists of 334 respondents in the basic treatment (no display) and 323 in the enriched information treatment. Table 1 summarizes the

respondent demographic and psychographic characteristics. Although ours is clearly a convenience sample of respondents, many of the demographic measures such as household income, race, and gender align well with general population distributions, suggesting our sample is reasonably representative of American households.

Procedure. In both studies, participants began by reading short descriptions of the annuity attributes being tested in the conjoint analysis as well as the full range of levels for each of these attributes (see Shu, Zeithammer, and Payne 2016 for more detail on annuity attributes). They were told the annuities were otherwise identical and satisfactory on all omitted characteristics. They were also told all annuities were based on an initial purchase price of $100,000 at age 65. We then asked each participant to complete 20 choice tasks. To control for order effects, we presented the choice tasks to the participants in a random order.

In each choice task, participants were asked, "If you were 65 and considering putting $100,000 of your retirement savings into an annuity, which of the following would you choose?" They then saw three annuity options and a fourth option that read, "None: If these were my only options, I would defer my choice and continue to self-manage my retirement assets." Figure 1 provides a sample choice task used in both studies, including the enriched information treatment from one of the conditions in Study 2.

After completing all 20 choice tasks in their assigned condition, participants were asked to fill out a number of additional demographic and psychographic measures. First we asked them how long they expected to rely on their retirement funds, by having them indicate the probability that they would live to ages 65, 75, 85, and 95 (Payne et al. 2013).[3] We next collected demographic information including gender, race, marital status, number of children, household income, and retirement assets. To assess financial literacy, we included five numeracy questions and three CRT questions (Weller et al. 2012, Frederick 2005). In Study 1, we administered an

[3] Payne et al (2013) found that wording probabilistic life expectations questions in either a "live to" or "die by" frame changed average estimate life expectations by approximately ten years. Because "live to" framing has been found to have better predictive power for retirement decisions, we recommend and use it here.

additional set of questions to measure individual differences in key constructs thought to affect preference for annuities. We collected bequest motives by asking individuals who they would identify as beneficiaries, whether they had formally or informally designated any portion of their savings as inheritance to others, and if so, what proportion of their savings was so designated. We also asked them to agree or disagree (7-point Likert scale) with statements about the importance of providing inheritance for family members versus financing their own retirement (see Appendix for text of all questions).

Research has suggested perceived fairness is an important consideration for consumers of financial products as well as a strong input into attitude measures for such products; such fairness judgments depend on not just how outcomes are shared between consumers and firms, but also on the transparency and procedural aspects of the system that determines the outcomes (Bies et al. 1993). Therefore, in both studies we measured perceived fairness for annuities through both direct questions about fairness (Kahneman, Knetsch, and Thaler 1986) and questions about the process underlying annuities; the inter-item covariance for these factors is high ($\alpha = .91$) and factor analysis suggests the factor driven by the single-item direct fairness question captures 78% of the overall variance. Thus, for the remainder of this analysis, we use the single-item direct fairness measure as our measure of perceived fairness for annuities. Specifically, the direct fairness measure asks "Please rate how fair you think a life annuity product is?" on a 4-point scale {Very Unfair, Somewhat Unfair, Acceptable, Completely Fair}. We measured risk aversion in Study 1 through a series of choices for uncertain annuity income streams adapted from Barsky et al. (1997) as used in the 1992 HRS; responses to these choices allow us to categorize individuals into one of six levels of risk aversion (also see Kapteyn and Teppa 2011). Finally, participants in both studies responded to a set of 10 questions that asked them to choose between mixed (gain and loss) gambles, thus providing us with individual-level loss-aversion measures (Brooks and Zank 2005, Payne, Shu, Webb, and Sagara 2015).

Model Estimation Methodology: two types of respondents

Although our conjoint task involved 20 single-stage choices between four options (three annuities and one outside (self-managed) option), we find that a substantial proportion of respondents do not like annuities at all. Specifically, of the 363 participants in Study 1, 22% (n=80) did not choose any annuity at all among the 20 choice tasks they completed (in other words, they chose the outside "self-manage" option 20 times). We find consistent results in Study 2, where 20% of the 334 participants in the basic-information condition and 16% of the 323 participants in the enriched-information condition choose no annuities among all tasks. Some of the annuities in our design provided well over $200K in expected NPV payout, in exchange for the $100K price of the annuity (held constant throughout). Therefore, we conclude some people simply dislike the idea of an annuity a priori, and are unwilling to consider these products even with a suggested substantial economic benefit.

As an example of this disliking of high-actuarial-value annuities, consider the three options displayed in the sample task shown in Figure 1. Taking into account standard mortality rates and an annual discount factor of 0.97, the actuarial value for each annuity is $264,900 for Option A, $174,100 for Option B, and $165,700 for Option C. In Study 1, 41% of respondents selected "none of the above" in this example choice task. In Study 2, 36% of respondents in the basic information condition and 24% of respondents in the enriched information condition selected "none of the above." This strong aversion to annuities with a high actuarial benefit relative to upfront costs (more than would ever be offered in the market, in fact) suggests some individuals are unwilling to consider annuities regardless of the benefit offered. In the next section, we focus on describing these "annuity haters".

Estimation results: Willingness to consider annuities

In this section, we describe how the 283 subjects who chose at least one annuity in Study 1 differ from the 80 "annuity haters." Table 2 shows the univariate analysis, which compares

annuity haters to the rest of the sample using each variable separately. Measured variables are standardized by rescaling them to a value between 0 and 1, except for life expectations which are left in years. The only variable which exhibits a significant difference in both studies is fairness: in terms of the underlying 4-point fairness scale, annuity haters consider annuities to be "Somewhat unfair", while the rest of the respondents consider them to be closer to "Acceptable". Study 1 also suggests that annuity-haters are more likely to be female, over 60, more risk-averse, and, perhaps surprisingly, wealthy as measured by retirement savings over $150,000. Study 2 also measured gender, age, and retirement savings, but these significant demographic findings of Study 1 did not replicate (recall that only the basic information condition of Study 2 is relevant as a replication of Study 1). Conversely, Study 2 found a significant difference in numeracy, but Study 1 did not.

We now move from the univariate analysis shown in Table 2 to a logistic regression multivariate analysis. This approach allows the model to take all variables into account simultaneously, and hence control for confounds. In other words, the logistic regression shows the marginal effect of each variable while holding all other variables constant. Table 3 shows results for the three logistic regressions of selecting at least one annuity on individual characteristics versus disliking annuities a priori (the annuity haters) for Study 1 and the two conditions of Study 2. In both studies, most demographics are not significant correlates of buying annuities. In both studies, the exceptions echo the results of the univariate analysis in that choosing at least one annuity is associated with having lower retirement savings and lower risk-aversion in Study 1, and with being more numerate in Study 2. It seems that age and gender – found to be significant predictors by the univariate analysis in Study 1 but not by the multivariate analysis of the same data – are merely correlated with other significant explanatory variables. Interestingly, the multivariate analysis of Study 1 suggests an inverse-U-shape effect of retirement savings[4], with a significant negative coefficient on individuals with over $150K

[4] Theory suggests that retirees with about $100K are the best candidates fora $100K annuity

saved. Unfortunately, this pattern does not replicate in Study 2 even directionally. The multivariate analysis also finds that survey respondents in Study 1 who clearly identify a family member as a potential beneficiary are significantly more likely to select annuities, a somewhat surprising result given theoretical predictions that individuals with family beneficiaries may like annuities less due to bequest motives or use of the family as a replacement for an annuity (Brown 2007, Kotlikoff and Spivak 1981). This intriguing result could suggest instead that individuals who are worried about becoming a burden on family are more open to the idea of annuities; more research is needed to better understand the tradeoff between bequests and dependence.

As in the univariate analysis, there is only one individual difference that has a large effect and replicates across both studies: perceived fairness of annuities (measured by a direct question on a 4-point scale following Kahneman, Knetsch, and Thaler 1986, see above for details): individuals who perceive annuities to be fair are much more likely to select some in our studies. The coefficients on fairness are much larger than the coefficients on all other measures, which is meaningful given that the measures have all been standardized to be between 0 and 1. To get a sense of the effect's magnitude, imagine an average respondent in Study 1, who considers annuities to be about half way between "Somewhat Unfair" and "Acceptable", and has a probability of 0.16 of being an annuity-hater according to the estimated logistic regression. Keeping all variables at their average level while changing the fairness perception to "Completely fair" reduces the person's probability of being an annuity hater to 0.03. Conversely, changing to "Very Unfair" increases the probability of being an annuity hater to 0.56. We also included several other psychological measures in our logistic regression that we expected to influence overall liking of annuities, such as risk aversion, loss aversion, numeracy, and life expectancy. None of these measures had a significant effect on willingness to consider annuities, with the exception of a negative effect of very high levels of risk aversion in Study 1 and a positive effect of numeracy in the basic-information condition of Study 2. It is worth noting that the negative effect of risk aversion is contrary to normative economic theory, which predicts that

higher risk aversion should lead to stronger preference for guaranteed life income because an annuity is fundamentally an insurance product.

In addition to evaluating the individual characteristics of which individuals do and do not like annuities in our studies, the results reported in Table 3 also allow us to observe the effect of providing the "enriched" cumulative payout table in the second condition of Study 2. Recall from Figure 1 that the enriched condition "did the math" for participants by multiplying out the monthly payouts (including any annual increases) by number of years to calculate the cumulative payout for various survival ages. In our previous work (Shu, Zeithammer, and Payne 2016), we found that this enriched information table made participants value particular annuity attributes, such as annual increases, at levels more similar to their full actuarial value. It also increased overall liking of annuities. We also observe that latter result in the data analysis reported here; by comparing the constant estimated for condition 1 of Study 2 (-2.59) to that of condition 2 (1.29), we can see a significant drop in the overall percentage of individuals who never choose any annuity at all across our twenty tasks. Put into percentage terms, 20% of participants in condition 1 never chose an annuity (similar to the 22% in Study 1), but this percentage dropped significantly to only 16% of participants in condition 2. These results suggest that providing the enriched table helped our study respondents recognize the overall value of these annuities over time.

DISCUSSION

While the studies reported here are relatively simple in design, they still yield some interesting and novel insights about the types of individuals who do and do not like annuities. Looking overall at the percentage of individuals who never selected any of the highly valuable annuities across our twenty study tasks, a relatively high percentage (approximately 20%) dislike annuities strongly enough to never select one. Encouragingly, this percentage drops to 16% when an enriched information display is provided that helps individuals recognize the value of the

annuities over time. Such a display offers hope to marketers and planners who hope to encourage purchase of annuities that simple changes in how information is provided can be powerful as interventions to increase perceived value.

More novel are the findings about which individual differences are significant predictors of who likes and dislikes annuities. Standard demographic characteristics, such as gender, age, marital status, and income are all insignificant in our data. Characteristics predicted to be important based on traditional economic models, such as health, life expectations, saved assets, and numeracy, are either insignificant or small in their effect. Some measures predicted by traditional models to be important that are significant are actually opposite in the predicted effect, such as risk aversion and well-identified family beneficiaries. We also used this opportunity to test psychological measures such as loss aversion that more recent behavioral models have predicted as important for annuities. Interestingly, the coefficient on high loss aversion is consistently negative across all studies, but not significant, consistent with our prediction that high loss aversion (unlike risk aversion) can help explain dislike of annuities.[5]

However, by far the strongest of all the individual differences we measured at predicting liking of annuities is the question of whether the individuals think annuities are "fair". Prior research on consumer fairness has suggested that judgments of fairness are affected by the way that profits are shared between the firm and consumer (Kahnaman, Knetsch and Thaler 1986), the intentions of the firm (Campbell 1999), the firm's perceived wealth and power (Seligman, Schwartz 1997), and whether underlying costs are variable or fixed (Nunes, Hsee, Weber 2004). In this project, our fairness measure was a simple one taken directly from Kahneman, Knetsch, and Thaler (1986). It is difficult using only this measure to determine what our participants had in mind when they answered the question, or what outside influences might affect these fairness judgments. For example, it is possible that exposure to negative media coverage of other types of

[5] Additional research by Shu & Payne (2013) finds that high levels of individual loss aversion are a strong and significant predictor of which individuals intend to claim their Social Security retirement benefits early, consistent with this predicted effect on annuities.

annuity products (e.g., variable annuities instead of life annuities) could affect perceptions, as could access (or lack of access) to financial planners who understand the value of the product. More research is necessary to understand the drivers of these fairness perceptions. From a positive perspective for marketers of these products, however, this suggests that the annuity puzzle is more a problem of perception that of the financial tradeoffs inherent in the product.

Our findings offer several practical implications for financial planners who are working with clients to design optimal decumulation plans for retirement. While economists have argued for the important role of life annuities in retirement, especially as a tool to manage longevity risk and uncertainty, demand by consumers has been limited. Our research identifies which clients may be most open to the possibility of annuities – specifically, individuals who are less loss averse and consider annuities more fair will be more willing to consider annuity options. Ongoing research suggests that these individual differences are more important in decumulation decisions than in the accumulation stage (Shu & Payne 2013, Shu & Shu 2018); while most workers agree on the need to save for the future and respond well to standard savings interventions, the decumulation process requires greater personalization to the needs and preferences of the client. As legislators consider making annuities a more available option in workers' 401(k) plans (Rubin and Tergesen 2018), helping individuals make wise choices about incorporating annuities into their retirement plans will be an increasingly important task.

References

Agnew, J.R., L.R. Anderson, J.R.Gerlach, and L.R. Szykman (2008), "Who chooses annuities? An experimental investigation of the role of gender, framing and defaults," *American Economic Review, 98(2)*, 418-422.

Babbel, D. F., and C. B. Merrill (2006), "Rational decumulation." Wharton Financial Institutions Paper No. 06-14. Philadelphia, PA: The Wharton Financial Institutions Center.

Bengen, William P. (1994) "Determining withdrawal rates using historical data." *Journal of Financial planning*, 7.4, 171-180.

Barsky, R.B., F.T. Juster, M.S. Kimball, M.D. Shapiro (1997), "Preference Parameters and Behavioral Heterogeneity: an Experimental Approach in the Health and Retirement Study," *The Quarterly Journal of Economics*, 729-758.

Benartzi, Shlomo, Alessandro Previtero, and Richard Thaler (2011), "Annuitization Puzzles," *The Journal of Economic Perspectives*, 25(4), 143-164.

Bies, R. J., T. M. Tripp, and M. A. Neale (1993), "Procedural fairness and profit seeking: The perceived legitimacy of market exploitation," *Journal of Behavioral Decision Making*, 6, 243–256.

Brooks, P., and H. Zank (2005). "Loss averse behavior." *Journal of Risk and Uncertainty, 31*(3), 301-325.

Brown, J. R. (2007), *Rational and behavioral perspectives on the role of annuities in retirement planning*. (NBER Working Paper No. 13537). Cambridge, MA: National Bureau of Economic Research, Inc.

Brown, J. R., Kling, J.R., Mullainathan,S. & Wrobel, M.V. (2008), "Why don't people insure late-life consumption? A framing explanation of the under-annuitization puzzle," *American Economic Review, 98*(2), 304–09.

Campbell, Margaret C. (1999), Perceptions of Price Unfairness: Antecedents and Consequences *Journal of Marketing Research*, 36 (May), 187–99.

Davidoff, T., Brown, J. R., & Diamond, P. A. (2005), "Annuities and individual welfare," *The American Economic Review, 95*, 1573-1590.

Fernandes, Daniel, John G. Lynch Jr, and Richard G. Netemeyer. (2014). "Financial literacy, financial education, and downstream financial behaviors." *Management Science*, 60.8, 1861-1883.

Frederick, Shane (2005), "Cognitive reflection and decision making," *Journal of Economic Perspectives, 19*(4), 25-42.

Hu, W.Y., and Scott, J.S. (2007), "Behavioral obstacles to the annuity market," *Financial Analysts Journal*, 63(6), 71-82.

Inkmann, Joachim, Paula Lopes and Alexander Michaelides (2011), "How deep is the annuity market participation." *The Review of Financial Studies* , 24(1), 279-319.

Kahneman, D., Knetsch, J. & Thaler, R.H. (1986), "Fairness as a constraint on profit-seeking: Entitlements in the market." *American Economic Review*, 76(4), 728-741.

Kapteyn, Arie and Federica Teppa (2011). “Subjective measures of risk aversion, fixed costs, and portfolio choice,” *Journal of Economic Psychology*, 32(4), 564-580.

Kotlikoff & Spivak (1981), “The Family as an Incomplete Annuities Market,” *Journal of Political Economy*, 89(2), 372-391.

Kunreuther, Howard C., Mark V. Pauly, and Stacey McMorrow. 2013. *Insurance & Behavioral Economics*, New York, NY: Cambridge Press.

Lenk, P.J., W.S. DeSarbo, P.E. Green, and M.R. Young (1996), Hierarchical Bayes Conjoint Analysis: Recovery of Partworth Heterogeneity from Reduced Experimental Designs, *Marketing Science*, Vol. 15, 2, pp. 173-191.

Lieber (2010) “The Unloved Annuity Gets a Hug from Obama,” *New York Times*, January 29.

Milevsky, Moshe Arye. (1998). “Optimal Asset Allocation towards the End of the Life Cycle: To Annuitize or Not to Annuitize?” *The Journal of Risk and Insurance*, vol. 65, no. 3, pp. 401–426.

Nunes, J., Hsee, C. K. & Weber, E. U. (2004). Why are people so prone to steal software? The effect of products' cost structure on payment and purchase intentions. *Journal of Public Policy and Marketing, 23,* 43-53.

Payne, John, Namika Sagara, Suzanne B. Shu, Kirsten Appelt, and Eric Johnson (2013). “Life Expectancy as a Constructed Belief: Evidence of a Live-To or Die-By Framing Effect,” *Journal of Risk and Uncertainty*, 46, 27-50.

Payne, J. W., Shu, S., Webb, E., & Sagara, N. (2015). “Individual heterogeneity in loss aversion and its impact on social security claiming decisions.” Technical report, National Bureau of Economic Research.

Peters, E., Västfjäll, D., Slovic, P., Mertz, C. K., Mazzocco, K., and Dickert, S. (2006). “Numeracy and decision making.” *Psychological Science, 17*(5), 407-413.

Poterba, J. M. (2014). Retirement security in an aging population. *American Economic Review, 104*(5), 1-30.

Poterba, James, Steven Venti, and David Wise. (2011). "The composition and drawdown of wealth in retirement." *Journal of Economic Perspectives*, 25.4, 95-118.

Roth, A.E. (2007). “Repugnance as a constraint on markets,” *The Journal of Economic Perspectives, 21(*3), 37-58.

Rubin, Richard, and Tergesen, Anne. (2018). "Congress Explores 401(k) Plan Changes." *Wall Street Journal*, July 18, pg A1.

Schreiber, Phillip, & Weber, Martin (2016). Time inconsistent preferences and the annuitization decision. *Journal of Economic Behavior & Organization*, *129*, 37-55.

Seligman, D.A. & Schwartz, B. (1997), "Domain specificity of fairness judgments in economic transactions" *Journal of Economic Psychology*, 18 (6), 579-604.

Shu, S. B. (2008). "Future-biased search: The quest for the ideal," *Journal of Behavioral Decision Making, 21*(4), 352-377.

Shu, S. B., & Payne, J. W. (2013). *Life Expectation Judgments, Fairness, and Loss Aversion in the Psychology of Social Security Claiming Decisions* (No. onb13-05). National Bureau of Economic Research.

Shu, Suzanne B. (2018). "Psychological Ownership in Financial Decisions." In Joann Peck and Suzanne B. Shu (eds.), *Psychological Ownership and Consumer Behavior*, New York: Springer Publishing.

Shu, S. B., Zeithammer, R., & Payne, J. (2016). Consumer Valuation of Annuities: Beyond NPV. *Journal of Marketing Research*, 53 (2), 240-262.

Shu, Suzanne B. and Stephen D. Shu, "The Psychology of Decumulation Decisions During Retirement," forthcoming at *Policy Insights from the Behavioral and Brain Sciences.*

Soman, D. (1998). "The illusion of delayed incentives: Evaluating future effort-monetary transactions," *Journal of Marketing Research,* 35 (4), 427–237.

Tversky, Amos and Daniel Kahneman (1992). "Advances in prospect theory: Cumulative representation of uncertainty." *Journal of Risk and Uncertainty*, 5(4), 297-323.

Webb, 2009

Weller, Joshua A., Nathan F. Dieckmann, Martin Tusler, C. K. Mertz, William J. Burns, and Ellen Peters (2012) . "Development and Testing of an Abbreviated Numeracy Scale: A Rasch Analysis Approach." *Journal of Behavioral Decision Making*, forthcoming.

Yaari, M. E. 1965. "Uncertain lifetime, life insurance, and the theory of the consumer." *Review of Economic Studies, 32*, 137-150.

Zauberman, G., & Lynch, J. J. G. 2005. Resource slack and propensity to discount delayed investments of time versus money. *Journal of Experimental Psych.: General, 134*(1), 23-37.

Figure 1: Sample study choice task

If you were 65 and considering putting $100,000 of your retirement savings into an annuity, which of the following would you choose?

Monthly payments start at $400 ($4,800/year) 7% annual increase in payments 30 years period certain Company rated AA (very strong)	Monthly payments start at $600 ($7,200/year) 5% annual increase in payments 10 years period certain Company rated AAA (extremely strong)	Monthly payments start at $500 ($6,000/year) $400 annual increase in payments 20 years period certain Company rated AAA (extremely strong)	None: if these were my only options, I would defer my choice and continue to self-manage my retirement assets.
❍ A	❍ B	❍ C	❍ none

In the enriched information treatment, the following table was shown directly under the task:

	Cumulative amount paid to you by different ages if you live to that age					
Age	70	75	80	85	90	95
Option A	$27,600	$66,300	$120,600	$196,800	$303,600	$453,400
Option B	$39,800	$90,600	$155,400	$238,100	$343,600	$478,400
Option C	$34,000	$78,000	$132,000	$196,000	$270,000	$354,000

Table 1: Summary of individual characteristics for both studies

Study 1:

	mean	median	std. dev.	min	max
Age (years)	53.997	55	6.722	41	66
Male	0.537	1	0.500	0	1
Married	0.580	1	0.495	0	1
Has Children	0.633	1	0.483	0	1
HH Income 35to100K	0.519	1	0.501	0	1
HH Income over100K	0.141	0	0.349	0	1
Retirement savings 75to150K	0.120	0	0.326	0	1
Retirement savings over 150K	0.187	0	0.391	0	1
Period certain beneficiary would be family	0.898	1	0.304	0	1
Perceived fairness of annuities	0.552	0.667	0.219	0	1
Risk aversion	0.680	0.6	0.312	0	1
Loss aversion	0.572	0.6	0.302	0	1
Numeracy	0.428	0.375	0.247	0	1
Life expectancy (age at death, years)	82.92	83.39	9.27	59.50	99.04

Study 2:

Demographic or psychographic characteristic	Baseline treatment (334 respondents)			Enriched info treatment (323 respondents)			Same for both treatments	
	mean	median	std. dev	mean	median	std. dev	min	max
Age (years)	52.87	53	6.83	52.80	53	7.02	40	65
Male	0.41	0	0.49	0.40	0	0.49	0	1
Retirement savings 75to150K	0.13	0	0.34	0.17	0	0.38	0	1
Retirement savings over 150K	0.18	0	0.38	0.21	0	0.41	0	1
Perceived fairness of annuities	0.59	0.67	0.22	0.57	0.67	0.22	0	1
Loss aversion	0.66	0.7	0.29	0.68	0.7	0.29	0	1
Numeracy	0.50	0.5	0.16	0.50	0.5	0.15	0.125	1
Life expectancy (age at death)	85.77	87	8.03	84.80	86	9.01	59	99

Table 2: Univariate analysis of individual characteristics for both studies

	Study 1 N=363, 22% annuity haters				**Study 2, basic info** N=334, 20% annuity haters				**Study 2, enriched info** N=323, 16% annuity haters			
Variable	Mean| never buy	Mean | buy some	Diff (buy- not)	tstat	Mean| never buy	Mean | buy some	Diff (buy- not)	tstat	Mean| never buy	Mean | buy some	Diff (buy- not)	tstat
male	**0.39**	**0.54**	**0.15**	**2.4**	0.39	0.42	0.03	0.47	0.41	0.4	-0.01	-0.15
age 50 to 54	0.24	0.22	-0.02	-0.41	0.24	0.22	-0.01	-0.24	0.22	0.23	0.01	0.19
age 55 to 59	0.23	0.28	0.05	1	0.21	0.28	0.07	1.19	0.31	0.18	-0.13	-1.92
age 60 to 65	**0.35**	**0.23**	**-0.12**	**-2.03**	0.22	0.17	-0.05	-0.92	0.18	0.22	0.04	0.74
saved 75 to 150K	0.07	0.12	0.05	1.28	0.13	0.13	0	-0.07	0.16	0.17	0.02	0.28
saved over 150K	**0.33**	**0.19**	**-0.14**	**-2.39**	0.18	0.18	0	0.01	0.24	0.2	-0.03	-0.51
subjective life expectancy	84.15	82.92	-1.23	-0.95	85.49	85.83	0.34	0.27	83.04	85.13	2.09	1.36
numeracy	0.42	0.43	0	0.14	**0.45**	**0.51**	**0.06**	**3.03**	0.48	0.5	0.02	1.01
perceived fairness	**0.37**	**0.55**	**0.19**	**5.78**	**0.43**	**0.63**	**0.2**	**6.78**	**0.41**	**0.6**	**0.19**	**4.9**
medium loss-aversion	0.3	0.33	0.03	0.43	0.33	0.35	0.02	0.31	0.33	0.37	0.04	0.52
high loss-aversion	0.33	0.22	-0.1	-1.76	0.37	0.33	-0.04	-0.6	0.45	0.36	-0.09	-1.19
subjective health					0.75	0.74	-0.01	-0.24	0.73	0.74	0	0.08
medium risk-aversion	0.13	0.13	0	0.05								
high risk-aversion	**0.5**	**0.36**	**-0.14**	**-2.27**								
subjective understanding	0.67	0.66	-0.01	-0.43								
beneficiary family	0.84	0.9	0.06	1.33								
bequest important	0.68	0.68	0	-0.15								
married	0.61	0.58	-0.03	-0.53								
has children	0.71	0.63	-0.08	-1.37								
HH income 35 to 100K	0.61	0.52	-0.09	-1.49								
HH income over 100K	0.19	0.14	-0.05	-0.95								

Table 3: Multivariate logistic regressions of individual characteristics for both studies

	Study 1 N=363, 22% annuity haters				**Study 2, basic info** N=334, 20% annuity haters				**Study 2, enriched info** N=323, 16% annuity haters			
Variable	coefficient	t-statistic	mean X	Std. dev. X	coefficient	t-statistic	mean X	Std. dev. X	coefficient	t-statistic	mean X	Std. dev. X
constant	1.80	1.14	1.00	0.00	-2.59	-1.51	1.00	0.00	-1.30	-0.80	1.00	0.00
male	0.48	1.52	0.50	0.50	-0.15	-0.45	0.41	0.49	-0.53	-1.43	0.40	0.49
age 50 to 54	-0.47	-1.04	0.22	0.42	0.05	0.12	0.23	0.42	0.00	0.01	0.23	0.42
age 55 to 59	0.23	0.51	0.27	0.44	0.66	1.55	0.26	0.44	-0.68	-1.51	0.20	0.40
age 60 to 65	-0.61	-1.42	0.26	0.44	-0.15	-0.36	0.18	0.39	0.24	0.46	0.21	0.41
saved 75 to 150K	0.39	0.74	0.11	0.31	-0.29	-0.63	0.13	0.34	0.00	0.01	0.17	0.38
saved over 150K	**-0.81**	**-2.14**	**0.22**	**0.41**	-0.01	-0.03	0.18	0.38	0.12	0.29	0.21	0.41
subjective life expect.	-0.02	-0.89	83.19	9.54	0.01	0.67	85.77	8.03	0.03	1.31	84.80	9.02
numeracy	-0.44	-0.62	0.43	0.24	**2.04**	**1.99**	**0.50**	**0.16**	0.71	0.58	0.50	0.15
perceived fairness	**3.66**	**5.60**	**0.51**	**0.24**	**4.36**	**6.03**	**0.59**	**0.22**	**3.88**	**5.16**	**0.57**	**0.22**
medium loss-aversion	-0.07	-0.20	0.32	0.47	-0.36	-0.93	0.34	0.48	-0.23	-0.51	0.37	0.48
high loss-aversion	-0.38	-1.04	0.25	0.43	-0.42	-1.08	0.34	0.48	-0.65	-1.48	0.38	0.49
subjective health					-0.38	-0.43	0.75	0.19	-1.34	-1.31	0.74	0.20
medium risk-aversion	0.03	0.06	0.13	0.33								
high risk-aversion	**-0.71**	**-2.13**	**0.39**	**0.49**								
subjective understanding	0.13	0.14	0.66	0.17								
beneficiary family	**1.12**	**2.52**	**0.88**	**0.32**								
bequest important	-0.51	-0.78	0.68	0.24								
married	0.18	0.55	0.59	0.49								
has children	-0.45	-1.24	0.65	0.48								
HH income 35 to 100K	**-0.92**	**-2.37**	**0.54**	**0.50**								
HH income over 100K	-0.90	-1.75	0.15	0.36								