AARP Public Policy Institute



Do Default and Longevity Annuities Improve Annuity Take-Up Rates? Results from an Experiment

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Research Report



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AARP's Public Policy Institute informs and stimulates public debate on the issues we face as we age. Through research, analysis and dialogue with the nation's leading experts, PPI promotes development of sound, creative policies to address our common need for economic security, health care, and quality of life.

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EXECUTIVE SUMMARY

Older Americans saving for retirement face a serious problem: how to make their retirement nest egg last for the rest of their lives. Social Security provides some financial security to many older Americans, as do traditional pensions, since they both pay for life. However, many older Americans need something more.

Life annuities, which insurance companies sell to older people, and which pay the buyer a regular income for life, can provide the additional needed insurance against running out of money in old age. But these financial products have never been popular, in part because purchasers worry over possible insurance company failure and because of a lack of understanding of the proper role of an annuity in reducing the risk of poverty in old age. The typical 401(k) plan will usually offer only a lump-sum distribution to its retiring plan members; if it offers an annuity at all, it offers it as an alternative.

This report describes an experiment that explores ways in which the demand for annuities might be increased. When participants were offered a life annuity first (as the default option), with a lump sum as the alternative, the demand for the annuity increased. When faced with choice of different types of annuities, participants showed particular interest in a deferred or longevity annuity where payments do not begin shortly after the contract is signed, but as many as 15 years in the future.

These results have important policy implications. Simply making a life annuity the default option (the option offered first) could substantially increase demand for these products. In addition, there may be an untapped market for longevity annuities. Provided retirees can manage their finances carefully between the time they retire and the start of the payments by a longevity annuity, they can count on income for the rest of their lives. The further development of this product and the strategic use of default options could contribute materially to the financial security of Americans in old age.

INTRODUCTION

The declining role in the United States of the traditional final salary pension plan has reduced the amount of retirement capital that is automatically annuitized. Defined contribution plans, such as 401(k) plans, which have largely superseded the traditional pension, typically make lump-sum distributions.² The vast majority of 401(k) plans do not even offer the option to take final distributions as an annuity and, when offered, only 6 percent of participants take up the option.³ Although retirees could purchase annuities in the private market, most do not. Only about 6 percent of older U.S. households receive income from private annuities, accounting for approximately 2 percent of total income (Johnson, Burman, and Kibes (2004).⁴ The decline in the rate of annuitization of retirement capital increases the risk that many older Americans may over- or underspend their assets; neither of which would be optimal for their welfare.

Economists have long regarded the limited size of the annuity market as a puzzle.⁵ Although it is possible to accumulate a large retirement nest egg to account for the contingency of living longer than expected, purchasing a life annuity is a far more efficient way of insuring against that possibility. In particular, annuities allow people to receive a higher level of income if they live a very long time and eliminate the need to scrimp and save to avoid running out of funds.⁶

The modest demand for annuities could be partially explained by the competing role of Social Security, which is also an annuity. Many households have a substantial share of their retirement wealth in the form of Social Security and thus do not require additional annuitization through private markets. However, many do not. For these households, participation in the private annuity market could improve their welfare substantially, even if they want to leave an inheritance (a bequest) to their heirs.

Subjective Factors Influence the Demand for Annuities

What might explain the small size of the private annuity market? While a number of different reasons could partially explain this choice, growing evidence suggests that

² In 1989, 34 percent of workers were members of a DB plan through their current job, and 29 percent were members of 401(k) plans. By 2007, the coverage of DB plans had fallen to 17 percent, while that of 401(k) plans had risen to 40 percent. Mackenzie and Wu (2009) tabulate estimates from successive Surveys of Consumer Finance. These figures include coverage by both types of plan.

³ Hewitt Associates (2009) found that only 14 percent of 401(k) plans offer annuities as a final distribution payment. The 2005 edition of the same publication (Hewitt Associates, 2005) found that of the plans that offered annuity as a distribution option, only 6 percent of participants took that option.

⁴ "Elderly households" are households 65 years and older. See this report for more household-income composition details.

⁵ The pioneering study of the benefits annuities provide was Yaari (1965). Davidoff, Brown, and Diamond (2005) show that even when Yaari's assumptions are relaxed, some annuitization can enhance welfare. Benartzi, Previtero, and Thaler (2011) provide a more recent discussion of the evidence and puzzle.

⁶ Life annuities are a device for risk pooling. Annuitants who die relatively early finance increased lifetime consumption for those who live long.

behavioral biases could play a role in suppressing annuity demand.⁷ Within the context of retirement savings behavior, a number of studies have found that choice can be influenced by subjective factors, such as the way information is presented or the effort involved. Modifying the information frame or making the choice passive rather than active can produce meaningful differences in savings behavior.

Similarly, biases could affect the perceived value of annuities. In a survey that asked participants to rate the attractiveness of an annuity, the authors found that emphasizing the investment character of an annuity (framing outcomes in terms of investment returns and risks) made annuities less appealing than nonannuitized products. But when the annuity was presented in a consumption frame, a larger proportion selected the annuity. One experimental study found that participants were sensitive to the use of positive and negative framing. When participants were presented with negative information about annuities (such as dying early), they were more likely to select the investment option; when presented with negative information about investments, they were more likely to select the annuity option.⁹

In our earlier experimental work with college students, we observed that when

What Is an Annuity?

In this study, we consider two types of annuities: a life annuity and a longevity annuity.

A life annuity is a financial instrument with the special property of providing a regular income for life in exchange for a substantial up-front investment. For example, according to one popular website for potential annuitants, in late 2012, a 65-year-old man New York State resident could buy an immediate annuity with a monthly lifetime income of \$554 for a premium of \$100,000. For the same premium, a 65-year-old woman would receive a lifetime monthly income of \$517.¹⁰

A longevity or deferred annuity, as the name suggests, delays the start of the monthly payments, usually for a number of years. Some insurance companies are currently offering an annuity with the first payment deferred for as much as 15 years. Once payment begins, the longevity annuity provides regular income for the life of the annuitant. Because of the later payment date, the premium to purchase a longevity annuity can be much less than the premium to purchase a life annuity. For example, an immediate annuity that pays \$600 a month will cost a 65-year-old man \$83,205; for the same man, a longevity annuity that pays \$600 a month but doesn't begin until he is 81 years old will cost \$14,353.1

⁷ Demand also is low because of incomplete markets, existing annuities from other sources, and the desire to leave a bequest. However, these explanations alone cannot fully reconcile the gap between observed level of demand and that predicted by economic theory, particularly for households with high lifetime income (Davidoff et al., 2005).

⁸ Brown et al. (2008a, 200b) presented survey respondents with the investment and spending decisions of two fictitious persons—one with an annuity and the other with a nonannuitzed product—and asked them to assess who made the better choice. Benartzi, Previtero, and Thaler (2011) found that participants in cash balance plans were less likely to choose an annuity than participants in defined benefit (DB) plans, which they attribute to differences in the framing of benefits (DB plans presenting more of a consumption frame).

⁹ For more details, see Agnew et al. (2008). See also DiCenzo et al. (2011).

¹⁰ Annuity quotes are for single life annuity with no payment to beneficiaries, obtained from <u>http://www.immediateannuities.com on September 14, 2012.</u>

¹¹ The calculations for the two annuities do not assume a load factor.

endowed assets were designated as a lump sum, participants became excessively attached to that form and were less likely to trade the lump sum for an annuity-like option (Gazzale and Walker 2009). In addition, that study found that participants were more concerned with the risk of early termination (e.g., dying soon after purchasing an annuity) than the risk of outliving their resources. As a result of this concern, participants regarded the annuity-like option as a risky gamble and, therefore, less appealing.¹²

Bolstered by the emerging evidence, the Department of Labor and the Treasury Department are considering administrative rule changes that encourage the take-up of annuities. One change, for instance, would encourage plan sponsors to present account information to 401(k) participants as lifetime payments from an annuity, in addition to providing asset information, in the hopes that drawing attention to the income stream could stimulate demand for annuities. In 2010 they sought input from informed stakeholders on how such a proposal might be implemented.

The Experiment

In this Research Report, we test whether changing the default distribution option from a lump sum to an immediate annuity in individually managed accounts (such as defined contribution retirement plans) could increase annuitization rates. Whether such a policy would produce meaningful changes in behavior is unclear. Evidence from the framing studies suggests that it might, although, until now, the role of defaults has not been tested in the context of the retirement distribution decision.¹³ By replicating this policy in a controlled environment, we shed some light on this question.

This study builds on our earlier work to examine the strength of the default option. We improved on our previous approach in a number of ways to reflect real-world choices more closely. First, we tested the effectiveness of default settings on working-age people, for whom the retirement distribution problem is a more relevant concern. Second, we allowed our experiment to run several weeks, to resemble the notion of retirement length and to allow time and uncertain longevity to have a bearing on choices, as they do in the real world. Third, we structured the choice to resemble distribution choices from an individually managed retirement account, such as a 401(k) or Individual Retirement Account (IRA). In particular, the 401(k)-like option allowed participants to choose the amount to be withdrawn from the account each period. Finally, we provided context, which was previously lacking in an experimental lab using college students. We did so by relating certain components of the experiment to real life, such as relating the stages of the experiment to working and retirement phases, and certain tasks to accumulating assets or retirement draws.¹⁴ As in our earlier work, participants in our

¹² Gazzale and Walker (2009) show that subjects tend to place more weight on early risk than is warranted by objective measures. When people overweight early risk (e.g., dying soon after buying an annuity) relative to later risk (e.g., outliving their resources), annuities appear less attractive than the lump-sum option. Participants were also asked to explain their choice, and many felt that the annuity was a riskier choice.

¹³ The policy proposal is discussed in William G. Gale et al. (2008).

¹⁴ Many factors play into the decision of whether or not to annuitize retirement assets. Context allows participants to internalize some of these unmeasurable but potentially critical decision drivers, which we hoped would motivate more realistic choices in the experiment. By keeping context consistent across the treatment frames, we believe we elevate the study from being merely about choice under uncertainty to understanding the bias against annuities.

experiment received cash payments, which provided an incentive for them to evaluate their options more carefully than when payments are not dependent on the response.

The Default Setting Affects Annuity Choice

We found that the assignment of a default influenced participants' distribution choice. Participants were more likely to choose the default option in both the treatment where the lump sum was the default and the treatment where the annuity-like option was the default.

Given the observed distribution choices of participants in defined benefit (DB) plans, we assume that defaults may matter but may not completely account for lower than expected annuity demand. In DB plans that present benefits as a lifetime payment stream, if retirees are given the option to cash out and receive a lump sum, a large proportion choose to do so.¹⁵ We anticipated a similar outcome in our controlled experiment; that is, we expected an increase in the proportion that would select the annuity when we modified the default but expected that the change would not rise to the proportion that selected the lump sum if it were the default. Indeed, that was the case. Although we observed a meaningful increase in the likelihood of selecting the annuity, the likelihood of selecting the default immediate annuity (56 percent) was still well below the likelihood of selecting the default lump sum (72 percent).

In our earlier experimental work on biases and annuity take-up rates, we observed that participants tended to focus too much (more than warranted by actual probabilities) on the possibility of early losses—the proverbial fear of getting "hit by a bus" (Gazzale and Walker 2009).¹⁶ The implication is that consumers may view the immediate annuity as a gamble.¹⁷ Purchasing an immediate annuity also requires a sizable up-front commitment of assets, with limited and costly options for unraveling the commitment. Both the bias and the general irreversibility of immediate annuities could contribute to the observed lower than expected take-up rates.

The Longevity Annuity Has Appeal

A longevity annuity (also known as longevity insurance or deferred annuity) circumvents these two obstacles.¹⁸ First, because of its later starting payout date and shorter payout period, it requires a smaller up-front payment than an immediate annuity to receive an equivalent monthly income stream (see example in text box). Second, whereas the overweighting of near-term events would disadvantage an immediate

¹⁵ At least, a larger proportion of participants take the lump-sum in DB and cash balance plans that offer a cash out than do participants in a defined contribution plan with an annuity option. Only 6 percent of 401(k) participants take the annuity option when offered a choice, whereas in the two Fortune 500 companies studied by Mottola and Utkus (2007), 73 percent of those with a DB plan elected to take a lump sum and 83 percent of those with a cash balance plan took the lump sum. These proportions, however, are higher than found in other related studies of lump sum take-up rates in DB plans in U.S. companies. Bernartzi et al. (2011) note that excluding those who were offered an extra incentive to take the annuity, the lump-sum take-up rate in their DB data ranged from 39 to 50 percent.

¹⁶ This behavior is consistent with loss aversion.

¹⁷ In our study, participants who were more willing to take risks were also more likely to choose the annuity.

¹⁸ This policy option is discussed in Hu and Scott (2007) and Scott, Watson, and Hu (2009).

annuity, the overweighting of small-probability future events (such as the possibility of living to an advanced age) would advantage a longevity annuity.¹⁹

Therefore, we also evaluated the relative attractiveness of longevity annuities as an alternative distribution option to immediate annuities in individually managed retirement accounts. In our controlled experiment, the option of the longevity annuity moved participants away from the lump sum in a meaningful way. Even though it was not offered as a default, the likelihood of selecting the longevity annuity was 61 percent; in fact, it was preferred to the lump sum.²⁰

A potential implication is that 2012 Treasury Department and Internal Revenue Service (IRS) proposed changes to the required minimum distribution (RMD) rules for 401(k)s and IRAs may promote greater interest in the longevity annuity.²¹ The RMD rules specify the minimum amount that retirement plan account owners must withdraw annually starting in the year they reach 70½ years of age or (if later) the year they retire. This rule generally inhibits the purchase of longevity annuities, since the deferred payments would likely begin well after the required period specified by the RMD rule and most longevity annuities cannot be "unwound."²² The proposed regulations (77 Fed. Reg. 5443) provide that before annuitization, the account holder could exclude the value of a longevity annuity contract that meets certain requirements and use the remainder of the account balance to determine RMDs.

The results of our experiment suggest that it may be possible to increase the demand for annuities substantially, thereby enhancing the retirement security of many older Americans. In the following sections, we outline detail our experiment design and our results.

EXPERIMENT DESIGN

We recruited subjects from ages 22 to 70 who were working full- or part-time. We held sessions online and in person. Participants recruited for the online sessions were required to own a home computer and to use it more than six hours a week. Online participants were recruited from a national database owned by Userworks, a company that specializes in surveys, focus groups, and usability testing. Userworks moderated the online sessions. In-person sessions were held at Williams College, in Williamstown, Massachusetts, with participants recruited from the local community. In total, 223 people participated in the experiment—155 in online sessions and 68 in in-person sessions. All three treatments included online and in-person sessions. We conducted these experimental sessions from August 2011 through January 2012.

¹⁹ In their theoretical modeling of behavioral biases, Hu and Scott (2007) find that the same bias that leads a person to disfavor an immediate annuity will lead a person to overweight the prospect of living to 95, thus favoring the longevity annuity.

²⁰ Potentially, lack of motivation might explain the tendency to follow the default option; however, the result that a higher proportion selects the alternate longevity annuity over the default lump sum suggests otherwise.

²¹ The RMD rules apply to all employer-sponsored retirement plans, including profit-sharing plans, 401(k) plans, 403(b) plans, and 457(b) plans. The RMD rules also apply to traditional IRAs and IRA-based plans such as SEPs, SARSEPs, and SIMPLE IRAs. They also apply to Roth 401(k) accounts, although not while the owner is alive. See <u>http://www.irs.gov/Retirement-Plans/Retirement-Plans-FAQs-</u>regarding-Required-Minimum-Distributions for more information regarding the RMD rules.

²² That is, there is no commutation benefit or a cash surrender value.

In the first stage, all subjects earned tokens (similar to retirement assets) by completing computer-based tasks. We constructed an earnings phase to engender a feeling of asset ownership. In the second stage-the retirement stage-subjects "consumed" their earned tokens by converting them to cash payments, which they received every two weeks over an eight-week period, conditional on survival. The eightweek period was characterized as their retirement period. We informed subjects that while their "retirement" might last up to eight weeks, its actual duration was uncertain, as in the real world. At the end of every two weeks, a public randomization device (the final numbers of the S&P 500 index) determined survival to the next payment period.² Subjects could receive a maximum of four payments. All subjects received a first payment (survived the first period), but progression to subsequent payment periods was uncertain.²⁴ Figure 1 shows the survival distribution. Subjects were fully informed about their probability of survival from one period to another.

At the beginning of the retirement stage, subjects were presented with a default distribution option-either a lump sum or an immediate annuity-like option. In either case, if a subject reached a payment period, he or she received a payment based on the number of tokens allocated to that period. The formula for converting tokens to cash attempted to capture the declining value of additional consumption in a given period; therefore, doubling the number of tokens allocated to a period did not double the cash payment for that period.



Figure 1

See appendix B for a detailed description of how we determined survival; this description was made available to participants who requested more information.

²⁴ The probability of surviving from the first to the second round was 0.8, from the first to the third was 0.4, and from the first to the fourth was 0.2.

²⁵ We wanted to mimic the fact that \$1 allocated to a low consumption period results in more utility than \$1 allocated to a high consumption period. Simply, we wanted to respect the diminishing marginal value of a token. To get total (per-period) payoff concave in tokens allocated to that period, the marginal values decrease from a normalized 1 for the first token to 0 for the 141st token. We summed up the marginals, then scaled by 1.1 to get desired overall payment size. One result of our functional form is that 25 tokens results in 45 percent of the payment of 100 tokens, which discourages participants from frontloading tokens too aggressively.

In the annuity option, the number of tokens received and converted to cash was the same in each period and was determined by the number of tasks completed. In the lump-sum distribution option, the number of tokens was also determined by the number of tasks completed, but participants could allocate the tokens they had earned over four periods as they wished. This allocation was made at the first session and participants could not modify the allocation over the eight-week retirement period. Any tokens allocated to a payment period not reached by a subject also had value, as we describe below. To assist participants with their decision, we provided a calculator that showed, for any token allocation specified by the participant, the cash equivalent of the token allocations across the four payment periods.²⁶ To help them understand how the cash payments would vary, participants were encouraged to try as many allocation options as they wished.

To prevent subjects from over- or underconsuming in any payment period, we imposed a penalty, deducting \$5 if they did not allocate at least five tokens in any period.²⁷ This penalty attempts to mimic the cost in real life of over- or underconsuming. Subjects who received the annuity-like distribution option received the same number of tokens each payment period. They received the cash equivalent of these tokens if they survived to that period.

To further mimic the financial choices faced by retirees, subjects who received the lump-sum treatment option could choose how to dispose of their remaining unconsumed tokens should they die before the fourth and final payment period. That is, they were given the option to bequeath their assets. They could choose to receive 50 percent of the value of the remaining tokens as a cash payment to themselves or donate the value of the asset to one of 11 charities we made available to them.²⁸ Subjects who received the annuity-like default option, on the other hand, did not receive any further payments if they did not survive to the next payment round.

In all sessions, after participants viewed a table detailing the payments received in each retirement period, they were offered a choice between the default option and an alternative option as described below. Subjects viewed a table with payments from the two options presented side by side and were asked to choose between the two.

Testing Whether Default Matters

To test whether the default affects choice, we offered participants the opportunity to trade their current method of receiving cash payments for an alternative.²⁹

 Participants who initially received a lump sum of tokens and distributed those assets across the four payment periods were offered the opportunity to trade that payment schedule for an immediate annuity-like option.

²⁶ Appendix C shows the calculator.

²⁷ We wanted to avoid the situation of subjects consuming everything in the early periods and leaving nothing for later periods. Again, this penalty attempts to mimic the response of someone with a concave utility function.

²⁸ The "self" option received a smaller cash payout than the charity option to reflect the lower relative contribution to overall utility.

²⁹ Subjects had to choose either the default or the alternative. No partial trades were allowed.

Participants who were initially presented with an immediate annuity-like option were given the choice to trade that option for a lump sum of tokens. We required these participants to specify how they would allocate their tokens if they accepted this option. They used the same calculator as participants who initially received a lump sum, and they were similarly encouraged to try many different allocation options.

In each case, the trade (between the default and alternative option) was actuarially fair in that the annuity's expected value in tokens given our assumed survival probabilities equaled the annuity premium. Specifically, a subject who earned 100 lump-sum tokens was offered an annuity that paid 42 tokens per period conditional on survival, and vice versa.³⁰

Testing the Appeal of Longevity Annuities

In our third treatment, we initially presented participants with a lump-sum default distribution option. As described earlier, participants chose how to allocate their tokens over the four payment periods and received a cash payment if they survived to each period. To test the relative appeal of a longevity annuity, after subjects completed their allocation of tokens across the four payout periods, we offered the following trade: If a subject agreed to give up a portion of her lump-sum tokens, specifically 20 tokens, she would receive 33 tokens if she reached round 3 and an additional 33 tokens if she reached round 4.³¹ Thus, this option mimicked a longevity annuity and offered participants an opportunity to partially annuitize their assets and receive annuity payments at a deferred date. Participants still had the remaining accumulated tokens to distribute across the payment periods as they wished. The tokens from the longevity annuity had no cash value if the participant did not reach round 3 or 4. Unconsumed tokens from the accumulated assets, however, could be cashed out or donated to charity if the participant did not survive to the round.

To facilitate a comparison of the two options, we required participants to distribute the remaining tokens as if they were accepting this option and provided them with a calculator showing per-period payments for any allocation they specified. Table 1 summarizes the three treatment options.

Once they had made their choice, participants in all three treatments completed a short survey. It included questions about their demographic profile and that of their spouse, if they were married, as well as questions to assess their level of risk aversion, patience (discount rate), and knowledge of simple financial concepts. They were then

Lump-Sum Default	Immediate Annuity Default	Lump-Sum Default
Option to trade all of lump sum	Option to trade annuity	Option to trade part of lump sum
for immediate annuity	for lump sum	for longevity annuity

Table 1	
Summary of Treatment	Options

³⁰ We calibrated the earnings task so that average task performance netted 100 lump-sum tokens for participants whose default was the lump sum and 42 tokens in each retirement period reached for participants whose default was the annuity.

³¹ The trade was equivalent in expected value.

asked whether they would like to receive their payments via deposits into their PayPal account or by a check in the mail. This concluded the experimental session; participants were not required to engage in any additional tasks or make additional decisions beyond the first session. In subsequent weeks, participants received an email every two weeks to inform them whether they had survived to the next payment period. If they had, they received a cash payment based on the payment schedule they had selected.³²

Participants were paid \$60 to participate in the experiment and were told that they could earn an additional \$100 for completing tasks during the session.³³ On average, participants received \$134.88, although there was considerable variation in the payments (table 2). Mean payments were similar in the in-person and online sessions.

Table 2 Payments to Participants									
StandardMeanDeviationMin.Max.									
In-person sessions	\$131.66	\$29.78	\$42.00	\$204.48					
Online sessions	\$136.40	\$30.44	\$70.68	\$242.48					
Total	\$134.88	\$30.25	\$42.00	\$242.48					

EXPERIMENT RESULTS

Figure 2 presents the raw data from the three treatment options. It shows the proportion of participants that chose the annuity option. We combined the in-person and online sessions for a total of 223 cases.

Comparing the Lump-Sum Default with the Immediate Annuity Default

When participants were presented with a lump sum of tokens as the default option, they were far more likely to select the default than if they were presented with an immediately annuity-like option.³⁴ In the first treatment option, we offered participants a lump sum of tokens as the default and the immediate annuity as the alternative (lump sum to immediate annuity). We see a 44 percentage-point difference in the proportion selecting the default lump sum over the immediate annuity. Our second treatment offered participants the immediate annuity as the starting point and the lump sum as the alternative (immediate annuity to lump sum). In this treatment, the proportion selecting the default annuity is virtually identical to the proportion selecting the lump sum,

³² In the real world, people who choose a lump sum have the option to update their portfolio allocation as new information arrives. This flexibility to adjust may be another appealing feature of the lump-sum distribution option. Our design, which locks participants into a predetermined consumption stream, does not permit that flexibility. Future work is planned that will accommodate this feature.

³³ \$20 of the \$60 participation fee was withheld until the final payment to allow for offsets should participants fail to allocate a minimum of six tokens to each payment period in the lump-sum schedule.

³⁴ We reject the null that the proportions are equal between the two treatment groups (chi-squared test, p = 0.003).



although the proportion choosing the default annuity is still much smaller than the proportion choosing the default lump sum.³⁵ Nevertheless, the proportion choosing the annuity in the second treatment is much larger than in the first treatment: a difference of 23 percentage points. The difference suggests that changing the characterization of the value of individual retirement accounts could improve annuity take-up.

Comparing the Immediate Annuity with the Longevity Annuity Alternative

When participants were offered the longevity annuity as an alternative to the lump sum, they were more likely to select the annuity than if they were offered the immediate annuity as an alternative to the lump sum. The difference is sizable. Compared to the first treatment, there is a 32 percentage-point difference in the proportion choosing the annuity. In fact, the proportion selecting the alternative longevity annuity far exceeds the proportion selecting the lump-sum default and exceeds the proportion selecting the immediate annuity when it is the default.

These results suggest that the longevity annuity has considerable appeal and, if offered in IRAs, might move participants away from the lump-sum default. The greater appeal might reflect the fact that in the treatment with the longevity annuity, participants were allowed to partially annuitize their lump sum, whereas partial annuitization was not an option with the immediate annuity.³⁶ The all-or-nothing trade might have been perceived as too risky a gamble. In addition, the cost of purchasing the longevity annuity was lower than that of the immediate annuity, so it might have been perceived as a better deal.

³⁵ Given the experience of cashouts in DB plans, this result was not surprising.

³⁶ We propose to test this feature in future work.

Accounting for Differences across Treatment Groups

The sizable differences in the simple tabulation of results might be driven by differences in the characteristics of the participants in each of the three treatment groups. For instance, it is possible that more risk-averse people ended up in one group than in the comparison group. Risk-averse people might perceive the annuity differently than those who are less risk-averse, and that characteristic (rather than the frame or the product offering) could be motivating the choice. If so, the results would be misleading.

Table 3 shows selected characteristics of participants that differ by treatment group. The full list of observable characteristics and how they varied across treatment groups is available in appendix A, table A1. These characteristics were obtained from the survey that participants completed at the end of the experimental session, which included demographic information and assessed knowledge about simple financial concepts and survival probabilities. People who are more knowledgeable about financial concepts might be more likely to appreciate the risks inherent in managing one's own assets and

	Lump Sum vs. Immediate Annuity	Immediate Annuity vs. Lump Sum	Lump Sum vs. Longevity Annuity			
Age	53.60	50.80*	51.60			
Male	0.39	0.34	0.43			
Married	0.56	0.53	0.47			
Unconsumed tokens to self^	0.50	0.61	0.65*			
Total tokens earned	108.40	114.10	109.60			
Indicators of Knowledge of Surviv actual	val Probabilities (re survival probabilit	ported survival pro ty)^^	bability minus			
Surviving to age 70	-13.35	-16.71	-11.88			
Surviving to age 80	-4.39	-10.66*	-5.97			
Surviving to age 90	8.20	6.72	8.89			
Surviving to age 100	9.18	6.63	7.20			
Indicators of Financial Lite	eracy (count of nu	umber of correct	answers)			
Questions about simple financial concepts	2.72	2.38***	2.52*			
Questions about whether assets in various financial instruments are federally insured	5.55	5.51	5.62			
Indicators of Risk Preferences and Impatience (proportion falling into these categories)						
Tolerates high risk	0.42	0.30	0.26**			
Relatively patient	0.27	0.19	0.38			
Received payments by PayPal	0.27	0.53***	0.43*			

Table 3	
elected Characteristics and Choices of Participants by Treatment Grou	р

Notes: ^ - the omitted category is unconsumed tokens to charity. ^^ - a value of 0 indicates that participants reported a survival probability equal to the actual survival probability of a 65-year-old person living to that particular age. A negative value indicates that the reported probability was lower than the actual probability; vice versa for a positive value.

*Compared with the lump-sum default/immediate annuity alternative option, we can reject the null of equal means at the 10 percent level. **Compared with the lump-sum default/immediate annuity alternative option, we can reject the null of equal means at the 5 percent level.

***Compared with the lump-sum default/immediate annuity alternative option, we can reject the null of equal means at the 1 percent level.

might therefore appreciate the insurance value of an annuity.³⁷ Likewise, people who are more familiar with survival probabilities might be more likely to understand that longevity is uncertain and, therefore, annuities could be protective.

The survey also elicited participants' tolerance for risk (as measured by their response to survey questions about taking a job with higher but uncertain income) and patience (measured by their response to survey questions about their willingness to wait for a lottery payout).³⁸ We also compared, across treatment groups, the proportion of participants who donated their unconsumed tokens to charity (which we used as an indicator of potential bequest motive) and the proportion choosing the PayPal option rather than a check in the mail.³⁹ In addition, we compared, across treatments, total tokens earned during the earnings phase, given the possibility that choices might be dependent on available resources (that is, wealth). Table A1 provides more information about the survey questions and the construction of the risk, patience, survival knowledge, and financial knowledge indicators.

We observe differences across the groups in some demographic factors, knowledge about stock returns relative to savings account and bonds, risk preferences, patience, and donation to charity. Any or all of these factors could affect the decision of whether or not to choose the annuity. If these factors varied systematically across treatment groups, they might explain the pattern we observed in the simple tabulation and would therefore confound our results.

Our next step was to disentangle these potential confounding effects. Figure 3 shows the results of a simple probit analysis, which shows the extent to which the probability of choosing the annuity changes when (a) participants are offered an annuity-like option as the default (compared with a lump sum as the default) and (b) participants are offered a longevity annuity as the alternative (compared with the alternative of an immediate



this is treatment 1). Results from a probit analysis. No other covariates introduced. Results are significant at the 1 percent level.

³⁷ As it turned out, participants had relatively similar levels of understanding of financial concepts (perhaps owing to our selection approach), so this variable did not gain much traction in the probit analysis. In the real world, there may be more variation in financial knowledge, which may partly explain differences in valuation of annuities.

³⁸ The patience indicator proxies for the discount rate.

³⁹ The choice of using PayPal (i.e., comfort with using an alternative payment option) may be correlated with financial literacy.

annuity). This analysis captures the same information as the raw data tabulations presented earlier without accounting for differences in the characteristics identified above.

We next evaluate the probability of selecting the annuity with a full set of controls, accounting for risk preferences, patience, total tokens, and other factors that could affect the decision to select the annuity and that also varied across treatment groups. Figure 4 shows only those factors that significantly affected the probability. (See appendix A, table A2 for the full table, with marginal effects of each covariate.)



presented in appendix A, table A2

*Significance at the 10 percent level. **Significance at the 5 percent level. ***Significance at the 1 percent level.

Even with the introduction of characteristics that varied across treatment groups, having the annuity as a default or offering the longevity annuity increased the probability of selecting the annuity option. In fact, the marginal effect did not change with the introduction of controls. These results bolster our assessment that recharacterizing assets in an individually managed retirement account could potentially increase annuity take-up rates in 401(k)s and IRAs. The proposed changes by the Labor Department and the IRS to exempt longevity annuities from the RMD rules could also have a meaningful effect in increasing the selection of annuities at the time of distribution.

Other characteristics also affect the decision to choose an annuity. People who were relatively more willing to take risks were more likely to choose the annuity. This is consistent with results from our earlier work and reinforces the notion that people perceive the exchange of a lump sum for an annuity as a gamble—perhaps because of the irreversible nature of the annuity and the potential to lose it all if the annuitant dies early or dies before he or she reaches the age when a longevity annuity starts to pay out. Of course, in the real world, the lump-sum alternative includes the risk of running out of resources, but people might discount that risk more than warranted by actual probabilities. Participants who are relatively more patient are also more likely to choose an annuity, consistent with behavior under standard economic theory.

DISCUSSION

Many economists believe that most people are very averse to running through their retirement assets before they die; accordingly, life annuities should be popular because they provide payments for life.⁴⁰ However, the private market for immediate life annuities is very small. In 2008, sales of immediate life annuities paying a constant nominal monthly amount were only \$8 billion, compared with \$8.979 trillion in IRA assets in 2007 (Employee Benefit Research Institute 2010).⁴¹ The market for longevity annuities is even smaller.

Recent actions by the Department of Labor, the Treasury Department, and the IRS attempt to encourage the take-up of different types of lifetime income options, such as the longevity annuity. Our study explores the extent to which these policy interventions would change distribution choices.

The experiment provides strong support for the view that default options (or framing) matter. Faced with a choice between a lump sum and an immediate annuity, the majority of participants chose their endowed option. Even more striking, the purchase of a longevity annuity with part of the funds was highly popular and moved the majority of participants away from the default lump sum.⁴²

The apparent popularity of the longevity annuity might reflect the fact that it seems to allow annuitants to have their cake and eat it too. It provides "tail risk" insurance but does not entail the loss of all the annuitant's capital. A participant could frontload the tokens left after he purchased a longevity annuity and still have income in the later periods, should he survive to reach them.

The choice of a longevity annuity does not have the same all-or-nothing quality as the choice of an immediate annuity, in which 100 percent of retirement capital must be annuitized. That said, if the annuitant is not concerned about leaving a bequest and has no need for liquidity, the immediate annuity would finance a larger stream of lifetime consumption than the longevity annuity.⁴³ In theory, a longevity annuity is likely to be more popular than an immediate annuity if the share of the retirement nest egg a retiree is willing to devote to either kind of annuity is small. If that share is larger, this does not necessarily hold (Mackenzie 2012; Scott et al. 2009).

Encouraging 401(k) and other defined contribution plan sponsors to offer annuities, either immediate or longevity, would require dealing with some design issues. Plan

⁴⁰ A recent survey of Americans aged 44 to 75 years found that 61 percent were more afraid of running out of money before they died than of death itself (*AARP Bulletin*, July 1, 2010).

⁴¹ Annuity sales data are from LIMRA.

⁴² Our participants may have been drawn from a select group and our results might not generalize to a wider population. Participants in our sessions were more likely to have a college degree than the general population, and most were generally knowledgeable about simple financial concepts. Future work will focus on a more randomized sample of participants.

⁴³ The comparison is between buying an immediate annuity and investing the amount in a combination of a longevity annuity and bonds. The investment in the bonds— if they are as safe as the bonds that the insurance company holds to finance the immediate annuity—has to finance consumption until the longevity annuity begins paying. However, because the bonds do not stop paying when their holder dies, the stream of income they provide costs more than the stream of equivalent annuity income.

sponsors benefit in theory from a "safe harbor" that lowers the risk of legal exposure from offering their members an annuity. While there are current safe harbors for annuities, plan sponsors have argued that they are more akin to guidance on what constitutes a prudent selection process for annuities, as the criteria for qualification are not specific enough (Wray 2010). Modification to the safe harbor standards may be warranted to encourage greater plan sponsor participation. For instance, a modification could include making it easier for a plan sponsor to choose a creditworthy annuity provider; a revised safeguard might conceivably require that a cap be imposed on the ratio of premium to income and on the share of the plan member's balance that might be annuitized.

Because the choice between immediate and longevity annuities is not an easy one to make, plan sponsors that offer both types might be required to provide financial counseling. These and similar conditions would reduce the risk of buyer's remorse but would increase the cost of providing annuities. To reduce the risk of the failure of annuity providers, a high standard could be imposed on their creditworthiness. Including a guarantee would give annuitants important protection but would heighten the risk that annuity providers might not take appropriate steps to prevent failure (that is, moral hazard).

The growth in the market for longevity annuities raises additional issues. Because the payments from an annuity can be many years in the future, it must be funded with assets that have a similar maturity profile. Distrust of insurance companies, which could discourage sales, might also be an issue with longevity annuities. Further, longevity insurance might be unattractive to people who are pessimistic about their long-term survival probabilities or to certain demographic groups that tend to have relatively shorter life expectancy.

This brief discussion is intended to give a flavor of the issues that could arise in increasing the role of annuities in retirement finance. The findings from our experiment suggest that broadening the annuity market is potentially viable and a positive step to enhance the welfare of older people.

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Table A1							
	Descriptive Statistics by T	reatment Group					
		Lump Sum vs	Immediate	Lump Sum			
		Annuity	Lump Sum	Annuity			
	Age	53.60	50.80*	51.60			
	Male	0.39	0.34	0.43			
	White	0.73	0.83	0.78			
	Hispanic	0.04	0.05	0.03			
Variables	Born in the United States	0.88	0.95	0.95			
	Married	0.56	0.53	0.47			
	College degree or higher	0.74	0.79	0.70			
	Unconsumed tokens to self^	0.50	0.61	0.65*			
	Total tokens earned	108.40	114.10	109.60			
Indicator of Knowledge	Surviving to age 70 ^{^^}	-13.35	-16.71	-11.88			
of Survival Probabilities	Surviving to age 80	-4.39	-10.66*	-5.97			
probability minus actual	Surviving to age 90	8.20	6.72	8.89			
survival probability)	Surviving to age 100	9.18	6.63	7.20			
	Stocks have higher returns than savings accounts or bonds	0.80	0.63**	0.70			
	Stocks have greater unpredictable changes than savings accounts or bonds	0.97	0.95	0.93			
	Buy less in 1 year than today if inflation is 2% and savings account pays 1% interest	0.95	0.80***	0.89			
	Number of correct answers to simple financial concepts	2.72	2.38***	2.52*			
Familiarity with Simple	Money in checking account insured by U.S. government	0.81	0.86	0.86			
Financial Concepts (proportion with correct	Money in savings account insured by U.S. government	0.88	0.92	0.92			
answers)	Money in CD insured by U.S. government	0.80	0.86	0.80			
	Money in a money market mutual fund insured by U.S. government	0.43	0.46	0.39			
	Money in a stock mutual fund insured by U.S. government	0.11	0.14	0.15			
	Term life insurance policy insured by U.S. government	0.18	0.25	0.22			
	An annuity insured by U.S. government	0.22	0.26	0.20			
	Number of correct answers to insurance questions	5.55	5.51	5.62			
Indicators of Risk Preferences and	Tolerates high risk	0.42	0.30	0.26**			
Impatience	Relatively patient	0.27	0.19	0.38			
(proportion falling into these categories)	Received payments by Paypal	0.27	0.53***	0.43*			

APPENDIX A. DESCRIPTIVE STATISTICS AND PROBIT RESULTS

Notes: ^ - the omitted category is unconsumed tokens to charity. ^^ - a value of 0 indicates that participants reported a survival probability equal to the actual survival probability of a 65-year-old person living to that particular age. A negative value indicates that the reported probability was lower than the actual probability; vice versa for a positive value.

*Compared with the lump-sum default/immediate annuity alternative option, we can reject the null of equal means at the 10 percent level.

**Compared with the lump-sum default/immediate annuity alternative option, we can reject the null of equal means at the 5 percent level.

***Compared with the lump-sum default/immediate annuity alternative option, we can reject the null of equal means at the 1 percent level.

	Marginal Effect	Std Errors	p-values
Immediate annuity is default	0.275***	0.086	0.001
Longevity annuity is alternative	0.334***	0.082	0.000
Relatively high risk taker	0.185**	0.075	0.014
Relatively patient (low discounter)	0.140*	0.079	0.076
Total tokens	-0.001	0.002	0.664
Count of correct insurance questions	-0.028	0.053	0.596
Count of correct basic finance questions	-0.004	0.025	0.884
Unconsumed tokens to self	0.088	0.072	0.221
Married	0.025	0.073	0.773
Chose payments through Paypal	-0.062	0.074	0.406
N=223			

 Table A2

 Probit Results: Probability of Choosing the Annuity

Notes: ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level.

APPENDIX B. DETERMINING SURVIVAL OF PARTICIPANTS FROM ONE ROUND TO THE NEXT

Whether or not a participant survives from one round to another is entirely random. It is not and cannot be influenced by the sponsors of the experiment. To review what the instructions have already described, a participant has an 80 percent chance of surviving from round 1 to round 2; a 40 percent chance of surviving to round 3; and a 20 percent chance of surviving to round 4. What this means is that of every 10 participants who start the experiment, roughly 8 will survive to round 2, 4 to round 3, and 2 to round 4. This implies that, *having survived to round 2*, a participant has a 50 percent chance of surviving to round 3. *Having reached round 3*, he or she then has a 50 percent chance of making it to the final round.

The experiment determines who survives to a subsequent round and who does not by using the last two digits of the closing value of the S&P500 stock market index. This index of the market value of the country's largest corporation is used to generate random (unpredictable) numbers. As an example, on June 30, 2011, the S&P 500 closed at 1320.64, so the last two digits were 64. These numbers are effectively generated in an entirely random way. Each of the one hundred numbers between 00 and 99 are equally likely.

To determine who survives to round 2 and who does not, each participant is assigned a range of numbers that falls between 00 and 99 and has 80 numbers, like 00–39 and 60– 99. If the last two digits of the S&P 500 on the day the experiment specifies for determining survival to the second round fall in a participant's range, he or she survives to that round. For example, if the last two digits were either 15 or 66, he or she would survive. If the last two digits were 49, however, the experiment would end.

Exactly the same procedure is used to determine survival to rounds 3 and 4. However, because the probabilities or surviving to those rounds are smaller, the size of the range will be smaller. It will now contain 50 of the one hundred numbers between 00 and 99, and not 80.

APPENDIX C. INTERACTIVE CALCULATOR USED BY PARTICIPANTS TO DETERMINE ALLOCATION ACROSS FOUR ROUNDS

							GoToMeeting® Window:	Distrib	outionScreen
The	Choic	e Phase	e				-		
Dietri	bute voi	ur tokone s	across A na		ut nhaso	rounde			
Vour	Interact		tor will lo	iyu ski	ut pliase	Tounus.			
rour	interacti	ve Calcula	ator will loc	JK	ike uns:				
Your to	tal tokens	: 60							Dollar
F	Round 1: 20	Roun	d 2: 20	R	ound 3: 10	Round 4: 10	Tol	kens	Value
To see th	e payments r	esulting from a	particular distrib	utio	n, click Calcu	late		0	-\$6.00
Please ca	lculate as ma	any distributions	as you would li	ke.	,	Calculate		1	-\$6.00
When yo	u find the dis	stribution you m	ost prefer, click	Fina	alize below.			2	-\$6.00
		SUBVIVE			NOT	SUBVIVE		3	-\$6.00
		Participants	Payment for		Number	Donation		4	-\$6.00
	Round	Reaching	Tokens in		Not	to Charity for		5	\$5.34
		this Round	this Round		Surviving	Remaining Tokens		6	\$6.36
	1	All Participants	\$19.15					7	\$7.37
		Turticipunts			2 of every 10			8	\$8.36
F	Surviv	e to Round 2?	\rightarrow	No	who start	\$32.89		9	\$9.34
					Round 1			10	\$10.30
Vec	2	8 of every 10	\$19.15					10	\$11.25
103	-	Round 1	φ17.15					12	\$12.18
					4 of every 8			13	\$13.10
F	Surviv	e to Round 3?	\rightarrow	No	who reach	\$19.15		14	\$14.01
		A of avery 10			Round 2			16	\$15.78
Yes	3	who start	\$10.3					17	\$16.64
		Round 1	•					18	\$17.49
					2 of every 4	* 10.0		19	\$18.33
•	Surviv	e to Hound 4?	-	NO	who reach Round 3	\$10.3		20	\$19.15
		2 of every 10			Round 5			21	\$19.96
Yes	4	who start	\$10.3					22	\$20.75
		Round 1						23	\$21.53
						Finalize	Nort	24	\$22.30
							INEXT	25	\$23.06
								26	\$23.80
								27	\$24.53
								28	\$25.25
								29	\$25.95
								30	\$26.64
								31	\$27.32
								32	\$27.99
								33	\$28.64
								34	\$29.28
									529.91