HOW MUCH DO PEOPLE VALUE ANNUITIES AND THEIR ADDED FEATURES?

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Abstract

A longstanding puzzle in the economics of insurance, household finance, and public policy is why so few individuals annuitize their wealth. This paper describes results from a recent survey of people with investable assets over $100,000 that included a randomized control trial module eliciting individuals' valuations for a simple immediate annuity, as well as whether they are willing to pay more for annuities with survivor benefits or with a liquidity clause allowing them to withdraw the remaining premium. The major result suggests that half of those surveyed want to annuitize at prevailing market annuity prices, a much higher share than the 12 percent of this group who actually do buy annuities. In terms of annuity features, individuals are unwilling to pay more for a death benefit or a liquidity option, underscoring that it is not supposedly aversive features of annuities preventing more widespread adoption. Moreover, the analysis calibrates a lifecycle model using the *Health and Retirement Study*. With reasonable preference parameters, the model suggests that annuitization rates for individuals with investable assets over $100,000 should be even higher than 50 percent, further suggesting that the wedge between the 50 percent that want to annuitize and the 12 percent that do is not due to preferences or economic circumstances. The results find support for "channel factors" – difficulties associated with actually purchasing an annuity – as a major impediment to annuitization.

Introduction

A longstanding puzzle in the economics of insurance, household finance, and public policy is why so few individuals annuitize their wealth. Under general conditions, rational individuals should exchange a large share of accumulated assets for a guaranteed stream of lifetime income (Yaari 1965; Davidoff, Brown, and Diamond 2005). And yet, only a small fraction of individuals buy a commercial annuity. In the *Health and Retirement Study* (HRS) conducted by the University of Michigan, approximately 10 percent of older Americans receive income from an annuity at some point in their life, rising to just 12 percent among those with over $100,000 of investable assets.

Most explanations for this "annuity puzzle" are rooted in why individuals might not *want* to annuitize. For example, if individuals want to leave a bequest, they might prefer not to annuitize.[1] As a response to the low demand for annuities, insurance companies have designed products aimed at addressing supposedly aversive characteristics of annuities, such as the inability to bequeath benefits or the illiquidity of annuitized wealth. However, such features have not appreciably increased annuity demand.

In this paper, we describe results from a recent survey that included a randomized control trial (RCT) module. The survey covered individuals with over $100,000 of investable assets, and elicited their valuations for a simple immediate annuity, as well as their willingness to pay more for annuities with survivor benefits or with a liquidity clause allowing them to withdraw the remaining premium. The results suggest a very different explanation for the "annuity puzzle:" About half of people in this wealth group *do want* to annuitize at prevailing market annuity prices. Furthermore, respondents are not actually willing to pay more for a death benefit or a liquidity option, underscoring that it is not supposedly aversive features of annuities that are preventing more widespread adoption.

The analysis seeks to bridge three quantities: 1) the share of rational individuals who would annuitize; 2) the share of surveyed individuals who would annuitize; and 3) the share of individuals who actually annuitize. To reconcile these numbers, the analysis goes on to develop

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[1] Behavioral explanations also tend to focus on why people do not like annuities. For example, some individuals are pessimistic about their survival probabilities, reducing the perceived value of a life-contingent payout (O'Dea and Sturrock 2023; Arapakis and Wettstein 2023a).

a rich lifecycle model, which examines the extent to which annuity valuations are driven by preferences and economic circumstances. The lifecycle model captures multiple rational explanations for the annuity puzzle. With reasonable preference parameters, it predicts an annuitization rate of 95 percent, much higher than the 50 percent among households with over $100,000 of financial assets found in the survey, further suggesting that the wedge between the 50 percent that want to annuitize and the 12 percent that do is not due to preferences or economic circumstances.

Instead, the findings support "channel factors" as a major impediment to annuitization. In social psychology, channel factors refer to "apparently minor but actually important details of the situation" (Ross and Nisbett 1991). Such factors may prevent or facilitate the carrying out of intentions.[2] In the context of annuitization, the survey and model both suggest that the discrepancy between the roughly half of individuals surveyed who *want* to annuitize and the 12 percent who do so must be rooted in the difficulty of actually buying an annuity in the real world, outside of the experimental setting.

The rest of the article is organized as follows. The second section reviews the literature. The third section presents the RCT and its results. The fourth section briefly discusses the model. The fifth section discusses the data used for the model's calibration. The sixth section presents the results. The seventh section discusses the findings. The eighth section concludes that while major annuity puzzle explanations may rationalize why half of individuals do not *want* to buy annuities, the practical difficulty of buying an annuity is the most likely reason why the remaining half do not annuitize more often.

Explanations for Low Annuitization Rates

For decades, economists have sought to explain the gap between theory, which says that almost everyone should annuitize at least some wealth, and reality, in which only a small fraction of individuals buy an annuity voluntarily. A recent review of the literature highlighted eight major explanations for the annuity puzzle (Arapakis and Wettstein 2023b): bequest motives; late-life health and long-term care costs; adverse selection and loading costs; crowd-out by public

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[2] For example, having a firm and detailed plan of how to receive a tetanus vaccination is far more effective at inducing actual vaccination than just receiving information about its importance (Leventhal, Singer, and Jones 1965).

annuities; crowd-out by intra-family risk-sharing; present bias; survival pessimism; and investment framing. Without exception, these explanations suggest reasons why individuals might not *want* to annuitize as much as a simple theory would suggest.

Leading the "rational" explanations is bequest motives. If individuals strongly desire to leave as much of a legacy as possible, annuitization is a poor means of accomplishing that goal. The theoretical attractiveness of an annuity is that it guarantees a beneficiary will never outlive their money, based on mortality credits whereby beneficiaries who die subsidize those who survive. The economics literature has failed to find consensus on how strong the bequest motive is, but – to the extent it exists – it is a strong argument that some people will wish to limit their annuitization.[3]

Similarly, if individuals are concerned about large consumption shocks, they may wish to avoid annuitization.[4] Such shocks are particularly important when thinking of possibly exorbitant late-life health and long-term care costs. An annuity necessarily constrains liquidity, because an individual is limited to their annuity payout for expenses in any given time period, rather than having access to the full premium with which the annuity was purchased. As with bequest motives, individuals with strong concerns about late-life health expenses may not want to tie up much of their wealth in an annuity.

Both these explanations for limited annuity take-up have been recognized by insurers. Annuity providers have therefore developed products that attempt to mitigate these concerns to some extent. Thus, annuities with death benefits are common, and some annuities allow withdrawal of some or all of the remaining premium. Such variations dilute the value of the annuity as insurance (because the annuity price must reflect the additional risk that insurers face), but they have proven relatively popular.[5] Nevertheless, even with the availability of such products, the share of all Americans over age 50 who annuitize any of their assets hovers around 10 percent, according to the *Health and Retirement Study*.[6]

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[3] Some papers find evidence of bequest motives (Mariger 1987; Bernheim 1991a; Hong and Rios-Rull 2012; DeNardi 2015; Lockwood 2018; and Franklin 2022) while others do not (Hurd 1987; Hurd 1989; Hurd 2006; DeNardi, French, and Jones 2010; and Gan et al. 2015).
[4] See Hubbard and Judd (1987) and Laitner, Silverman, and Stolyarov (2018).
[5] For example, between half and three quarters of annuities sold in the United States have some death benefit either explicitly or in the form of a joint-and-survivor benefit (Ranade 2006; and Brown, Poterba, and Richardson 2023).
[6] Specifically, for those with under $100,000 of investable assets, 7 percent receive income from an annuity at some point in their life, with an average monthly income of approximately $200. For those with over $100,000 of investable assets, 12 percent receive income from an annuity at some point in their life, with an average monthly income of approximately $550.

High annuity costs are a bit different than the previous proposed solutions to the annuity puzzle in that they do not reflect a hypothesized consumer preference per se. Rather, this explanation pins the low annuitization rate on the fact that annuities are costly because of adverse selection or loading costs.[7]

Substituting annuities with public longevity insurance (predominantly Social Security)[8] and intra-family risk sharing[9] also boils down to individuals not wanting to buy further longevity protection. Finally, behavioral explanations like present bias, pessimism, and viewing annuities as a (poor) investment rather than insurance[10] are also arguments that individuals do not want to buy annuities. These latter are claims that real people, rather than theoretical rational agents, view annuities as undesirable due to mistakes that they make in thinking about such products.

The survey and model described below demonstrate that concerns about bequests and liquidity can play a role in explaining why about half of individuals do not annuitize. However, a wedge remains between the half of respondents with over $100,000 of investable assets who say they do want to annuitize and the 12 percent who actually do so. Furthermore, because half of the respondents say they want to annuitize at available market prices, the theory that annuity costs can narrow that wedge is also dismissed. That these respondents also have access to typical Social Security benefits and family structures helps rule out these explanations as possible bridges of this wedge. Since the survey is asking people's preferences, rather than inferring them assuming rationality, it also rules out behavioral explanations (e.g., present bias) as a way to reconcile the results of the survey with real-world outcomes.

Instead, an explanation for why so much less than half the population annuitizes must lie in the ways in which the choice to annuitize in the RCT differs from reality. Most obviously, the RCT just required respondents to answer some online questions conveniently presented to them. In reality, an individual who hypothetically wants to buy an annuity must know that such a product exists, find a provider they trust, choose among the many complex product options and riders, contact the insurer, and contract with them. Each of these steps might in turn require multiple smaller actions and bits of information; the failure of any of them could become an

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[7] See Mitchell et al. (1999); Finkelstein and Poterba (2004); Cutler, Finkelstein, and McGarry (2008); and Wettstein et al. (2021). In the annuity market, adverse selection refers to the fact that longer-lived people are more likely to buy annuities.

[8] Bernheim (1991b), Pashchenko (2013); and Hosseini (2015).

[9] Kotlikoff and Spivak (1981); and Kotlikoff, Shoven, and Spivak (1986).

[10] Brown et al. (2008).

insurmountable obstacle to annuitization *even for a person who wants to annuitize* in the abstract.

Channel Factors

In social psychology, these little situational characteristics are called "channel factors." Small details like figuring out the names of insurance companies selling annuities may seem to entail such low costs that they could not possibly affect behavior. However, such small impediments have been found by psychologists to have determinative impacts on what actions individuals take or do not take.

In a classic experiment (Leventhal, Singer, and Jones 1965), researchers randomly evoked two levels of fear regarding tetanus and provided two plans for getting a tetanus shot, one vaguer and the second more specific and concrete. The results were that generating more fear of tetanus was effective at producing the intention to be inoculated. However, only the group that had concrete plans for receiving the shot ended up getting vaccinated. The conclusion, replicated many times since, was that intentions are insufficient to produce action on their own, but rather require specific step-by-step plans (e.g., Gollwitzer 1999).

In the context of annuities, this finding implies that wanting to buy an annuity is meaningfully removed from actually buying one. The results of the RCT and model below are consistent with this social psychology intuition. The next section describes the RCT and how it eliminates the major non-channel factor explanations of the annuity puzzle for about half the population of potential annuity buyers.

Survey Results

The survey, conducted by Greenwald Research, questioned 1,216 retirement investors. The survey asked various questions relevant to retirement, including questions about demographics, subjective longevity, annuitization, housing, spending, and wealth. The participants were ages 55-95 and had at least $100,000 in savings, excluding real estate, defined benefit pension plans, or the value of any business. Table 1 shows the sample's descriptive statistics.

Table 1. *Summary Statistics*

Variable name	Mean	S.D.
Age	70.7	10.5
Male	0.5	0.5
Single/no partner	0.3	0.5
White	0.8	0.4
Black	0.1	0.2
Asian	0.04	0.2
Other race	0.06	0.2
High school or less	0.1	0.3
Some college or trade school	0.4	0.5
College (4-year degree)	0.2	0.4
Graduate or professional degree	0.2	0.4
Observations	1,216	

Source: Authors' calculations from the 2023 Greenwald Research survey.

The survey provides some direct evidence that many individuals generally like annuities (see Table 2).

Table 2. *Interest in Annuities, for Individuals with Over $100,000 in Investable Assets*

Response	How valuable is it to own a financial product that guarantees a certain amount of income for life, no matter how long you live?	How interested are you in owning an annuity that guarantees you a certain amount of regular income for the rest of your life?
Not at all	7.2%	18.6%
Not too	16.4	20.8
Somewhat	34.7	25.0
Very	24.2	12.9
Extremely	17.4	9.1
Already own	-	13.6
Observations	1,216	1,216

Source: Authors' calculations from the 2023 Greenwald Research survey.

While many respondents do not say they value annuities, many do – far more than the 12 percent of those with over $100,000 in investable assets who buy annuities in practice. Thus, 42 percent say that it is very or extremely valuable to them to own a financial product guaranteeing income for life (and another 35 percent say it is somewhat valuable). Furthermore, 60 percent

say they are at least somewhat interested in owning a product guaranteeing regular income for themselves and their spouse for the rest of their lives, or already own one – but only 14 percent fall in that latter group. These numbers do not change appreciably when considering only those already retired, or those with more than median wealth in the survey.[11] Moreover, when respondents were asked how much guaranteed lifetime income might benefit them on different dimensions, overwhelming majorities said that it would provide peace of mind, give long-term security, allow them to maintain their standard of living, protect them if they end up living a long time, and protect them from market declines (see Table 3).

Table 3. *Respondents' Opinions on the Benefits of Guaranteed Income Products, for Individuals with Over $100,000 in Investable Assets*

| | Financial products that provide guaranteed income: | | | |
	Provide peace of mind	Give more long-term security	Provide extra protection should you live a long time	Help protect against the risk of stock market decline
Disagree	8.6%	11.2%	6.6%	9.7%
Neither	20.6	28.1	17.3	24.3
Agree	70.8	60.7	76.2	66.0
Observations	1,216	1,216	1,216	1,216

Notes: Respondents were asked to what degree they agree or disagree with these statements on a scale from 1 (completely disagree) to 7 (agree completely). Here, responses 1-3 are categorized as "Disagree;" a response of 4 is categorized as "Neither;" and responses 5-7 are categorized as "Agree."
Source: Authors' calculations from Greenwald Research survey.

However, the survey also hints at what might prevent annuitization. In particular, more than a third of respondents say they are not familiar with annuities providing guaranteed lifetime income (see Table 4). Almost 40 percent are only somewhat familiar, and this finding likely represents an overestimate if respondents do not like to admit ignorance.

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[11] Respondents were asked to approximate the value of their household's assets, excluding home equity, pension wealth and the value of any business. Respondents had a median wealth category of between $500,000 and $749,000.

Table 4. *Respondents' Familiarity with Annuities, for Individuals with Over $100,000 in Investable Assets*

	How familiar are you with annuities that provide monthly income that is guaranteed for life?
Not at all familiar	12.9%
Not too familiar	22.3
Somewhat familiar	38.8
Very familiar	18.9
Extremely familiar	7.1
Observations	1,216

Source: Authors' calculations from the 2023 Greenwald Research survey.

Direct questions about annuities in the abstract cannot easily unpack why those who do not value annuities feel that way. In particular, respondents may think annuities are good but not worth their cost, one of the main explanations of the annuity puzzle. Or, they may like the idea of an annuity but feel their benefits are outweighed by their costs in terms of foregone bequests or liquidity. To explore these issues in greater depth, the survey also included an RCT, to which we turn next.

Randomized Control Trial

The RCT module was designed to determine how people value annuities and the extent to which bequest motives or liquidity concerns affect these valuations. Participants were split randomly into three groups for this exercise. Each group was presented with a different variation of a Single Premium Immediate Annuity (SPIA): a basic version (the control group); a version with a death benefit (Treatment Group 1); and a version with an added liquidity clause (Treatment Group 2). In all three groups, the survey elicited the annuity's minimum annual payment, such that an individual would be indifferent between paying a premium of $100,000 out of their savings or keeping their $100,000. Specifically, the participants were first asked:

Imagine that you face the following two options regarding $100,000 of your savings:

*1) You can keep the **$100,000** of savings as is and use it however you like.*

*2) You can buy a financial product that pays **$Y** per year for as long as you live.*

Further, if you die with less than $100,000 paid out, your heirs will receive the remaining balance. (Treatment Group 1 only)

Further, if less than $100,000 has been paid out, you will be able to withdraw the remaining balance whenever you want, with suspension of future payments. (Treatment Group 2 only)

Which option do you prefer?

For this question, $Y was an annual payment based on the participant's age. Individuals were led through a series of unfolding brackets until they eventually provided a value of an annual payment, which would make them indifferent between buying the financial product and keeping their $100,000 to use however they like.[12]

The results indicate that approximately 50 percent of the participants in all three groups would be willing to buy a SPIA at the market prices prevailing when the survey was conducted. Figures 1 and 2 show the gender- and age-specific share of respondents who say they would buy an annuity at the prevailing market annuity rate appropriate to their gender and age.[13]

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[12] Based on each participant's initial answer, the annual payment was either increased or decreased sequentially. For example, if someone preferred $100,000 over $Y, he was asked to choose between $100,000 and $1.5Y, and if he still preferred $100,000, he was asked to choose between $100,000 and $2Y. If someone preferred $Y over $100,000, he was asked to choose between $100,000 and $0.5Y, and if he preferred $0.5Y, he was asked to choose between $100,000 and $0.25Y. The questions would stop if the participant's valuation was bounded above and below. In the end, the participant had to use a scroll bar to select an exact value for $Y between the upper and lower valuation bounds, which made them indifferent between keeping their money or selecting the annual payment. Participants who preferred $100,000 over $2Y had to choose a value between $2Y and $6Y, and participants who preferred $0.25Y over $100,000 had to choose a value between $0 and $0.25Y.

[13] The figures pool respondents from all three groups, but the pattern of responses is similar across the groups. For accuracy, separating valuations by gender and age is important because those are the two characteristics priced by annuity providers. Thus, men and women, and individuals of different ages, face different prices for market annuities and have different expectations of remaining life years.

Figure 1. *Share of Respondents Who Report a Minimum Annual Payment to Buy an Annuity Below the Available Market Rate for a $100,000 Premium Annuity, for Men with Investable Assets of Over $100,000, by Age*
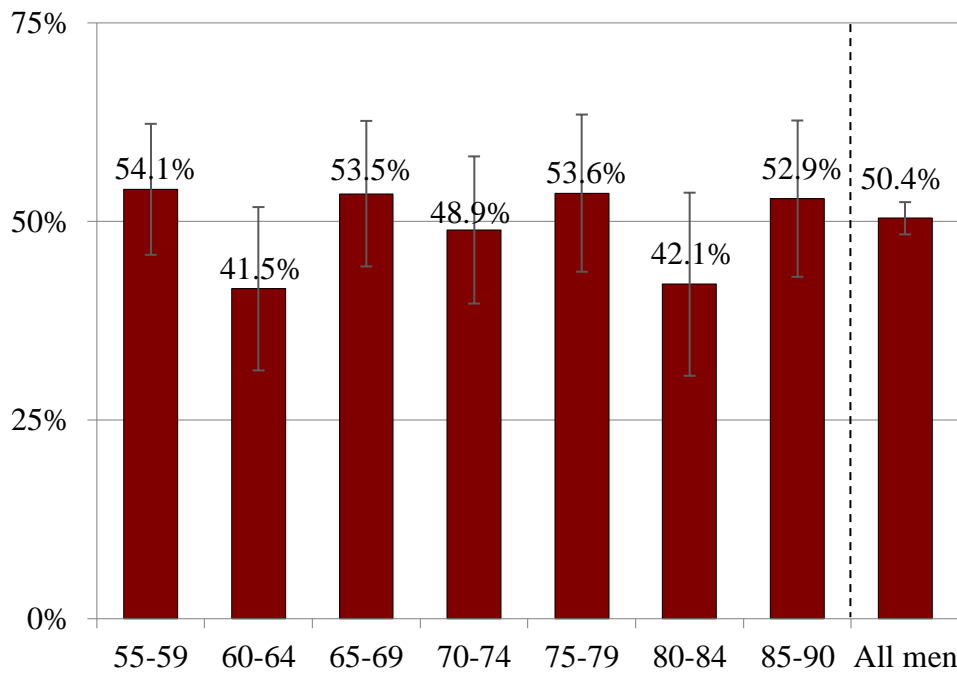
Note: The whiskers represent 95-percent confidence intervals.
Sources: Authors' calculation from the 2023 Greenwald Research survey and market annuity payouts in June 2023 from immediateannuities.com.

Figure 2. *Share of Respondents Who Report a Minimum Annual Payment to Buy an Annuity Below the Available Market Rate for a $100,000 Premium Annuity, for Women with Investable Assets of Over $100,000, by Age*
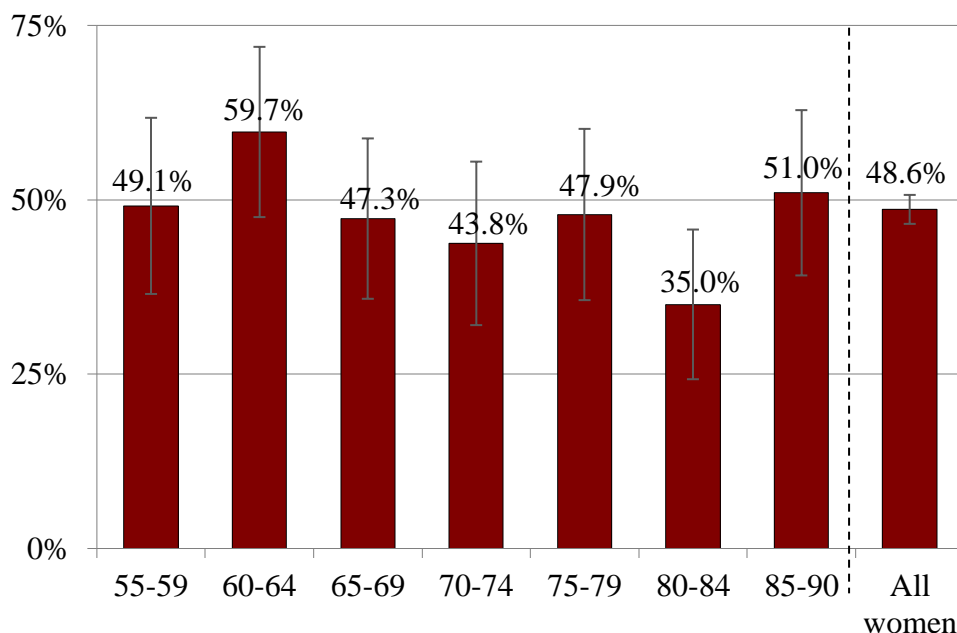
Note: The whiskers represent 95-percent confidence intervals.
Sources: Authors' calculation from the 2023 Greenwald Research survey and market annuity payouts in June 2023 from immediateannuities.com.

Difference in Valuation for Different Annuity Types

Analysis of the demand for annuities with different characteristics can also show how much individuals value a product with survivor benefits or liquidity clauses. Each group's annuity has a different money's worth because of its added features. According to the market prices for age 55 annuitants on Immediateannuities.com, the annuity with survivor's benefits is worth approximately 8 percent more than the basic SPIA, while values for the annuity with liquidity clauses span a range, depending on when the liquidity clause is activated.[14,15] Table 5 shows the money's worth for each type of annuity.

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[14] The money's worth of the basic SPIA is consistent with estimates in prior literature, such as Mitchell et al. (1999) and Wettstein et al. (2021).

[15] The money's worth of the annuity with the liquidity clause is bounded, depending on when and if that clause is activated. The lowest money's worth is obtained by activating the clause just before exhaustion of the premium; the highest is obtained when the clause is activated immediately, yielding an immediate refund of the full premium.

Table 5. *Age 55 Money's Worth for Each Type of Annuity*

Annuity type	Money's worth
Basic SPIA	$86,000
With survivor benefits	93,047
With liquidity clauses	[65,000 - 100,000]

Note: These numbers use the mortality probabilities of the full population, not restricted to having assets over $100,000.
Sources: Authors' calculations and annuity rate data from immediateannuities.com.

Although participants in Treatment Groups 1 and 2 are offered products with objectively greater value, they are not willing to pay for these added benefits. To buy an annuity, individuals in the Control Group require on average that the SPIA will pay them $16,452 annually. The difference in the annual payment requirement to buy a SPIA in Treatment Groups 1 and 2 is not statistically significant.[16] Table 6 shows the regression results.

Table 6. *Differences in Required Annual Annuity Payment for a $100,000 Premium, for Individuals with Investable Assets Over $100,000, by Annuity Type*

Variable	Coefficient	Robust S.E.	P > |t|
Treatment Group 1	-307	12758	0.810
Treatment Group 2	221	1251	0.860
Constant	16,452***	858	0.000

Source: Authors' calculations from the 2023 Greenwald Research survey.

The fact that respondents do not value the annuities with the survivor benefits or the liquidity clause could be either because they do not understand these products or because of their preferences (e.g., they do not have a strong enough bequest motive). To quantify the difference between the RCT and the actual U.S. annuitization rate of roughly 12 percent for people with investable assets of over $100,000, and to better understand why individuals do not value these

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[16] The results are robust to dropping outliers or including controls, such as age and gender. See Appendix Table A1. Although the constant might appear much higher than current market prices for an annuity at age 65 would indicate, this value is driven by the older population, who require a high annual payment due to their lower life expectancy, and to a smaller extent by outliers.

products, we construct a lifecycle model that will allow us to disentangle preferences, financial motives, and non-rational factors.

The Model

This section presents the main structure of the model. A detailed description is in Appendix 1.

The model considers male[17] household heads who seek to maximize their expected discounted lifetime utility at age $t = 62, ..., 105$ by deciding their consumption, savings, labor supply, how much to annuitize, and when to claim Social Security benefits, where later claiming is a form of annuitization (see, for example, Munnell, Wettstein, and Hou 2022). While they choose consumption, savings, and labor supply every period, they can claim OASI benefits between the ages of 62 and 70 and decide how much to annuitize only once, at age 65.

The timing of the model is as follows. At the beginning of each period, health, productivity, and medical spending shocks occur. Then, household heads make decisions, receive their income, and means-tested transfers take place.[18] Finally, mortality shocks are realized, and surviving household heads move on to the next period.

Household heads can be single or married to a spouse who is two years younger. If their spouse dies first, the household head keeps the household's wealth, which is an implicit risk-sharing contract that may substitute annuitization by pooling the risk of death (Kotlikoff and Spivak 1981). Nevertheless, heads are liable for their spouse's medical expenses while she is alive, and they must cover the expenses associated with her death if she dies first.

When the household head dies, his remaining wealth is bequeathed to his spouse or heirs. The model's timing, which is similar to De Nardi et al. (2021), implies that medical costs associated with his death are collected before any bequests are made.

Data

The parameters of the model are mostly calibrated using the HRS, a representative biennial survey of the U.S. population ages 51 and older, and their spouses, conducted by the

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[17] The focus on male heads reflects that most financial decision makers in two-gender households are men. Considering only men is a simplification and women-headed households can be incorporated in future work.
[18] To mimic the rules of SSI, SNAP, and Medicaid, means-tested transfers are modeled as a minimum consumption floor.

University of Michigan. Although drawn from the non-institutionalized population when first interviewed, these individuals are tracked and re-interviewed as they enter nursing homes and other institutions. Also, the HRS collects data on all out-of-pocket medical expenses, including private insurance premiums and nursing home care.

The HRS conducts interviews every other year. Households are followed until both members die; attrition for other reasons is low. When the respondent for a household dies, in the next wave, an "exit" interview with a knowledgeable party – usually another family member – is conducted. This procedure allows the HRS to collect data on end-of-life medical conditions and spending.

To keep the data consistent with the model, which only allows the household's composition to change because of death, the analysis drops a number of households: households who are "partnered" (but not married), divorce, get married, or whose partner reports conflicting marital status.

In terms of health status, the analysis assigns individuals to the nursing home state if they were in a nursing home at least 120 days since the last interview or if they spent at least 60 days in a nursing home before the next scheduled interview and died before that scheduled interview. Further, it assigns the remaining individuals a health status of "good" if their self-reported health is excellent, very good, or good and a health status of "bad" if their self-reported health is fair or poor.

Results

In the model, health and survival are individual-level variables. Table 7 shows the life expectancy for the household heads and their spouses. When calculating life expectancies, the analysis conditions on the health state of the household head. Further, it assumes that the wife is two years younger. She can be in any health state, with the frequencies observed in the data. This way, the analysis can shed light on the probability that the household head will outlive his wife, which is a substitute for annuitization.

The analysis finds that while, at age 65, men have a life expectancy of approximately 16.7 years, the number varies with health status. Specifically, those in good health will live approximately 17.4 more years, those in bad health will live for 14.7 years, and those in nursing homes will survive for approximately 4 more years.

Table 7. *Life Expectancies of Married Men, Their Spouse and Unmarried Men at Age 65*

Health status	Male life expectancy at age 65	Female life expectancy at age 63	Probability man outlives spouse at age 65
Single men			
All	16.7		
Good	17.4		
Bad	14.7		
Nurs. home	3.9		
Married men			
All	16.7	22.7	29.6%
Good	17.4	22.7	31.0
Bad	14.6	22.70	25.3
Nurs. home	3.9	22.7	4.5

Source: Authors calculations based on the *Health and Retirement Study* 1992-2018.

The model produces a reasonable fit of the data.[19] Figure 3 shows the model's fit for assets, hours of work, participation rates, and Social Security claiming ages.

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[19] The demographic model suggests that the chances of a man outliving his spouse are 30 percent. Further, it suggests that there is almost no correlation between the wife's life expectancy and the man's health at age 65.

Figure 3. *Model's Fit of the Data*
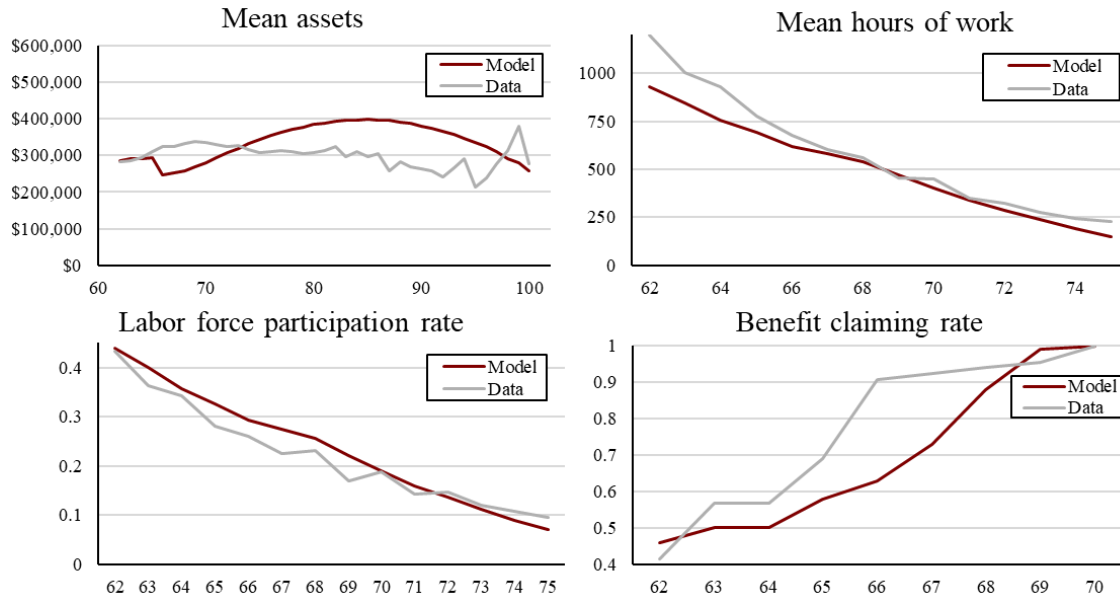
Source: Authors' calculations.

Preferences, Financial Motives, or Irrational Factors

Because wealth is endogenous to the model, the calibration is done for the full population. However, the annuitization results that follow are based on an analysis of only individuals with over $100,000 of investable financial assets at age 65. This restriction is intended to make the population analyzed in the model comparable to the population surveyed for the RCT.

The model suggests that approximately 95 percent of those with over $100,000 in assets at age 65 buy an annuity. To understand whether the RCT's between-group differences are driven by preferences or non-rational factors, the analysis simulates the model after adding the survivor benefit to the SPIA. Once again, and similar to the RCT, the percentage of simulated individuals that buy the annuity with survivor benefits remains the same. In other words, the model suggests that individuals' unwillingness to pay more for annuities with a death benefit or liquidity features is driven by preferences and economic circumstances, rather than irrational factors.

This result might appear counterintuitive at first: rational individuals with a bequest motive do not meaningfully value an annuity with a higher money's worth more ($86,000 for the basic SPIA and $93,047 for the SPIA with survivor benefits). However, the model suggests that

the bequest motive, which is calibrated from the literature, is not strong enough to influence the across-group annuitization rates. Specifically, the money's worth of the SPIA with survivor benefits can be decomposed into the amount that will be paid to the individual, $86,000, and the amount that his spouse or heirs will inherit after he dies, $7,047. Hence, the model suggests that individuals considerably down-weight the $7,047, to the point where it has a very small impact on their behavior.

Once the analysis considers stronger bequest motives, such that a higher fraction of individuals are willing to buy the SPIA with survivors' benefits than the basic SPIA, then the model produces savings profiles that are significantly higher than those observed in the data. This result is similar to that in Hurd (1987 and 1989), showing that observed dissaving rates are not consistent with strong bequest motives.

Discussion

The analysis here seeks to explain the gap between three numbers in the population with over $100,000 in investable assets: 1) the 12 percent of individuals that buy an annuity; 2) the 50 percent of the survey participants who report that they want to buy an annuity at prevailing market rates; and 3) the 95 percent of rational individuals who would annuitize according to our lifecycle model that accounts for most major theorized reasons for not wanting an annuity.

The model predicts that 95 percent of rational individuals should annuitize to some extent. This result shows that rational reasons to avoid annuities cannot explain why only 50 percent of survey respondents say they want annuities. The difference between 95 percent and 50 percent is therefore attributable to unaccounted *rational* or *irrational* reasons.

Furthermore, both the model and the RCT find that the supposedly aversive quality of annuities, the fact that they cannot be bequeathed, is not a substantial hurdle to annuitization by the half of the population willing to annuitize at all.[20] To the extent these considerations matter, they may be more important for those who do not want to annuitize regardless.

Importantly, neither the unaccounted rational nor irrational explanations for low willingness to pay for annuities can explain the gap between the 50 percent of survey respondents who want annuities at market rates and the 12 percent who buy them at those rates.

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[20] The RCT suggests that the lack of liquidity in annuities is similarly not a major factor in reducing annuitization rates.

The explanation for this wedge must therefore lie in some element not captured by the survey or the model.

What is left is that the survey did not require respondents to go through all the real-world steps necessary to buy an annuity. Such impediments to annuitization include acquiring appropriate financial literacy (e.g., knowing that annuity products exist, who sells them, how those providers can be approached, how to choose among their menu of products) or other channel factors (actually calling an insurer, selecting an annuity, and signing a contract). The social psychology literature suggests that such channel factors could be crucial in translating the intent to buy an annuity into action. Future work can delve deeper into how annuity providers and policymakers can facilitate the purchase of annuities for those who want them – the lowest-hanging fruit for increasing annuitization rates generally.[21]

Conclusion

This paper describes results from a recent survey which included an RCT module eliciting individuals' valuations for a simple immediate annuity, as well as whether they are willing to pay more for annuities with survivor benefits or with a liquidity clause allowing them to withdraw the remaining balance of the premium. The findings suggest that half of people with investable assets of over $100,000 want to annuitize at prevailing market annuity prices, but that they are unwilling to pay more for a death benefit or a liquidity option. Next, this paper introduces a rich lifecycle model that captures the key variables that affect annuitization. The model produces a reasonable fit of the data. Further, the model shows that low willingness to pay for a death benefit can be rationalized by a calibrated lifecycle model.

The findings suggest that approximately 50 percent of the population with investable assets of over $100,000 does not buy an annuity for rational or irrational reasons involving not wanting an annuity, such as bequest motives or economic circumstances. The remaining 38 percent (50 percent minus the 12 percent that actually buy an annuity) state that they do want to buy an annuity, but do not actually buy one in practice. This could be due to various reasons not captured by the lifecycle model, which include channel factors or financial literacy. Future work

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[21] For example, whether it would be desirable or effective to embed annuities as default options in retirement plans.

can further disentangle the various small hurdles to annuitization which combine to prevent almost half the population studied here, who want annuities, from actually benefitting from them.

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Appendix: The Model

Preferences

Household heads have inter-temporally separable preferences, and they discount the future using a subjective factor β. Their within-period utility function is of the form

$$u(c_t, l_t) = \frac{(c_t^{\gamma} l_t^{1-\gamma})^{1-\nu}}{1-\nu} \tag{1}$$

where c_t is consumption, l_t is leisure, γ is consumption's utility weight relative to leisure, and ν is the coefficient of relative risk aversion. Leisure is defined as $l_t = L - h_t - \theta_{h,t}$, where L is the total time endowment, $h_t \in \{\text{Not employed, Full} - \text{time hours}\}$ is a discrete hours of work choice, and $\theta_{h,t}$ is the disutility from working.

Household heads value leaving bequests according to a bequest utility function of the form:

$$u^b(e_t) = \theta_1 \frac{(e_t + \theta_2)^{(1-\nu)\gamma}}{1-\nu} \tag{2}$$

where e_t denotes the estate, θ_1 determines the intensity of the bequest motive and θ_2 determines the bequest utility function's curvature. We select this form for two reasons. First, it generates lifecycle savings profiles consistent with the data (De Nardi 2004) and implies that bequests are a luxury good, which is important when modelling annuitization decisions (Lockwood 2018). Second, it supports several interpretations of a bequest motive, including dynastic altruism, strategic motives, and utility from holding wealth (De Nardi et al. 2021).

Health and Survival Uncertainty

Health and survival are modeled as individual-level variables. The household head's health status is denoted as $hs_t^m \in \{\text{good, bad, nursing home}\}$ and his spouse's health status is $hs_t^f \in \{\text{good, bad, nursing home, dead/no spouse}\}$. The conditional probability of transitioning from health status hs_t^m to hs_{t+1}^m is denoted as $\pi_{\{t\}}\left(hs_{\{t+1\}}^{\{m\}} \middle| hs_{\{t\}}^{\{m\}}, , t\right)$, and it depends on current health status and age. [22] The household head's survival depends on the same variables as his health. We denote the probability that a household head alive in period t survives to period t+1 by $s_t(hs_{\{t\}}^{\{m\}}, t)$.

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[22] A similar notation is used for the female's health status, which depends on the same variables.

Medical Spending

Medical expenses are modeled as an exogenous household-level variable, denoted z_t. They depend on both spouses' current and lagged health status, current and lagged marital status, age, and an idiosyncratic component. By including current and lagged health and marital status, medical expenses being correlated with medical risk (Reichling and Smetters 2015) and the increase in medical expenses that occurs when a household member dies (Arapakis et al. 2021), are both accounted for, among other things. The medical expense process is defined as

$$\ln(z_t) = Z(hs_t^m, hs_{t-1}^m, hs_t^s, hs_{t-1}^s, f_t, f_{t-1}, t) + u_t \tag{3}$$

where u_t is a persistent shock following a first-order Markov process (η_t).

Labor Earnings

Each household's gross labor earnings are denoted as $y^h = e_t h_t$, where e_t is the household's productivity. Productivity is defined as

$$\log(e_t) = \phi(h_t, t) + \eta_t \tag{5}$$

where $\phi(h_t, t)$ is mean log-productivity conditional on age and hours of work, and η_t is idiosyncratic productivity evolving according to a first-order autoregressive process.

Budget Constraints

The household's budget constraint is modeled using four equations. The first three are the cash-on-hand equation, the cash-on-hand evolution equation, and the liquidity constraint:

$$m_t + y_t^h - p_t^{ann} = a_{t+1} + c_t$$
$$m_{t+1} = (1+r)a_{t+1} + y_{t+1}^{SS} + y_{t+1}^{ann} - z_{t+1} \tag{6}$$
$$a_{t+1} \geq 0$$

Where m_t is cash-on-hand, p_t^{ann} is the premium paid for an annuity, y^h is labor earnings, a_{t+1} is savings, r is the interest rate, y_t^{SS} is Social Security benefits, and y_t^{ann} is annuity income.

The fourth equation is the means-tested transfers equation. To approximate the rules of the U.S. government's means-tested income programs, such as Medicaid, SSI, and SNAP, these programs are modeled jointly such that these means-tested transfers cover the spending gap between a minimum consumption floor and the household's resources. Following De Nardi et al. (2010), these transfers are assumed to only be available for liquidity constrained households ($a_{t+1} = 0$), and we define them as:

$$y_t^{\text{Means-tested}} = \max\{0, C^{\min}(f_t) - m_t - y_t^h\} \mathbb{I}_{a'=0} \qquad (7)$$

This approach is chosen for two reasons. First, the minimum consumption floor mimics the Medicaid spend-down rules, where an individual who may have high income or assets can deplete them and qualify for means-tested transfers that year. Second, it also mimics U.S. default laws, where individuals who default, for example due to high out-of-pocket expenses, are eligible for transfers that year and will still receive their annual income or Social Security benefits in the future, as private creditors cannot garnish them.

Recursive Formulation

The household's state space is denoted as $\omega = \left(m_t, hs_t^m, hs_t^f, \eta_t, e_t, AIME_t, S_t, an_t, t\right) \in \Omega$, where $AIME_t$ is Average Indexed Monthly Earnings, S_t is Social Security claiming status, and an_t is annuitized wealth. The value and policy functions are obtained by solving

$$V(\omega_t) = \max_{G_t} \left\{ \begin{array}{l} u(c_t, l_t) + s_t \left(hs_{\{t\}}^{\{m\}}, t\right) \beta \mathbb{E}[V(\omega_{t+1})] \\ + (1 - s_t(hs_{\{t\}}^{\{m\}}, t)) \mathbb{E}[u^b(m_{t+1})] \end{array} \right\}$$

subject to equations (1) – (7). $G_t = \{c_t, a_{t+1}, l_t, s_t, b_t\}$ is the household's choice vector, where b_t is the annuity purchase choice for a price of $p_t^{ann} = \$100,000$.

Calibration

Earnings

The analysis assumes that $\phi(h, t) = \alpha^h \ln(h) + \sum_{s=0}^{3} \phi_s t^s$ where a^h is the part-time wage penalty. $\{\phi_s\}_{s=0}^{3}$ are the age polynomial's coefficients. The fixed cost of work is set to 0.415 following Aaronson and French (2004), who estimate that a 50-percent reduction in annual work hours leads to a 25-percent reduction in the offered hourly wage. $\{\phi_s\}_{s=0}^{3}$ are estimated from the *Panel Study of Income Dynamics* using the fixed-effects regression:

$$\log(w_{i,j}) - \alpha^h \ln(h_{i,j}) = \phi_0 + \phi_1 t_{i,j} + \phi_2 t_{i,j}^2 + \phi_3 t_{i,j}^3 + \eta_{i,j}, \qquad \eta_{i,j} = f_i + u_{i,j}$$

where $w_{i,j}$ is the hourly wage rate in year j, $h_{i,j}$ is annual hours of work, f_i is the individual fixed-effect, and $u_{i,j}$ is the regression residual. The estimates for $(\rho, \sigma_{\{\eta\}}^{\{2\}})$, which determine idiosyncratic productivity's AR(1) process are $\hat{\rho} = 0.981$ and $\widehat{\sigma_\eta^2} = 0.014$. $\hat{\rho}$ is the persistence of the AR(1) process, and $\widehat{\sigma_\eta^2}$ is the variance of the innovation.

Medical Spending

The medical spending process is estimated using the HRS out-of-pocket spending. Specifically, OLS that controls for age, both spouses' current and lagged health status, and marital status is used. Next, we scale the mean and the variable of medical spending to capture that the amount that the individuals are liable for is out-of-pocket, plus Medicaid, plus the amount that they default.

Health and Survival

Health and mortality transition probabilities are estimated by fitting an annual logit model to the HRS data, which are biennial.

Social Security

A household head's OASI benefits depend on his Primary Insurance Amount (PIA) and the age at which he claims benefits.

$$AIME_{t+1} = AIME_t + \frac{1}{35} max\{0, min\{y_t^h, ss^{cap}\} - AIME_t\}.$$

We convert AIME into the Primary Insurance Amount (PIA) using the formula

$$PIA = \begin{cases} \$0.9 \; AIME, \; if \; AIME \leq \$9,132 \\ \$8,218.8 + \$0.32 \, (AIME - 9,132), if \; AIME > \$9,132 \quad and \; AIME \leq \$55,032 \\ \$24,283.8 + \$0.15 \, (AIME - 55,032), if \; AIME > \$55,032. \end{cases}$$

Household heads face Social Security's 2023 rules for individuals born after January 1, 1960. They can claim Social Security benefits between ages 62 and 70. The Full Retirement Age is 67. The delayed claiming credit is 8 percent per year (ages 68-70). The early claiming penalty is either $6\frac{2}{3}$ percent per year (ages 64-66) or 5 percent per year (ages 62-63).

To make our model's solution computationally feasible, we impose four simplifying assumptions. First, we assume that at age 62 everyone has worked for 35 years. Second, our updating function replaces an average, rather than the lowest indexed earning year. Third, we abstract from spousal or survivor's benefits. Fourth, to capture the effect of either early or delayed claiming, we adjust AIME instead of the PIA. The first assumption can lead to a benefit overestimation. The second and third assumptions can lead to a benefit underestimation, and the fourth assumption can lead to either a benefit underestimation or overestimation, depending on the claiming age.

Annuities

We assume that individuals can buy a SPIA at age 65, by paying a premium of $100,000. The annuity will pay the individual $7,740 per year for life. This premium corresponds to the average price of a SPIA for a 65-year-old man on July 2023 at immediateannuities.com.

Preferences

We calibrate the model's preferences following the literature. We assume that the time preference is 0.98, the risk aversion coefficient is 7, the weight of consumption in utility is 0.5, the bequest intensity coefficient is 0.072, and the bequest curvature coefficient is $530,000.

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